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COMMISSION DECISION
ON THE
OCCIDENTAL GEOTHERMAL INC.

APPLICATION
for
CERTIFICATION
of the
OXY GEOTHERMAL PLANT NO. 1

Calistoga Geothermal Plant No. 1

81-AFC-1

JANUARY 1982

CALIFORNIA ENERGY COMMISSION

P800-82-002

STATE OF CALIFORNIA
ENERGY RESOURCES CONSERVATION
AND DEVELOPMENT COMMISSION

In the Matter of: Application for Certification by OCCIDENTAL GEOTHERMAL INC., for its OXY Geothermal Plant No. 1 Project	Docket No. 81-AFC-1 DECISION

After consideration of the evidence of record, including the comments received at the public hearing before the full Commission on February 1, 1982, the Commission finds as follows:

1. The OXY #1 Geothermal Project conforms with the Commission's most recently adopted forecast of statewide and service area electric power demands.

2. The OXY #1 Geothermal Project can be constructed to operate in conformance with all applicable local, regional, state and federal standards, ordinances, and laws.

3. The OXY #1 Geothermal Project can be constructed and operated without causing any substantial, reasonably unmitigable adverse environmental impacts.

4. The OXY #1 Geothermal Project can be constructed and operated without causing any substantial adverse impacts to the public health and safety.

5. The OXY #1 Geothermal Project can be constructed and operated in a reasonably safe and reliable manner.

6. The Final Environmental Impact Report (FEIR) has been prepared in accordance with the provisions of the California Environmental Quality Act and all applicable State and Commission guidelines and regulations. The FEIR has been fully considered in adopting this Decision.

The specific provisions relating to the manner in which the OXY #1 Geothermal Project is to be designed, sited and operated in order to protect environmental quality and assure public health and safety are contained in the findings, conclusions and conditions of the Proposed Committee Decision. This document is adopted by the Commission and incorporated by reference herein.

The Application for Certification for the OXY #1 Geothermal Project is hereby GRANTED, provided that the project is designed, sited and operated in conformity with the findings conclusions and conditions adopted and incorporated into this Decision.

The Commission ORDERS the Executive Director to transmit a copy of this Decision and appropriate accompanying documents to all persons and agencies as specified under section 25537 of the Public Resources Code and 20 Cal. Admin. Code section 1768.

This Decision shall be final following signature by voting members of the Commission and filing with the Commission Secretariat.

BY ORDER OF THE COMMISSION:

Dated: February 1, 1982

RUSSELL L. SCHWEICKART
Chairman and
Presiding Committee Member

ARTURO GANDARA
Commissioner and
Committee Member

Absent
JAMES A. WALKER
Commissioner

EMILIO E. VARANINI, III
Commissioner

KAREN K. EDSON
Commissioner

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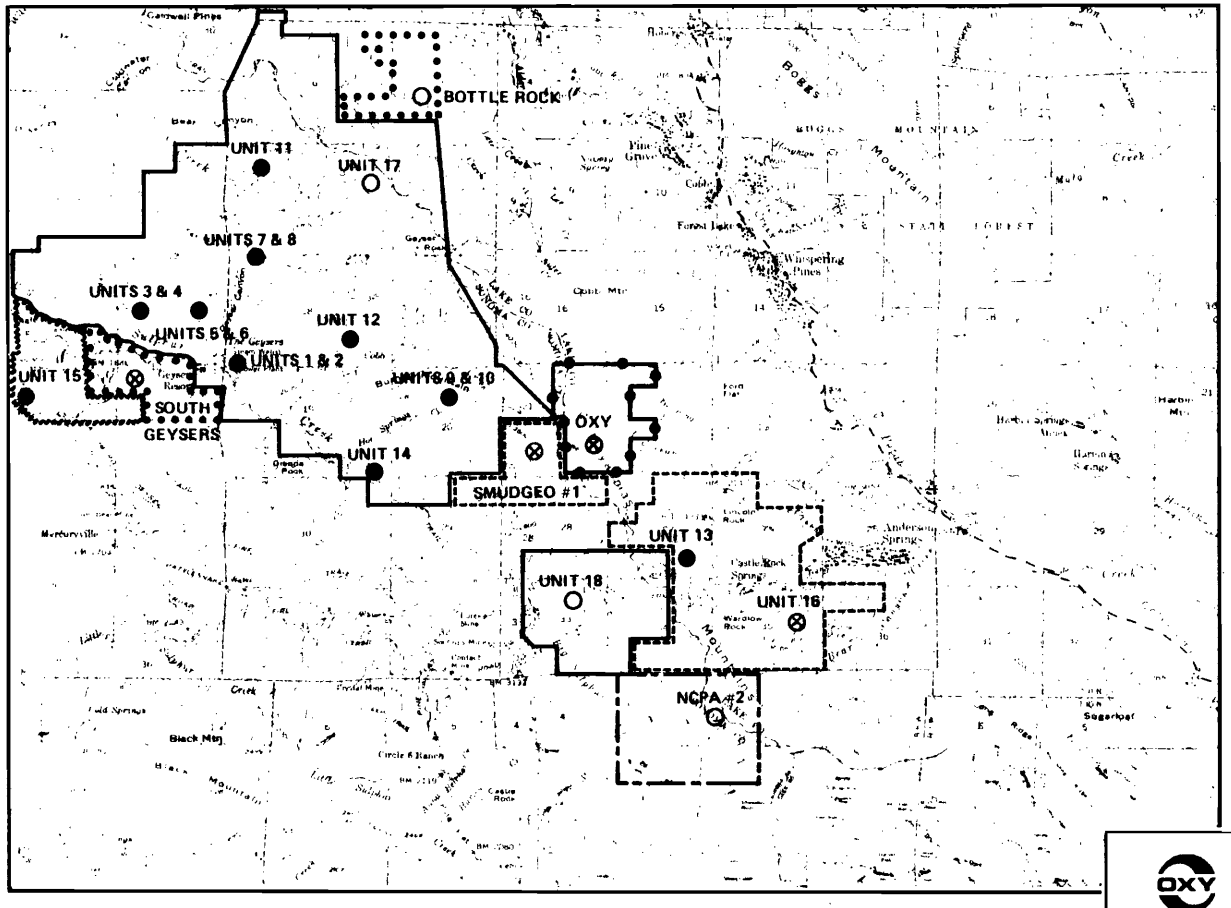
INTRODUCTION

On January 29, 1981, Occidental Geothermal, Inc. (Applicant), filed an Application for Certification (AFC) of its 80 megawatt (MW) OXY No. 1 Geothermal Power Plant. The project will be located primarily in Lake County, California, and partially in the County of Sonoma (see Figure 1.1-2 & 1.1-3 for a map of the region in which the proposed plant will be located). A 4,700 foot long 230 kV tapline to the SMUDGEO No. 1 plant in Sonoma County will transmit the electricity. Operation is scheduled for June 1984. Applicant is supplying its own steam. The leasehold consists of approximately 550 acres. Major structures are the turbine building, cooling towers, hydrogen sulfide (H_2S) abatement, and the service building.

The Proposed Decision recommends findings, conclusions, and conditions on the AFC. Part One contains the procedural history of the case. In Part Two, the Committee reviews the evidence presented during the proceeding and explains what conditions to certification are being recommended to ensure compliance with existing law or standards and to mitigate significant environmental impacts.

OCCIDENTAL SITE
SANTA ROSA
MOUNT ST HELENA
SOURCE: USGS SANTA ROSA AND UKIAH 1:250,000 MAPS
N
SCALE 1:250,000
5 0 5 10 MILES
5 0 5 10 KILOMETER
APPLICATION FOR CERTIFICATION
OXY
FIGURE 1.1-2
THE GEYSERS - CALISTOGA
KGRA



LEGEND

- EXISTING UNITS
- UNITS UNDER CONSTRUCTION
- PROPOSED UNITS
- UNION LEASEHOLDS
- McCULLOCH - GKI LEASEHOLDS
- SHELL LEASEHOLD
- AMINOIL LEASEHOLDS
- OCCIDENTAL LEASEHOLD
- THERMOGENICS LEASEHOLD

SCALE 1:62500

3000 0 3000 6000 9000 12000 FEET

1 .5 0 1 2 3 4 KILOMETERS

N

SOURCE: USGS KELSEYVILLE, HEALDSBURG, MOUNT ST. HELENA, AND LOWER LAKE QUADRANGLES

OXY

APPLICATION FOR CERTIFICATION

FIGURE 1.1-3

THE GEYSERS DEVELOPMENT AREA

PART ONE

PART ONE

I. PROCEDURAL HISTORY

On January 29, 1981, Applicant filed its AFC pursuant to the expedited 12-month procedure described in Public Resources Code (PRC) section 25540.2(a). CEC staff presented the AFC for acceptance by the Commission at the February 25, 1981, Business Meeting. Following discussion about the AFC's data adequacy, the Commission accepted the filing (establishing the January 29, 1981 filing date as the beginning of the 12-month certification period) with the understanding that Applicant would agree to a day-for-day extension of the certification period if its data submittals (in the areas of fiscal and air quality) were not satisfactorily completed by May 15, 1981. The May submittals were accepted by Staff and discussed at the June 17, 1981 business meeting.*

Section 25540.2(a) eliminates the requirement for a Notice of Intention if the applicant reasonably demonstrates that geothermal resources are available in commercial quantities. Such availability was established at a March 2, 1981 hearing in Sacramento which was attended by Applicant,

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* The Executive Director reported that, for Staff purposes, Applicant's May 15, 1981 data submittals were adequate. During the meeting, the Commissioners discussed the applicability of PRC section 25520 on a nonutility applicant (see 6/17/81 business meeting: RT 412-421). (The transcript record on this proceeding is organized as follows: 3/2/81 Hearing on Commercial Availability: RT 1-222; 4/15/81 Informational Hearing: RT 223-271; 6/15/81 Issues Assessment Conference: RT 272-395; 9/4/81 Prehearing Conference: RT 1-76; 10/8/81 Evidentiary Hearing: RT 423-657; 11/17/81 Evidentiary Hearing: RT 696-1,469; 11/19/81 Evidentiary Hearing: RT 1,470-1,879; 11/23/81 Evidentiary Hearing: RT 1,880-1,957. Because of duplicate numbering, non-evidentiary transcript citations are dated; undated citations refer to the evidentiary transcript, pages 423-1,957.)

Staff, the Department of Conservation's Division of Oil and Gas, the Public Utilities Commission,* and other interested parties.

On April 15, 1981, Chairman Schweickart conducted the Informational Hearing in Lakeport, California. On June 15, 1981 he held an Issues Assessment Conference in Lake County. The Prehearing Conference was held on September 4, 1981 in Sacramento to identify and organize the specific subject area information needed to assess the potential environmental impacts and corresponding mitigation measures.

On October 8, November 17, 19 and 23, 1981, Evidentiary Hearings were conducted.

II. COMPLIANCE MONITORING PROGRAM

Under PRC Section 25532, the Commission must establish a monitoring system to ensure that a facility's construction and operation complies with "air and water quality, public health and safety, and other applicable regulations, guidelines, and conditions adopted or established by the Commission or specified in the written decision on the application. In designing and operating the monitoring system, the Commission shall seek the cooperation and assistance of the State Air Resources Board, the State Water Resources Control Board, the Department of Health, and other state, regional and local agencies which have an interest in environmental control." (Emphasis added.)

In this case, the Compliance Plan was distributed in draft form on October 14, 1981 (CEC Publication No. P800-81-010) and a Committee-sponsored workshop was held on October 28, 1981 to receive comments

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* During the hearing, the Public Utility Commission's pending Petition to Intervene was granted without objection.

and suggestions. Based on public and Applicant response, the Compliance Plan was then coordinated to reflect the evidentiary presentations on November 17, 19 and 23, 1981. The final "Staff-Proposed Compliance Plan for OXY Geothermal Plant No. 1, 81-AFC-1" was distributed on December 4, 1981.

At the November 19, 1981 evidentiary hearing, CEC Staff explained that the proposed plan contains "Requirements" and "Verification Procedures" based on jointly-sponsored and separately-sponsored. (RT 1,368) The Committee recommends the Plan as modified in its Proposed Decision,* for adoption to meet the statutory requirement expressed in PRC Section 25532.

A. Dispute Resolution

The "Dispute Resolution Procedure" outlines the voluntary, informal procedure for examining compliance questions during the post-certification stage. This procedure provides a flexible, practical problem-solving method for monitoring compliance but does not modify the substantive conditions imposed in the Commission Decision, which

* The Committee-recommended Compliance Plan is contained in "Appendix B: OXY Compliance Plan, CEC Publication No. P800-81-010."

are subject to existing law affecting post-certification complaints, amendments, and revocations.*

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* An allegation of noncompliance with the conditions to certification may be filed with the Commission's Executive Director under Title 20, California Administrative Code, Sections 1230, et. seq. Additionally, the Warren-Alquist Act authorizes revocation or amendment of a license under PRC Section 25534 for:

- any material false statement set forth in the application, presented in the proceedings before the Commission, or included in supplemental documentation by the applicant.
- other than insignificant failure to comply with the terms or conditions of approval of the application as specified by the Commission in its written decision.
- violation of any provision of PRC Division 15, or any regulation or order issued by the Commission under Division 15.

B. Requirement and Verification

The second part of the Compliance Plan (Appendix B, pages 1-46) specifies requirements and verification procedures proposed by the Commission's Compliance Audit Unit (CAU) in response to PRC Section 25532. Neither the "requirements" (which enumerate duties imposed by existing law on Applicant during the construction and operation of its plant) nor "verification" procedures (which explain what the CAU will do to determine compliance with existing legal "requirements") should be read in any way that changes a substantive condition to certification. In most instances, this clarification may be unnecessary; however, it is the Committee's intent that all parties--especially the Applicant--understand that the Compliance Plan only records and does not create predetermined conditions to certification. Its usefulness, then, lies in compilation of all requirements imposed by existing law or Commission Decision on Applicant's license.

Following certification, all communications directly affecting this project shall be filed in Docket No. 81-AFC-1C and addressed as follows:

Compliance Auditor (81-AFC-1-C)
California Energy Commission
1111 Howe Avenue, M.S. 2000
Sacramento, California 95825

C. Certification Conditions

The substantive conditions to certification recommended by the Committee are contained in the conclusion section of each impact area described in Part Two. In most cases, the conclusion refers back and adopts the Applicant-Staff jointly-proposed conditions.

D. Environmental Impacts

During a certification proceeding, the Commission staff is required to prepare an Environmental Impact Report (EIR) pursuant to PRC Section 2100, et. seq. Under Title 20, California Administrative Code Section 1760(b), the Committee reviews the Draft EIR and must "resolve any substantial dispute over the contents of the draft EIR (DEIR)."*

The EIR meets the requirements of both the California Environmental Quality Act (CEQA) and the National Environmental Protection Act (NEPA) and was prepared with the participation of the Bureau of Land Management and the United States Geological Survey (FEIR, p. XIX).

The Presiding Member is responsible for preparation of the FEIR, which was distributed on December 18, 1981 (State Clearinghouse No. 81081811; California Energy Commission Publication No. P700-81-024). The United States Geological Survey also prepared a Final Environmental Assessment.

* Title 20, California Administrative Code Section 1760(a)(4) sets a 45-day minimum review period of the DEIR. The Oxy No. 1 DEIR (State Clearinghouse No. 810-818-11) was distributed on August 17, 1981, and available for public comment through October 3, 1981. On September 16, 1981, Staff also conducted a public hearing in Middletown, Lake County, to encourage and receive comment. For a record of that hearing, see 9/16/81 Transcript, pages 1-116.

E. Intervenor Participation

During the Application for Certification proceeding, ten parties became intervenors pursuant to Title 20, California Administrative Code Section 1207:*

COUNTY OF SONOMA
CALIFORNIA PUBLIC UTILITIES COMMISSION
GEYSERS 1916-ACT LANDOWNERS
FRANK PALMIERI
LAKE COUNTY AIR POLLUTION CONTROL DISTRICT
ANDERSON SPRINGS INTERVENORS (name change, November 17, 1981: ANDERSON SPRINGS COMMUNITY SERVICES DISTRICT)
COUNTY OF LAKE
LAKE COUNTY SCHOOL DISTRICTS
SONOMA COUNTY SCHOOL DISTRICTS
CHARLES T. SIMMONS

Intervention by the Geysers 1916-Act Landowners, Mr. Frank Palmieri, and Mr. Charles T. Simmons was granted for the purpose of determining whether the Commission should proceed with Applicant's Application for Certification in light of litigation over the surface land proposed for the construction of Occidental's power plant facility.** After considering the facts and arguments set forth in briefs identified at the September 4, 1981 Prehearing Conference, the Committee decided on September 17, 1981 to proceed. All other intervenors participated throughout the proceeding in those matters in which they were interested.

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* The February 3, 1981 Petition to Intervene by Donald F.X. Finn was denied by the Committee after it determined that his interest in "the contractual relationship of Pacific Gas and Electric Company with other steam suppliers" was not an issue in this case. (Committee Order, March 4, 1981)

** see: Occidental Geothermal, Inc., a corporation, v. Charles T. Simmons, Individually and as Conservator, etc., and Robert M. Curtis, as Trustee, etc., No. C-81-0510 MPH, United States District Court, Northern District of California.

F. Federal-State Cooperation in Power Plant Siting

The United States Geological Survey (USGS) and the California Energy Commission coordinated their respective power plant siting responsibilities throughout this proceeding. However, at the November 17, 1981 evidentiary hearing, concern was expressed by both parties about the jurisdictional status of the surface land to be used for the construction of Applicant's power plant and related facilities. Since that time, the USGS (by letter dated December 23, 1981) has issued a Final Environmental Assessment (#192-82) rather than prepare with the Commission a joint environmental document as was done in previous cases.

The Committee is awaiting a Letter of Understanding (LOU) from the USGS to memorialize the federal-state post-certification responsibilities and will present it to the full Commission with this Proposed Decision. For purposes of federal-state participation in the OXY No. 1 Compliance Plan, the Letter of Understanding to be signed by the USGS and CEC shall control. (The Letter of Understanding with Commission ratification is included at Appendix D.)

PART TWO

PART TWO

I. PROJECT ENGINEERING

A. Civil Engineering

V.R. Fesmire, Stone and Webster Project Engineer for Occidental Geothermal, Inc., sponsored Section 1.3 of the Application for Certification (RT 438) and participated in workshop discussions. Applicant's AFC and data submittals were examined by Marco Farro, CEC Civil Engineer. On the basis of this review, Applicant and Staff proposed the following Findings, Conclusion and Condition:

Findings:

1. The proposed power plant site is located along the ridgeline of the Mayacamas Mountains with moderately steep terrain which descends eastward from elevation 3,800 to elevation 3,420.

2. The construction of the power plant pad requires approximately 7.4 acres of level area and is accomplished by 370,000 cubic yards of cut and 380,000 cubic yards of fill.

3. By refining of slope angle, the project will result in a balanced cut and fill, and no outside disposal area will be required.

4. The site preparation requires cut slopes as high as 200 feet and fill slopes as high as 180 feet. The fill embankments will be constructed 2:1, and the cut will be 3:2 except in areas underlain by weak bedrock, where the slope will be 5:2. Both cut and fill slopes will be benched at regular intervals.

5. Recommendations for cut, fill, and foundation support are given in the April 1981 report by Harding-Lawson Associates, "Element II--Geotechnical Investigations Power Plant Site 1 Occidental Geothermal, Inc., Lake County, California," and supplement thereto. Applicant has agreed to follow the recommendations in the Harding-Lawson report if conditions in the field are substantially similar to those reported in the Harding-Lawson report.

6. Site preparation also requires the design and construction of retaining walls for areas where fill slopes are excessively long (north and east edge of the site). The retaining walls will be designed by a registered civil engineer, and supported on compacted fill or rock.

7. The retaining walls in Finding 6 shall be designed according to accepted engineering practice and shall be able to withstand sliding and overturning from siesmic induced or other forces.

8. Regarding the power plant site, the Applicant has suggested adequate erosion mitigation measures for the slopes to minimize erosion and sediment transport off leasehold.

9. A California certified engineering geologist should be assigned to the project to be present as needed to monitor engineering geologic conditions to assure that conditions encountered during excavation are similar to those described in the Harding-Lawson report and/or that any adverse conditions encountered are mitigated in a safe and environmentally sound manner.

10. The certified engineering geologist shall sign and will be responsible for all engineering geologic analyses, reports, and maps which are conducted or prepared for the project.

11. The Applicant should submit all maps, plans, and reports required by the UBC (1979 edition), especially (but not limited to) Chapters 3, 29, and 70 (or required by other conditions of the Certificate), to the CEC or its delegate agent for review and approval.

Conclusion:

1. With the implementation of measures referred to in Findings 4, 5, 7, and 8, the unit is acceptable from a civil engineering standpoint.

Conditions:

1. Applicant shall undertake the measures referred to in Findings 3, 4, 5, 6, and 7.

2. The Applicant shall abide by Findings 9, 10, and 11.

B. Geotechnical

V.R. Fesmire sponsored AFC Sections 1.3.2 and 5.3; filed data responses on April 29, 1981; and participated in workshops on May 7, 8, and 21, August 16, 17, and 28, and September 22, 1981. Applicant's AFC and data submittals were examined by Bob Brand, CEC Associate Engineering Geologist. (RT 458-466) Applicant and Staff proposed the following Findings, Conclusion and Condition:

Findings:

1. The geologic conditions of the leasehold and the plant site are described by Harding-Lawson Associates in "Elements I and II Geologic Investigation, Power Plant Site 1, Occidental Geothermal Inc., Lake County, California," and supplement by Harding-Lawson Associates, 1981, hereafter called the Harding-Lawson Report.

2. The Harding-Lawson Report is an adequate Geotechnical study and recommends adequate measures for safe site development.

3. The Harding-Lawson Report recommends reasonable cutslope angles for the type of rock to be excavated (3:2 or flatter in hard graywacke rock and 5:2 in melange).

4. Frequent field observations by competent geotechnical personnel during excavation are recommended to evaluate slope stability and to recommend appropriate stabilization measures, as necessary.

5. The Harding-Lawson Report concludes that the rock can withstand the pressures of structure footings designed for an allowable bearing pressure of 4,000 psf in melange and 6,000 psf in graywacke.

6. According to the information contained in the Harding-Lawson Report, the power plant can be safely constructed on the proposed site.

Conclusion:

1. If the Applicant implements the recommendations of the Harding-Lawson Report, there will likely be no geologic conditions within the power plant site that would preclude or impair the siting of the proposed project.

Condition:

1. The Applicant shall follow the recommendations of the Harding-Lawson Report as referred to in Findings 3, 4, and 5.

C. Structural Engineering

V.R. Fesmire sponsored AFC Section 1.3.3 and Appendix A; filed data responses on April 29 and July 22, 1981; reviewed CEC staff's August 19, 1981 analysis; and participated in workshops on May 7-8, 21, August 16-17, 28, and September 22, 1981. Robert Thacker, Office of State Architect, examined Applicant's AFC and data submittals. (RT 476-498) Based on review and discussion, Applicant and Staff submitted the following proposed Findings, Conclusions, and Conditions:

Findings:

1. Occidental Geothermal, Inc., (OGI) will design and construct the power plant and its related facilities in accordance with:

   a. Oxy Geothermal #1 AFC, Sections 1.3.3, 1.3.4, and 1.3.5, and Appendix A.

   b. OGI's responses (dated April 30, 1981) to Staff interrogatories and review comments.

   c. Oxy Geothermal #1--Workshop Summary--May 8, 1981, and July 15, 1981, additional information.

d. Telephone conversation from Vince Fesmire, Stone and Webster, to Robert Thacker, OSA-SSS, June 9, 1981.

e. Title 8, California Administrative Code, adopting American Society of Mechanical Engineers' Boiler and Pressure Vessel Code (ASME BPV Code).

f. Title 24, California Administrative Code, adopting current edition of Uniform Building Code (UBC) as minimum legal building standards. UBC (1979 edition) is currently scheduled for adoption.

g. Chapter 7, Division 3, Business and Professions Code, requiring state registration to practice as a civil engineer or structural engineer in California.

h. Lake County Ordinance 970.

i. Uniform Building Code, 1979 Edition (UBC 79).

j. American Society of Mechanical Engineers' Boiler and Pressure Vessel Code.

k. American National Standards Institute (ANSI), "B 31.1 Power Piping Code."

l. ANSI, "Building Code Requirements for Minimum Design Loads in Buildings and Other Structures" (ANSI A 58.1-1971).

m. American Concrete Institute (ACI), "Building Code Requirements for Reinforced Concrete" (ACI 318-77).

n. ACI, "Building Code Requirements for Structural Plain Concrete" (ACI 322-72).

o. ACI, "Commentary on Building Code Requirements for Reinforced Concrete" (ACI 318c-77).

p. American Institute of Steel Construction (AISC), "Specification for the Design, Fabrication, and Erection of Structural Steel for Buildings" (AISC SDFESS 80).

q. AISC, "Commentary on the Specifications of the Design, Fabrication, and Erection of Steel for Buildings" (AISC CSDFESS 78).

r. AISC, "Specification for Structural Joints Using ASTM A325 or A490 Bolts," April 1978 (AISC SST 78).

s. AISC, "Code of Standard Practice for Steel Buildings Bridges," September 1976 (AISC CSPSBB 76).

t. American Welding Society, "Structural Welding Code AWS D1.1-81" (AWS D1.1-81).

u. AWS, "Reinforcing Steel Welding Code" (AWS D12.1-75).

v. "National Design specification for Stress-Grade Lumber and Fastenings, 1977" (NDS 77).

w. American Institute of Timber Construction, 1972, "Timber Construction Standards" (AITC-100).

x. American Iron and Steel Institute (AISI, "Specification for the Design of Cold-Formed Steel Structural Members," 1968 (AISI SDCFSS).

y. Steel Joist Institute, "Standard Specifications and Load Tables" (SJI SSLT).

z. American Association of State Highway and Transportation Officials, "Standard Specifications for Highway Bridges," 1977 Edition (AASHTO BRIDGE 77).

aa. Cooling Tower Institute, "CTI Code Tower, Standard Specifications for the Design of Cooling Towers with Douglas Fir Lumber," 1978 (CTI 114-78).

2. Criteria set forth in Finding 1 which govern the design of specific structures and facilities will be used in the final design and construction of each such structure and facility. However, in the case of discrepancies between various criteria, the most conservative criteria will be used unless the CEC authorizes use of less restrictive criteria.

3. The Applicant will use the following references as guides in the final design of the power plant and related facilities.

   a. Applied Technology Councils, "Tentative Provisions for the Development of Seismic Regulations for Buildings" (NBS-SP-510; ATC-3-06).

   b. Structural Engineers Association of California, "Recommended Lateral Force Requirements," 1975, Recommendations and Commentary.

4. In the event that UBC (1979 edition) is not adopted by the state (under Title 24, CAC) prior to construction, OGI has agreed to use a facility design that conforms with the requirements of UBC (1976 edition).

5. For other than seismic loads, the Applicant will use UBC (1979 edition) structural design criteria (augmented as necessary by special live loads) and structural analysis methods.

6. The Applicant will design and construct the Oxy Geothermal #1 power plant and related facilities to withstand a functional basis earthquake with minor structural damage and loss of power generation for one week or less. It is considered that a structure designed according to the applicable codes for the functional basis earthquake will not structurally collapse if subjected to the extreme basis earthquake.

7. For seismic loads, the Applicant will use an equivalent lateral force (ELF) method of structural analysis with a base shear coefficient of 0.27 w for nonessential facilities and 0.4 w for essential facilities (see Oxy Geothermal #1 AFC, Appendix A, Section 11.3.1).

8. The Applicant will seismically design the turbine-generator building and pedestal using a dynamic method (STRUDL) of structural analysis to ensure that the seismic design will achieve the performance criteria (see Finding 6).

9. For the dynamic analyses, the Applicant will use the response spectra, with code allowable stresses, given in ATC-3-06 (Figure C 1-9), normalized to 0.15 g (5 percent damping) for the functional basis earthquake and to 0.28 g (10 percent damping) for the extreme basis earthquake.

10. For the functional basis earthquake, the Applicant will specify and use design stresses for the proposed wooden cooling tower structure in accordance with CTI 114-78. In addition, the Applicant will emphasize to the manufacturer in the procurement specifications that compliance with UBC (1979 edition), Section 2312(e), regarding appropriate assumptions of lateral force distribution is required.

11. The Applicant will design and construct bolted and/or welded anchorage on H_2O_2, acid, caustic, and chelating agent tanks to withstand a force of 0.87 w using UBC (1979 edition) Formula 12.8. All other bolted or welded anchorages for Category 1 equipment will be designed and constructed for an equivalent lateral force of 0.4 w when located or anchored at ground level, increasing linearly to 0.8 w when located or anchored at a height of 30 feet.

12. The Applicant shall design and construct tanks containing H_2O_2, acid, caustic, and chelating agent, or the containment surrounding these tanks to withstand a force of 0.87 w.

13. The Applicant will design piping (including valves) and anchorages in accordance with ANSI B31.1. The equivalent static loads shall be as specified in Finding 11.

14. Should there be discrepancies between criteria and methods set forth in Findings 1, 5, 6, 7, 8, 9, 10, 11, 12, 13, and 16, the Applicant will design to the highest calculated loads using the lowest allowable stresses, unless the Applicant can justify use of a less restrictive set of criteria or methods to CEC.

15. The Applicant's seismic design criteria, when considered in conjunction with code allowable stresses, lead to a design for Category 0 and 1 structures and equipment that is approximately equivalent to use of an FBE with a PGA = 0.20 g with code allowable stresses (except for the cooling tower).

16. The turbine lube oil coolers and associated piping design will be compatible with the turbine pedestal seismic design.

Conclusions:

1. The seismic and nonseismic design criteria and analysis methods for critical equipment, and for critical and noncritical structures specified or referred to in the Findings, will provide a basis for design for the Oxy Geothermal #1 power plant and its related facilities that will likely satisfy the Applicant's performance criteria.

2. If the Oxy Geothermal #1 power plant and its related facilities are designed as specified by the Findings, the design of the unit will likely comply with applicable laws and standards with respect to structural engineering and seismic safety.

3. The Applicant will submit final (i.e., bid) plans, specifications, and substantial change orders to the CEC and Lake County Chief Building Official pursuant to the procedures described in Conditions 1 through 6. Construction inspections may be performed to ensure conformance with the final plans, specifications, and change orders.

Conditions:

1. The Applicant shall demonstrate in the final design plans, design calculations, and specifications conformance with the criteria and requirements set forth in the Findings. Final plans, as used herein, are the plans upon which the construction will be based (i.e., used for bid purposes). The Applicant shall certify to the CBO and CEC that the final plans and specifications conform to the requirements listed in the Findings.

2. The Applicant shall submit plans and specifications for review in accordance with the following procedures:

   a. All plans, calculations, and specifications shall be signed and stamped by the responsible structural engineer who shall have the authority to use the title "Structural Engineer" in California.

   b. The Applicant shall furnish two complete sets of final structural design plans, design calculations, and specifications for each structure and structure foundation to both the CEC and CBO at least 90 days prior to intended start of construction. At least 30 days prior to intended filing date for such plans, the Applicant will notify the CBO and CEC of the intended filing. The final plans, specifications, and design calculations shall be filed not later than 45 days prior to the intended date of bid opening and shall be developed using the approved structural design criteria, seismic design criteria, and seismic analysis methods. The plans, calculations, and specifications shall clearly reflect the inclusion of approved criteria, assumptions, and methods used to develop the design.

c. In the event that the Applicant is notified within 90 days of filing that the Applicant's proposed final plans, specifications, or change orders are not acceptable to the Lake County CBO and the CEC, the Applicant will not proceed with the work described in those documents until such time as the alleged deficiency is resolved. The Applicant will modify the plans, specifications, or change orders as necessary according to the agreed upon resolution.

d. The plans, calculations, and specifications, signed and stamped by the responsible structural engineer, shall be accompanied by a letter signed and stamped by the responsible structural engineer certifying that the design conforms to the requirements listed herein.

3. The Applicant will file with the CEC and CBO any substantial changes* to the final plans and specifications and will notify the CEC and CBO at least 15 days in advance of intended filings of such change orders.

4. If the Lake County CBO delegates responsibility to the Applicant for special and continuous inspection, then the Applicant shall provide through its construction office a staff of field engineers and inspectors to monitor conformance with the accepted final plans, specifications, and change orders. Field engineers or inspectors will be present on site to monitor construction activities and will have the authority to require changes or remedial work to construction and to halt construction in the affected area until the work conforms with the applicable requirements. The CBO, or its agent, and the CEC may, upon reasonable notice, inspect the construction at any time to ensure that construction conforms to the accepted final plans, specifications, and substantial change orders.

5. In the event that UBC 1979 is not adopted prior to construction by the state (under Title 24 CAC), the Applicant will demonstrate that facility design conforms with the requirements of UBC 1976.

D. Reliability

V.R. Fesmire sponsored AFC Section 7, filed data responses on April 29, 1981, and participated in public workshops on May 7-8, 21, August 16-17, 28, and September 22, 1981. Darrel "H" Woo, CEC Energy Facility Siting Planner, examined Applicant's AFC and data submittals. (RT 499-514) On the basis of this review, Applicant and Staff proposed

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* Substantial changes in facility design would include all changes which required an alteration in design concept and, consequently, the preparation of new design calculations.

the following Findings, Conclusion and Condition:

Findings:

1. The Oxy facility will be comprised of two operating units with a combined generation capability of 80 MW with each unit generating 40 MW. Each individual unit will have the capability of generating 60-80 MW in the event the other unit is shut down.

2. Reliability critical components of sufficient quality and redundancy ensure that the plant will have a high availability factor which will allow the 88 percent targeted capacity factor to be met.

3. The turbine-generator of each unit is the only major reliability critical component without an installed standby spare. The facility will have a spare turbine rotor to minimize down time required for turbine repair. The facility will have a common Stretford system which will be equipped with redundant components.

4. Major features installed to increase reliability are two 100 percent capacity air compressors, two 100 percent capacity turbine lube oil coolers per unit, two parallel generator hydrogen coolers per generator, two 100 percent capacity component cooling pumps, two 100 percent capacity turbine lube oil pumps per unit, and two 100 percent capacity transformers to feed the main station service bus.

5. For each reliability critical item, the Applicant will require a Certificate of Compliance from the manufacturer. A Certificate of Compliance will help ensure equipment reliability in that:

   a. It contains a written statement by the manufacturer that an item is in accordance with the required bid specifications, and

   b. backup documentation to substantiate the statement is available.

Conclusion:

1. If the Applicant undertakes the measures described in Findings 2, 3, and 4 and the other procedures and design measures identified in the AFC and responses (dated April 6, 1981) to staff data requests, Oxy Geothermal #1 can reasonably be expected to operate at a 90 percent availability factor and have the capability to operate at least at 88 percent capacity factor at plant maturity.

Condition:

1. The Applicant shall implement its proposed procedures and design measures identified in Conclusion 1.

E. Seismic Hazards

V.R. Fesmire sponsored AFC Appendices A and C; filed data responses on April 29 and July 22, 1981; and participated in workshops on May 7-8, 21, August 16-17, 28, and September 22, 1981. Gaylon Lee, CEC Associate Geologist, examined Applicant's AFC and data submittals. (RT 515-529) Based on this review, Applicant and Staff proposed the following Findings and Conclusion:

Findings:

1. The Applicant proposes to use response spectra from ATC 3-06 (Figure C1-9, soil type S_1) normalized to a peak ground acceleration of 0.15 g as one basis for seismic design for the functional basis earthquake (FBE).

2. H.C. Shah and Keith Feibusch, in 1980, developed uniform probability response spectra for certain sites in The Geysers Known Geothermal Resource Area (KGRA) which, for purposes of evaluating seismic hazards are very similar to the proposed Oxy #1 site.

3. A comparison of the Applicant's FBE response spectra with the uniform probability response spectra of Shah and Feibusch shows that the probability of exceeding the earthquake forces (accelerations) during a 30-year facility lifetime ranges from 20 percent to less than 10 percent depending on the frequency of vibrating motion being considered.

4. Faults which may be considered potentially active cross the leasehold. However, the proposed power plant is set back about 250 feet from such faults. Consequently, there is no significant danger of damage to the power plant and related facilities due to fault ruptures.

5. Liquefiable soils are not known or inferred to exist on or adjacent to the leasehold. Potential damage to the proposed facilities from soil liquefication is not significant.

Conclusion:

1. The Applicant adequately evaluates potential seismic hazards (earthquake shaking, fault rupture, and soil liquefaction) to the proposed geothermal plant and its related facilities.

Staff's witness also recommended that "the Commission encourage the State Division of Oil and Gas and the United States Geological Survey to develop policies, criteria, and appropriate regulations to assure adequate evaluation and mitigation of the potential for steam well blowouts due to fault rupture where steam wells intersect active or potentially active faults in the subsurface." (RT 520) He explained that this issue "is beyond the direct regulatory jurisdiction of the Commission, it only represents a recommendation on the part of Staff that the Commission urge those agencies which do have jurisdiction to address this particular item of concern, which appears to have been overlooked by all the regulatory agencies." (RT 517-518)

Since Staff did not propose this recommendation as a condition to certification of the Occidental Application, the Committee invited Staff to raise this matter with the Presiding Member in his capacity as Chairman of the Commission (RT 518) and discouraged the use of "recommendations" in siting cases to present issues not relevant to the specific case.

F. Reliability (Seismic Risk)

V.R. Fesmire sponsored AFC Sections 1.3.2, 5.3, Chapter 8, and Appendix A; filed data responses on April 29, and July 22, 1981; and participated in workshops on May 7-8, 21, August 16-17, 28, and September 22, 1981. Darrel "H" Woo analyzed Applicant's AFC and data submittals. (RT 530-543) On the basis of this review, Applicant and Staff proposed the following Findings and Conclusion:

Findings:

1. The Applicant proposes seismic design parameters of 0.15 g (g = acceleration due to gravity for a functional basis earthquake (FBE) with an associated probability of exceedance of 25 percent.

2. The CEC staff under Structural Engineering has made a finding that the Applicant's seismic design criteria, when considered in conjunction with code allowable stresses, lead to a design for Category 0 and 1 structures and equipment that is approximately equivalent to use of an FBE with a peak ground acceleration of 0.20 g with code allowable stresses.

3. A seismic design parameter of 0.20 g reduces the seismic risk to a 13 percent exceedance probability.

4. A design parameter of 0.20 g with a probability exceedance of 13 percent is consistent with the Applicant's reliability goals of 90 percent plant availability and an 88 percent capacity factor.

Conclusion:

1. If the Oxy #1 power plant and its related facilities are designed as proposed, the Applicant will likely meet operational goals of 90 percent availability and an 88 percent capacity factor.

G. Safety

V.R. Fesmire sponsored AFC Sections 1.4.7.5, 1.4.8, and 6.3; filed data responses on April 29, 1981; and participated in workshops from May through September 1981. Darrel "H" Woo examined Applicant's AFC and data submittals for CEC staff. (RT 543-579) Based on this review, Applicant and Staff proposed the following Findings, Conclusions and Conditions:

Findings

1. The fire protection system will be designed, constructed, and operated to meet or exceed applicable National Fire Protection Codes (NFPA) and applicable portions of Title 8 of the California Administrative Code (CAC), Public Resources Code (PRC), and Uniform Building Codes (UBC). Additional laws and regulations that apply to the safety of the facility and personnel include but are not limited to:

a. Title 8, California Administrative Code, Section 3203 (Accident Prevention Program).

b. Title 8, California Administrative Code, Section 5204 (Handling of Hydrogen Peroxide).

c. Title 8, California Administrative Code, Section 5179.

d. 49 CFR, Section 173.249; Title 8, California Administrative Code, Section 5162 (Handling and Transportation Procedures for Caustic Material).

e. Title 8, California Administrative Code, Article 138 (Handling and Storage Procedures for Hydrogen Gas).

f. ASME Code, Section VIII, Division 1 (Pressure Vessel Design).

g. Chapter 4.1, Title 8, California Administrative Code (Pressure Vessel Design).

h. ATC-3.06, Section 8.3 (Anchorage of Tanks).

2. The plant yard will have hydrants, fully equipped hoses, and connections to serve interior and exterior systems. The hydrants will be served by buried pipe distribution systems taking water from the fire protection water system. Two turbine fire pumps, each having about 1,000 gallons per minute discharge capacity at 100 psig, will draw water from the cooling tower basin to serve the plant; 1 driven by a 460v electric motor and 1 by a diesel engine.

3. The turbine building will be protected with a dry pipe preaction-type sprinkler system for the areas below the operating floor and turbine generator and 20 feet in every direction. This system will also cover areas of the hydrogen seal oil equipment, lube oil reservoir, coolers, and transfer pumps. The generator will have an automatic CO_2 purge system. The relay room will be protected by a Halon 1301 system or CO_2. Interior hose stations with 75 feet of neoprene lined hose and adjustable spray nozzles will be located throughout the plant.

4. The main and station service transformers will be protected by automatic deluge water spray systems. The administration/service building/warehouses will have hose stations. The cooling tower fill will be of fire retardant construction. The support structure will be made of wood.

5. AFC Section 6.2 describes handling of certain toxic, flammable, or hazardous substances. The compounds used in the Stretford Unit are: anthraquinone disulfonic acid (ADA), Vanasol (sodium ammonium poly vanadate, 38.5 percent vanadium), and Sodium Hydroxide (NaOH stored as 25 percent solution). Soda ash may be substituted for the NaOH, in which case it will be stored in bags. Vanasol and ADA will be stored in Department of Transportation (DOT) approved containers. A separate chemical storage building next to the Stretford system will house these chemicals. A corrosion resistant tank will be used to store the NaOH, if used.

6. Chemical storage requirements for the secondary abatement system will depend on the design. A hydrogen peroxide (H_2O_2) secondary abatement system may require H_2O_2 (50 percent solution), Ferrous Sulfate ($FeSO_4$), and Hydroxyacetic Acid (HAA, 70 percent solution). Ferrous Sulfate would be delivered as a dry powder or as a saturated solution (approximately 15 percent $FeSO_4$). Approximately one month's supply will be stored in an appropriate corrosion resistant tank as a standard solution. Hydroxyacetic Acid would be delivered and stored as 70 percent solution. These will be stored in appropriate corrosion-resistant tanks. These measures in addition to appropriate handling and labeling are in accordance with Title 8, CAC, Group 16, "Control of Hazardous Substances," and should adequately control potential injuries in the event of an accident.

7. Lubricating oil will be stored in tanks designed according to API-650. Hydrogen will be stored in DOT approved containers. Hydrogen peroxide (H_2O_2) will be stored in tanks constructed of aluminum.

8. Berms around the entire plant site and H_2S abatement area will be sized to contain any spilled material. These berms will be asphalt and spill containments will be of reinforced concrete. Either the tanks or the secondary containments will be designed to an Equivalent Lateral Force of 0.87w.

9. During the construction phase all workers will be protected by an Accident Prevention Program required by CAL/OSHA (Title 8, CAC, Section 1509). During the operational phase (Title 8, CAC, Section 3203) training will be augmented by design features such as the water deluge systems on electrical and oil equipment, overload protection systems on electrical equipment, hot pipe and equipment insulation, devices for the abatement of noncondensible gases, and protective circuits in electrical installations.

10. Applicant has agreed to submit an affidavit from a registered fire safety engineer or the Applicant's fire hazard adviser attesting that the design, construction, and operation of the on-site fire protection system conforms with applicable fire safety codes and standards.

11. Applicant has agreed to cooperate with the California Department of Forestry and local entities for the provision of mutual assistance in connection with fire protection.

Conclusions:

1. If the Applicant implements its proposed measures as specified in Section 1.4.7.5 of the AFC and in response to data requests dated April 24, 1981, the proposed project will most likely comply with fire safety laws, standards, and ordinances and will reduce the hazards due to fire occurring at the plant site.

2. If the Applicant implements its proposed procedures and design measures specified in Section 6.2 of the AFC and in response to data requests dated April 24, 1981, the proposed project will comply with applicable laws, ordinances, and standards relating to the handling and storage of hazardous, toxic, and flammable materials.

3. If the Applicant implements its proposed measures and programs specified in Section 6.3 of the AFC, the proposed project will comply with applicable laws, ordinances, and standards relating to worker safety.

Conditions:

1. Prior to commercial operation, the Applicant shall submit to the CEC an affidavit from a registered fire safety engineer or the Applicant's fire hazard adviser stating that the design, construction, and operation of the on-site fire protection system conforms with applicable fire safety and codes and standards.

2. The Applicant shall submit to the CEC copies of correspondence with the California Department of Forestry and local entities for mutual assistance in connection with fire protection.

3. The Applicant shall obtain a letter from the CAL/OSHA Consultation Service verifying compliance of the project's accident prevention program with the requirement of Title 8, California Administrative Code, Section 3203. The Applicant shall submit a copy of this letter to the CEC prior to commencement of operation of Oxy Geothermal #1.

4. The Applicant shall notify the CEC of any safety violations, issuances of citations or penalties, and associated actions taken by the Division of Occupational Safety and Health.

5. The Applicant shall comply with the handling procedures for hydrogen peroxide as specified in Title 8, California Administrative Code, Section 5204.

6. The Applicant shall comply with the storage procedures for hydrogen peroxide as specified in Title 8, California Administrative Code, Section 5179.

7. The Applicant shall comply with the handling and transportation procedures for caustic materials as specified in 49 CFR, Section 173.249, and Title 8, California Administrative Code, Section 5162.

8. The Applicant shall comply with the handling and storage procedures for hydrogen gas as specified in Title 8, California Administrative Code, Article 138.

9. The Applicant shall specify that the design and construction of the Stretford system pressure vessels are in accordance with the ASME Code, Section VIII, Division 1, to comply with requirements of Chapter 4.1, Title 8, California Administrative Code.

10. The Applicant shall use methods specified in ATC-3.06, Section 8.3, in preparing plans and specifications for anchoring tanks for storing toxic or flammable materials.

11. Prior to commercial operation of the proposed project, the Applicant shall file with the CEC the following documents:

    a. Copies of the Manufacturers Data Reports that the Stretford pressure vessels have been fabricated in accordance with ASME B&PV Code, Section VIII, Division 1, which is adopted in Chapter 4.1, Title 8, California Adminisrrative Code.

    b. Copies of certificates from the manufacturer that the hydrogen peroxide tanks have been designed and fabricated in accordance with MCA Chemical Safety Data Sheet SD-53.

    c. Copies of field inspection reports that Stretford pressure vessels and hydrogen peroxide tanks are anchored in accordance with ATC-3.06, Section 8.3.

    d. Copies of certificates from the manufacturer that the tanks for HAA and $FeSO_4$ have been designed and fabricated in accordance with Title 8, California Administrative Code, Group 16.

    e. Copies of field inspection reports that the tanks for HAA and $FeSO_4$ are anchored in accordance with ATC-3-06, Section 8.3.

12. The Applicant shall comply with the handling and storage procedures for HAA and $FeSO_4$ as specified in Title 8, California Administrative Code, Group 16.

H. Transmission Line Engineering and Geysers-Area Capacity

V.R. Fesmire sponsored AFC Section 8, filed data responses on April 29, June 11, and July 22, 1981; and participated in workshops from May through September 1981. Joel B. Klein, CEC Electrical Engineer, examined the AFC and data submittals. (RT 579-606) Based on this review, Applicant and Staff proposed the following Findings and Conclusions:

Findings:

1. Regarding tapline connection point:

    a. The Applicant's preferred plan is to build a 4,700 foot, double circuit, 230 kV transmission tapline (1 circuit strung initially) from the Oxy power plant to the SMUDGEO #1 double circuit tapline, scheduled for completion in 1983. The Applicant would make use of the spare circuit on the SMUDGEO #1 tapline for approximately 1,800 feet before connecting to the major 230 kV PGandE transmission lines in The Geysers (designated collector lines).

b. As an alternative, the Applicant also considered a 5,400 foot tapline southwest to the existing Unit 13 tapline. The Applicant would make use of the Unit 13 tapline for approximately 3,000 feet before connecting to the PGandE collector lines, at a point approximately 3,000 feet south of the SMUDGEO #1 tapline termination point.

c. The CEC engineering staff has also considered a modified alternate tapline, which is equivalent to the Applicant's alternate except that the spare circuit on the Unit 13 tapline would be used instead of the existing tapline.

d. The above identified three tapline alternatives are comparable in costs and have acceptable transmission losses.

2. Regarding tapline conductor size:

a. The Applicant initially proposed a conductor size of 795 kcmil, but also considered 1,113 kcmil and 795 kcmil bundled (two conductors per phase, designated 795 kcmil(B)).

b. The 1,113 kcmil and 795 kcmil bundled conductors would reduce transmission losses with no increase in lifetime cost but at higher initial construction cost.

c. These three conductor alternatives all have more than adequate thermal capacity to carry the 80 MW of Oxy power, except that the 1,113 kcmil and 795 kcmil(b) would provide approximately 20 percent and 100 percent more thermal capacity, respectively.

Conclusions:

1. Tapline Connection Point: From the standpoint of cost and transmission losses, both the Applicant's preferred and alternate taplines are acceptable.

2. Conductor Size: The Applicant's proposed conductor size (795 kcmil) is acceptable.

In addition, CEC staff proposed--without comment by Applicant--the following Findings and Conclusions on the Geysers-area transmission system.

Staff Findings

1. Regarding adequacy of existing collector lines within The Geysers:

a. The PGandE 230 kV collector line, to which the Oxy power plant connects, is a double circuit 1,113 kcmil(B) transmission line with a total thermal capacity of approximately 1,240 MW.

b. This collector line has an economic load limit of approximately 400 MW which has already been exceeded.

c. With the addition of Oxy, this collector line will be carrying approximately 814 MW.

d. This collector line has adequate thermal capacity to carry the Oxy power to the southern 230 kV terminal of The Geysers, Castle Rock Junction.

2. Regarding outlet transmission lines (transmission outside of The Geysers):

a. The capacity of the existing 230 kV outlet transmission line that carries the power out of The Geysers and into the major transmission system will be exceeded in June of 1983, with the addition of Unit 18. The capacity will be further exceeded with each subsequent additional Geysers unit, including SMUDGEO #1 in December of 1983.

b. Additional outlet transmission has been proposed by PGandE (in The Geysers Unit 16 case) to accommodate Oxy and the other power plants through a double circuit 2,300 kcmil(B) transmission line from Castle Rock Junction to Lakeville Substation; but this outlet transmission has been delayed until June 1984 and may be subject to subsequent delays.

Staff Conclusions:

1. Collector Line Capacity: The transmission within The Geysers has adequate thermal capacity to carry the 80 MW of Oxy power but is not economical.

2. Outlet Transmission Capacity: The outlet transmission capacity will not be adequate to accommodate the Oxy Geothermal No. 1 power plant until the Geysers to Lakeville transmission line (or some alternate transmission capacity) is made available.

I. Transmission Line Safety and Nuisance

V.R. Fesmire sponsored AFC Chapter 18; filed data on April 29 and June 11, 1981; and participated in workshops from May through September 1981. Al McCuen, CEC Transmission Engineer, examined Applicant's

AFC and data submittals. (RT 609-624) Based on this review, Applicant and Staff proposed the following Findings, Conclusion and Conditions.

Findings:

1. California Public Utilities Commission (CPUC) General Order 95 (GO-95) sets forth minimum safety and reliability related construction standards.

2. The Applicant agrees to comply with the standards set forth in GO-95.

3. The proposed transmission lines will produce audible noise under wet conductor conditions of less than or equal to 40 db(A) at 100 feet from the transmission line.

4. The noise level in Finding 3 would usually be near or below ambient background levels and will probably not violate the Sonoma County General Plan noise element, the Lake County noise element, or be a significant nuisance to the public.

5. The California Department of Forestry requires minimum fire protection clearance standards under Public Resources Code Sections 4292 through 4296.

6. Applicant agrees to conform with the standards of the California Department of Forestry referenced in Finding 5.

7. The Commission staff has developed a radio interference and television interference RI/TVI mitigation procedure. That procedure requires the Applicant upon receipt of a complaint to locate and correct, on a case-by-case basis, all RI-TVI caused by the transmission facilities, including, if necessary, the modification of receivers and installation of antennas.

8. Applicant agrees to perform, at Applicant expense, the mitigation measures referenced in Finding 7 when radio or television interference is determined by Applicant to be caused by the proposed transmission facilities for Oxy Geothermal.

9. The electric and magnetic fields produced by a transmission line can induce a voltage on nearby ungrounded metallic fences or other metallic objects which may be an electrical shock hazard. Grounding fences or other metallic objects is effective in minimizing shock hazards.

10. a. Applicant agrees to ensure that, regardless of location or ownership, all ungrounded metallic fences longer than 150 feet within the right-of-way shall be grounded following the PGandE grounding procedures.

    b. In the event of complaints regarding induced currents from vehicles, portable objects, large metallic roofs, fences, gutters, or other objects, Applicant agrees to investigate and take all reasonable measures at its own expense to correct the problem for valid complaints, provided that (a) the object is located outside the right-of-way or (b) the object is within the right-of-way and existed prior to right-of-way acquisition.

For objects constructed, installed, or otherwise placed within the right-of-way after right-of-way acquisition, Applicant agrees to notify the owner of the object that it should be grounded. In this case, grounding is the responsibility of the property owner. Applicant agrees to advise the property owner of this responsibility in writing prior to signing the right-of-way agreement.

11. It is highly unlikely that the proposed transmission line would cause a safety hazard due to induced voltage if the grounding criteria referenced in Finding 10 are followed.

12. In addition to the foregoing, the following laws, regulations, and standards apply to the transmission line proposed for Oxy Geothermal. The Applicant agrees to comply with each of these requirements.

    a. Safety: CAL/OSHA, 8 California Administrative Code (Work Procedures and Operating Procedures), Article 85, Sections 2940 et seq., Article 87, Sections 2950 et seq., the applicable sections of general Construction Safety Orders, Title 8, Subchapter 4, and General Industry Safety Orders, Subchapter 7.

    b. Safety: (Interference with Navigable Airspace), FAA, 49 USCA 1348, 14 CFR Part 77.

    c. Nuisance: (Radio Interference), Federal Communications Commission Rules and Regulations, 47 CFR Part 15.25 (incidental radiation devices).

    d. Construction Noise: Federal Occupational Safety and Health Act of 1970, 29 USCA 655 et seq., 20 CFR 1910 et seq., CAL/OSHA, 8 California Administrative Code, Sections 5095 to 5099.

13. The Staff has developed a compliance and monitoring program for transmission line safety and nuisance. The Applicant agrees to comply with the referenced staff compliance and monitoring program.

Conclusion:

1. Subject to Finding 13 and based upon the Applicant's agreement to comply with the standards set forth in Findings 1, 4, 5, 7, 10, and 12, the proposed transmission line will be designed, constructed, and operated in conformance with all applicable laws, standards, and criteria and will not pose a significant safety hazard or be a significant nuisance to the public.

Conditions:

1. The proposed transmission line shall be designed, constructed, and operated to comply with the laws, regulations, standards, and criteria listed in Findings 1, 4, 5, 7, 10, and 12.

2. The Applicant shall comply with the provisions of the staff compliance and monitoring procedures as referenced in Finding 13.

J. Demand Conformance

V.R. Fesmire sponsored AFC Section 2 and participated in workshops from May through September 1981. At the October 8, 1981 evidentiary hearing he testified in support of the proposed Joint Findings.

Susan Bakker, CEC Electric Generation Systems Specialist, examined Applicant's AFC. On the basis of this review Applicant and Staff proposed the following Findings and Conclusions:

Findings:

1. Occidental Geothermal power plant #1, as proposed, will have a capacity of 80 MW and an expected output of 561 GWh annually. The Applicant plans to commence commercial operation by May 1984.

2. Public Resources Code, Section 25524, authorizes the Energy Commission to approve the AFC for the Occidental plant only if the plant is in conformance with the Commission's most recent 12-year forecast of statewide and service area electric power demand adopted pursuant to Public Resources Code, Section 25309(b).

3. The 1981 Biennial Report contains the most recent 12-year forecast of electric power demand adopted by the Commission pursuant to Public Resources Code, Section 25309(b). According to the report, the forecasts for statewide peak demand and energy requirements in 1992 are 43,365 MW and 219,184 GWh, respectively. Once load growth, retirements, contract expirations, planning adjustments, relability, and fuel displacement are taken into account, the forecasts include an additional 13,705 MW of capacity and 96,432 GWh of energy in order to meet the projected 12-year demand.

4. California utilities currently have 9,736 MW of projects either under construction or in operation since the base year 1979. These projects are expected to produce 48,632 GWh of electricity annually. Nevertheless, there is still a need for 3,969 MW of capacity and 47,800 GWh of energy requirement to meet the projected demand in 1992.

5. The Applicant is a private company, not a public utility as that term is defined by federal and state law. As a private company, it does not have a service area for which it must meet an electric power demand.

6. Occidental Geothermal is currently negotiating with PGandE to sell it power from the proposed project. The 1981 Biennial Report states that PGandE's area peak demand and energy requirements are 19,204 and 87,314 GWh, respectively. Once load growth, retirements, contract expirations, planning adjustments, reliability, and fuel displacement are accounted for, PGandE needs 7,524 MW of capacity and 28,478 GWh of energy by 1992. PGandE and other utilities in the PGandE area have projects under construction or completed since 1979. These projects amount to 4,218 MW and 16,590 GWh. With these projects accounted for, the PGandE area still needs 3,306 MW of capacity and 11,888 GWh of energy by 1992.

7. Based on hearings for the 1981 Biennial Report, the Commission has determined that geothermal power has historically been the cheapest of thermal options and has relatively few adverse environmental effects. Because of these factors, the Commission has established a policy to certify the maximum number of geothermal sites and facilities that demonstrate reasonably mitigable environmental impacts and that meet existing air and water quality standards. Any geothermal facility that meets these criteria will be deemed needed, both as to statewide and service area electric power demand.

8. As implemented through state policy, the provisions of the Public Utilities Regulatory Policies Act will determine the terms of the sale of the Applicant's geothermal power. Under the law, the purchasing utility must offer to purchase the Applicant's electrical output at the purchasing utility's current avoided or marginal costs for power. This cost to the utility is presently equal to its cost of generating electricity through existing oil-fired plants.

9. The cost of power from the Applicant's plant to the utility's ratepayers will be more expensive than the cost of power from existing or new utility-owned geothermal power plants, but probably not more expensive than most potential purchasing utilities' marginal fuel, the burning of oil in existing facilities.

Conclusions:

1. The Occidental Geothermal power plant #1, as proposed, conforms with the most recent 12-year statewide and service area demand forecasts adopted pursuant to Public Resources Code, Section 25309(b).

2. Although the project, as proposed, conforms with the statewide and service area demand forecasts, the Applicant must further justify the need for the plant, in accordance with stated Commission policy, by showing that the environmental impacts are reasonably mitigable and that the project will meet existing air and water quality standards.

K. Power Plant Efficiency

V.R. Fesmire sponsored AFC Section 1.4.1; filed a data response on June 12, 1981; and participated in workshops from May through September 1981. A. Rodney Gottschalk, CEC Energy Facility Siting Planner, reviewed Applicant's AFC and data submittal. (RT 634-652) Based on this review, Applicant and Staff proposed the following Findings and Conclusions:

Findings:

1. The Warren-Alquist Act requires that the "Commission shall develop and coordinate a program of research and development in energy supply, consumption, and conservation and the technology of siting facilities and shall give priority to those forms of research and development which are of particular importance to the state, including, but not limited to...increased energy use efficiencies of existing thermal electric and hydroelectric power plants and increased energy efficiencies in designs of thermal electric and hydroelectric power plants." (PRC § 25601)

   Further, PRC § 25002 states that wasteful uses of power "result in serious depletion or irreversible commitment of energy... resources...." PRC § 25004 states that "the Legislature further finds...that there is a pressing need to accelerate research and development into alternative sources of energy and into improved technology of design and siting of power facilities."

   PRC § 25401 states "It (the Commission) shall also carry out studies, technical assessments, ...directed to reducing wasteful, inefficient, unnecessary, or uneconomic uses of energy...of the following:

   e. Advances in power generation and transmisssion technology."

2. In a letter to the CEC dated June 12, 1981, Occidental stated that modifications to the turbine design in the AFC (26 inches last stage blades) will reduce the steam utilization to 17,540 pounds per hour per megawatt. The Occidental net plant heat rate is 20,783 Btu per kilowatt-hour based on the modifications to the turbine design. This value of steam utilization compares favorably with other geothermal power plants at The Geysers and is within the range of the most and least efficient power plants.

3. A 20 percent improvement in power plant efficiency would allow the plant to generate the intended amount of electric power while saving 2.4 billion pounds of geothermal steam per year.

4. No new equipment development is required to achieve an improved plant efficiency based on the Commission staff review of the SMUDGEO #1 Application for Certification. However, a modification to the Applicant's specifications for the turbine, main condenser, and circulating water system would be required. These modifications will likely increase the plant's installed capital cost.

5. The Staff has developed a compliance and monitoring program.

Conclusions:

1. The technology, design requirements, and plant equipment currently exist to improve the efficiency of the Occidental geothermal power plant.

2. An improvement in plant efficiency will conserve the geothermal steam resource consistent with the requirements of the Warren-Alquist Act (PRC § 25002).

3. Fewer steam wells will need to be drilled over the plant lifetime to maintain the required steam supply. However, the cost savings may be offset by the increase in the plant's installed capital cost due to the modifications necessary to improve the plant's operating efficiency.

Staff conducted independent analyses on: (1) the cost-benefit of steam efficiency improvement and (2) equipment change impacts (for improved efficiency) on Applicant's construction schedule, but did not propose any conditions to certification related to power plant efficiency. (RT 651)

CONCLUSIONS ON PROJECT ENGINEERING

Public Resources Code Section 25523 requires the Commission to make decisions on the following matters:

(a) Specific provisions relating to the manner in which the proposed facility is to be designed, sited and operated in order to protect environmental quality and assure public health and safety.

(d) Findings regarding the conformity of the proposed site and related facilities with standards adopted by the commission pursuant to Section 25216.3 and subdivision (d) of Section 25402,* with public safety standards and the applicable air and water quality standards, and with other relevant local, regional, state, and federal standards, ordinances, or laws. If the commission finds that there is noncompliance with any state, local, or regional ordinance or regulation in the application, it shall consult and meet with the state, local, or regional government agency concerned to attempt to correct or eliminate the noncompliance. If the noncompliance cannot be corrected or eliminated, the commission shall inform the state, local, or regional governmental agency if it makes the findings required by Section 25525.

(f) Findings regarding the conformity of the proposed facility with the 12-year forecast of statewide and service area electric power demands adopted pursuant to subdivision (b) of Section 25309.

In addition, Title 20, California Administrative Code Section 1752 specifies how matters subject to review by statute are to be contained in the Committee's Proposed Decision.

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* PRC Section 25402(d) requires the Commission, in order to reduce the wasteful, uneconomic, inefficient or unnecessary consumption of energy, to "Recommend minimum standards of efficiency for the operation of any new facility at a particular site which are technically and economically feasible. No site and related facility shall be certified pursuant to Chapter 6 (commencing with Section 25500) of this division, unless the applicant certifies that standards recommended by the Commission have been considered, which certification shall include a statement specifying the extent to which conformance with the recommended standards will be achieved."

In the area of Project Engineering the Committee has inquired whether the proposed power plant and related facilities will comply with safety standards--including those adopted by the Commission--and whether any modifications, mitigation measures, conditions or other specifications must be imposed on the proposed plant and related facilities to ensure safe and reliable design, construction, and operation.

Based on the undisputed evidence presented by Applicant and Staff, and examination of the Final Environmental Impact Report, the Committee adopts the Findings, Conclusions, and Conditions jointly-proposed by Applicant and Staff in the areas of: Civil Engineering, Geotechnical, Structural Engineering, Reliability (non-seismic), Safety, Transmission Line Engineering and Safety and Nuisance, Demand Conformance, and Power Plant Efficiency.

The Committee directs the Commission's Compliance Audit Manager to respond to Applicant's exercise of the changes described in Findings 2 and 14 of the Structural Engineering section. The Manager's decisions on these matters shall be subject to approval by the Executive Director and appealable to the full Commission.

II. ENVIRONMENTAL IMPACTS

A. Aesthetics

V.R. Fesmire sponsored AFC Section 5.9 and participated in workshops from May through September 1981. Joseph O'Hagan, CEC Assistant Energy Facility Siting Planner, examined Applicant's AFC (RT 1,827-1,834) and prepared the Aesthetics section of the FEIR. Based on this review, Applicant and Staff proposed the following Findings, Conclusion and Condition:

Findings:

1. Long-term adverse impacts lasting throughout the life of the project will result from:

    a. Visibility to certain populated areas in Long and Collayomi valleys of the power plant and one transmission line tower on the preferred tapline route (see Finding #1a under "Electrical Transmission");

    b. Visibility to the east of three transmission line towers if the Applicant implements the alternate tapline route (see Finding #2b under "Electrical Transmission");

    c. Degradation of the water in Anderson Creek caused by sediment from the plant site; and

    d. Loss of natural vegetation on and severe alteration of the natural contours of the power plant site.

2. Short-term adverse impacts, such as noise, dust, and increased traffic will last only through the construction phase of development.

3. The adoption of the following measures will minimize many of the impacts:

    a. Use of colors and nonreflected materials to minimize the contrast between the development and the natural background;

    b. Selection of the preferred route for the transmission line;

    c. Revegetation on all land surfaces disturbed by construction of the Oxy No. 1 power plant; and

    d. Landscaping and erosion and sedimentation control (see under "Soils").

Conclusion:

If the mitigation measures in Finding 3 are implemented, the visual impact from the proposed project will be acceptable.

Condition:

The Applicant shall implement the mitigation measures referred to in Finding 3.

B. Cultural Resources

V. R. Fesmire sponsored AFC Section 5.7 and participated in workshops from May through September 1981. Greg Newhouse, CEC Senior Environmental Planner examined Applicant's AFC and prepared the Cultural Resources section of the DEIR (RT 1817-27). Based on this review, Staff and Applicant proposed the following:

Findings:

1. Evaluation of potential project impacts on cultural resources includes research of relevant literature, determination of the ethnographic context, consultation with knowledgeable experts, and on-site surveys of the areas affected by the project.

2. The term cultural resources includes paleontological, archaeological, and historic resources and those sites or artifacts which are of cultural significance to a particular sociocultural group.

3. Several cultural resource investigations have been conducted within the leasehold on which the proposed Occidental Geothermal Plant No. 1 would be sited.

Archaeological Resources

4. During 1976 field surveys, an archaeological site, now designated CA-LAK-711, was discovered. The site is located near the western edge of the leasehold. The site consisted of a surface scatter and a midden depth of nearly two meters. The site lies on the presumed boundary between two Native American tribal groups and on or near an aboriginal trail. The site area also was identified by a Native American consultant as being used within his lifetime for hunting bear and deer.

5. Following additional field investigations, site CA-LAK-711 was nominated to the Federal Register of Historic Places, and in 1980 the site was officially listed in the Register.

6. Cultural resources sites or districts which have been nominated to or listed on the Register may not be disturbed. Site CA-LAK-711 is located outside the area on which the proposed power plant and related facilities would be located. Construction is not planned in the immediate vicinity.

7. Occidental will protect site CA-LAK-711 by establishing a 200 foot (65 meter) buffer zone around the boundary of the resource site and restricting access to the site area.

8. Other unidentified archaeological resource sites may exist within the leasehold which may be identified during development of the leasehold for the proposed project or during construction activity.

9. Occidental will retain the services of a qualified archaeologist prior to and throughout the project construction period. If previously unknown cultural resources are encountered, all construction activity in the immediate area will stop until the specialist can evaluate the extent and significance of the resources and, in consultation with CEC and interested agencies, develop the necessary mitigation plan. If agreement between Occidental and CEC cannot be reached regarding a mitigation plan, the matter shall be considered under the provisions of the CEC Dispute Resolution Procedures.

Paleontological Resources

10. Specific geologic formations in The Geysers KGRA occasionally contain microscopic fossils. One such formation is the rock units of the Franciscan melange which may contain lenses of fossiliferous chert.

11. Rock units of the Franciscan melange occur within the leashold on which the proposed Occidental Geothermal Plant No. 1 would be sited. To date no fossil-bearing chert or other paleontological resources have been identified within the leasehold.

12. Occidental will retain the services of a qualified geological or paleontological specialist throughout the project site preparation period. For any excavation in an area of Franciscan melange which exceeds four meters in depth, the designated specialist will make a field check to determine whether any significant fossiliferous chert has been uncovered.

13. Occidental will notify the CEC within 24 hours of the specialist's evaluation of the excavated materials if significant fossil resources are present. Should mitigation be required to protect the resources, representatives of the CEC, Occidental, and the Ukiah office of the Bureau of Land Management will meet within one working day after the initial notification to discuss and reach an agreement on mitigation. Pending resolution of this matter, construction activity and/or excavation in the resource area will cease.

HISTORIC RESOURCES

14. Research of literature indicates that historic uses of the general area of and around the proposed project site have included mining, logging, grazing, and recreation. During the 1976 cultural resources field investigations of the Occidental leasehold no remains of historic activities were uncovered which would warrant designation of the area as a historic site. If such resources are uncovered during the construction period, the measures specified under point 9 shall be implemented.

RESOURCES OF SOCIOCULTURAL SIGNIFICANCE

15. Based on research of ethnographic and archaeological literature and field visits with Native American consultants, there are no sites of sociocultural significance within the Occidental leasehold, although there are several plants of ethnobotanical significance. Native American consultants indicated that a major trail once passed through the leasehold, but no current traces of the trail could be identified during the site visits. If archaeological resources are uncovered by construction, the archaeologist shall consult with appropriate Native Americans to determine the ethnographic significance of the resources.

Conclusions:

1. Mitigation measures proposed for protection of archaeological resource site CA-LAK-711 are adequate.

2. Mitigation measures proposed for identification and protection of previously unknown archaeological and paleontological resources are adequate.

3. No mitigation is required for protection of historic resources or resources of sociocultural significance.

4. If the mitigation measures set forth in Findings 7, 9, 12, 13, 14, and 15 are implemented, the project will comply with applicable laws, ordinances, and standards for cultural resources.

Condition:

1. The Applicant shall implement the mitigation measures as set forth in Findings 7, 9, 12, 13, 14, and 15, the EIR on the Occidental Geothermal project, and CEC's Compliance Plan for Occidental Geothermal Plant No. 1.

C. Soils

V.R. Fesmire sponsored AFC Sections 5.2 and 5.3; filed data responses on April 29, 1981; and participated in workshops from May through September 1981. Zene Bohrer, CEC Facility Planner, examined Applicant's AFC and prepared the FEIR analysis on soils. Based on this review, Applicant and Staff proposed the following Findings, Conclusions, and Conditions:

Findings:

1. Rainfall in The Geysers KGRA is known for its highly erosive nature.

2. Large increases in erosion and sediment transport due to road construction have been observed in areas with soil and rainfall patterns similar to The Geysers KGRA.

3. Increases in erosion have been attributed to the conversion of forest land and brushland to grass land. (Occidental proposes, at least initially, to replace a native stand of brush with introduced grasses.)

4. Soils developed on the Franciscan Formation and similar to those found on the Occidental leasehold (rainfall is also similar to that encountered in The Geysers KGRA) produced 10 times as much sediment (1.9 tons to 19 tons per acre per year) after the native brush cover had been removed and the slopes reseeded at the University of California Hopland Experiment Station.

5. The highest sediment delivery rates occur during the first year after construction and decline rapidly during the following three or four years. Thereafter, rates decline slowly but nevertheless remain above preconstruction rates for several decades.

6. Soils underlying the Occidental leasehold can be expected to erode badly when exposed to rainfall and overland flow.

7. The terrain on the leasehold is steep, ranging from 20 to 100 percent (45 degrees) with the steepest slopes in the northwestern portion of the leasehold.

8. The natural terrain at the plant site will be disturbed; the vegetative cover will be removed from the soil and replaced by buildings, paved lots, and temporarily denuded slopes, and a revegetation program promptly begun.

9. Preproject erosion rates on the Occidental leasehold have been estimated by the CEC staff to be three tons per acre per year. During construction, if soil surfaces are fully exposed to rainfall, erosion losses could escalate to as much as 55 to 200 tons per acre per year. Prior to the rainy season of the first construction year, the Applicant plans to begin a revegetation program including irrigation to assure germination and establish ground cover. Postproject losses have been estimated by the CEC staff to be six tons per acre per year which is still greater than generally acceptable soil loss tolerances of one to five tons per acre per year.

10. There is a possibility that the development of the Occidental leasehold inclusive of power plant, transmission lines, and access road will increase the sediment load in Anderson and Gunning creeks.

11. Following completion of Well Pad B construction, ¼ acre of the Applicant's leasehold disturbed by geothermal development will drain into Gunning Creek or its tributaries.

12. The Applicant proposes to implement the following erosion control measures on the ¼ acre of fill slope of Well Pad B:

    (a) Revegetate by using top soil, punched straw, seeding, jute netting, and irrigation;

    (b) Place rip-rap at the toe of the fill slope and a sediment screen/retaining wall of staked straw bales in a continuous line beyond the rip-rap;

    (c) Where possible, retain and divert to the Anderson Creek Watershed all runoff from the fill slope area that would normally drain to Gunning Creek side; and

    (d) Stake baled hay interceptors at intervals along the existing logging raod from the toe of the slope to the Applicant's property line.

13. The mitigation measures described in Finding 12, when implemented on the ¼ acre of fill slope of Well Pad B, will very likely be adequate to prevent the degradation of Gunning Creek by sediment deposition. However, no erosion control is entirely fail safe. To ensure that these erosion control measures are effective, the Applicant proposes to collect aerial and ground level photographic evidence as described in Findings 16 and 17 and conduct slope erosion transect analyses of the Well Pad B fill slope. These measures, when implemented, will produce sufficient evidence to evaluate the effectiveness of the foregoing erosion control measures.

14. Sediment ponds, the dams which form them, and accessory roads, when constructed in narrow mountain canyons, cause greater environmental damage than benefit.

15. Implementing the erosion control measures described in Finding 12 (except for irrigation) at Well Pad C and at the toe of the power plant fill slope provides a more effective means of mitigating sediment transport than building and maintaining a sediment pond.

16. Photographing cut and fill slopes after major rainstorms until there is an established grass cover on such slopes is a reasonable way of determining the effectiveness of mitigation measures to control sheet, rill, and gully erosion.

17. The Applicant proposes to conduct false color infrared aerial photography of the leasehold at 500 feet altitude (above ground) at 1:3,000 scale in the spring and fall for the years 1983 through 1987. Such aerial photography provides an adequate means of monitoring the effectiveness of the Applicant's erosion control measures.

Conclusions:

1. There is a high erosion potential at the proposed Occidental power plant site.

2. Because of the high erosion potential, measures described in Condition 1 should be taken to quantify and reduce erosion which may take place.

3. Development of the Occidental leasehold might cause sediment deposition in Anderson Creek which may degrade its quality and impair its primary use for recreation in the Anderson Springs community. The impact on the local water supply will be most noticeable during the first three or four years after the project completion but may exceed preconstruction rates for several decades.

4. If implemented, the erosion control measures described in Finding 12, together with the evaluation measures described in Finding 13, will very likely be adequate to prevent the degradation of Gunning Creek by sediment deposition.

5. The proposed sediment pond below the power plant site on a tributary of Anderson Creek should be eliminated from the project and replaced with mitigation measures, except for irrigation, as described in Finding 12.

6. In order to determine the effectiveness of mitigation measures to control erosion, the Applicant should photograph cut and fill slopes as described in Findings 16 and 17.

Conditions:*

1. The Applicant shall quantify in tons per acre the amount of sediment loss from cut and fill slopes on the Occidental leasehold.

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* The Hydrology Mitigation section includes additional requirements concerning erosion control measures.

2. The Applicant shall implement the erosion control measures on the ¼ acre of fill slope of Well Pad B as described in Finding 12. The Applicant shall also implement the evaluation measures described in Finding 13.

   If collected evidence indicates failure of on-slope mitigation to control erosion, the Applicant shall rectify the problem.

3. In lieu of the sediment pond, the Applicant shall implement the erosion control measures, except for irrigation, described in Finding 12 on the fill slope of the power plant site. The Applicant shall, during the first water year (i.e., October 1 through September 30) or until a grass cover is established, photograph cut and fill slopes from fixed reference points after a major rainstorm, to show the effectiveness of mitigation measures to control sheet, rill, and gully erosion.

4. The Applicant shall establish photographic monitoring points on the ground which give a full-face view of the fill. From such points, the Applicant shall photograph cut and fill slopes as described in Finding 16.

5. As described in Finding 17, the Applicant shall submit false color infrared aerial photographs taken twice a year in the fall and spring at 500 feet altitude above ground, 1:3,000 scale, for the years 1983 through 1987.

D. Waste Management

V.R. Fesmire sponsored AFC Sections 1.4.8 and 6.1.2; filed data responses in April 29, 1981; and participated in workshops from May through September 1981. Martin Homec, CEC Facility Planner, examined Applicant's AFC (RT 1,857-1,870) and prepared the Waste Management section of the FEIR. Based on this review, Applicant and Staff proposed Findings, Conclusion, and Conditions:

Findings:

1. The proposed project will generate the following wastes:

   a. Construction debris, waste oil, sewage;

   b. Hydrogen sulfide emissions abatement equipment wastes; and

   c. Cooling tower sludge.

2. Construction wastes include lumber scraps, unsalvageable shipping materials, concrete wastes, and plastic wrapping. These wastes are not hazardous, but still must be disposed on only in approved disposal sites.

3. The sewage produced at the site will be treated by a package secondary sewage treatment plant. Liquid effluent will be injected with the steam condensate into injection wells. The sewage sludge will be disposed of at an appropriately licensed landfill.

4. The hydrogen sulfide abatement equipment wastes, cooling tower sludge, and waste oil are currently considered to be hazardous wastes by the Department of Health Services.

5. The hydrogen sulfide abatement equipment consists of a Stretford unit as the primary process and a secondary abatement system for treating the steam condensate.

6. The Stretford effluent consists of elemental sulfur and excess process solution. Elemental sulphur will be stored on site and removed periodically to be sold or disposed of at an approved disposal site. Excess process solution will be reinjected.

7. The Applicant will temporarily store the secondary abatement process sludge and cooling tower sludge in the cooling tower basin until it is hauled to an approved disposal site. With respect to the storage, the Applicant will comply with applicable state and federal standards.

8. Hazardous wastes generated by this project will be transported only by registered waste haulers in compliance with applicable state and federal standards.

9. Toxic, hazardous, and other wastes must be disposed of only at sites approved for such wastes by the Regional Water Quality Control Board (California Water Code, Section 14040).

10. The closest sites approved by the Regional Water Quality Control Board for hazardous geothermal wastes are located in Middletown and Kelseyville. The closest site approved for nonhazardous waste disposal is located near Clear Lake Highlands.

11. The Applicant has not yet decided which disposal sites are to be used but will inform the CEC of the selected sites before beginning operation of the power plant.

12. The capacity of either approved site at Middletown or Kelseyville is sufficient to accommodate all hazardous wastes generated during the lifetime of the proposed power plant.

13. If the site(s) selected by the Applicant are filled during the lifetime of the plant, the Applicant agrees to seek approved alternative sites.

Conclusion:

1. If the Applicant implements the measures outlined in Findings 3, 6, 7, 8, 9, 11, and 13, this project will comply with all waste management standards required by state and federal laws.

Conditions:

1. The Applicant will supply the information referenced in Finding 11.

2. The Applicant will either sell its reusable wastes or seek alternative disposal sites if the sites initially selected by the Applicant reach capacity during the lifetime of the plant.

E. Hydrology/Water Quality

V.R. Fesmire sponsored AFC Section 6.0; filed data responses on April 29, 1981, and participated in workshops from May through September 1981.

In addition, Applicant called William K. Faisst to testify on:

- Condition of the Gunning Creek Watershed prior to development by the Applicant;
- Comparison of the impact of Applicant's development with other activities in the watershed;
- Water quality of Gunning Creek; and
- The condition of the Anderson Springs water diversion, treatment, and distribution. (RT 1,160)

Zene Bohrer, CEC Facility Planner, examined Applicant's AFC and prepared the FEIR section on Hydrology/Water Quality. (RT 1,167-1,238) Based on this review, Applicant and Staff proposed the following Findings, Conclusions and Conditions:*

Water Quality: Power Plant Site and Steam Field

Findings:

1. The Applicant's leasehold is situated on highly erodible soil at the headwaters of Anderson and Gunning creeks. (See the findings in the Soils section.)

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* Staff and Applicant noted that technical examination of the Hydrology issue included related evaluations in the area of Public Health, which contains some Findings, Conclusions and Conditions directly relevant to the Hydrology assessment.

2. Based on existing records and data collected by various private and public entities, water quality downstream from the Occidental leasehold appears to be generally good, with occasional high values for turbidity, iron, manganese, chromium, sulfate, total dissolved solids, and coliform bacteria.

3. The Applicant plans to remove vegetation and disturb soils on 51 acres of its leasehold in order to construct the proposed power plant and further develop the steam field. Such construction activities without mitigation increase the natural erosion rate by as much as 20 times. The Applicant proposes to implement mitigation measures which will probably reduce the erosion rate to preproject levels within two to three years after completion of construction. If the mitigation measures are successfully implemented and managed, the potential for impacts is substantially reduced in Anderson Creek and may be eliminated in Gunning Creek.

4. Federal, state, and local agencies have recommended that drill pads not be sited closer than 250 to 700 feet from a live stream. Lake County has approved the Applicant's construction of Well Pad B to allow the toe of one fill slope to be within 158 feet of the perennial tributary to Gunning Creek.

5. Anderson Springs residents use the water from Anderson Creek primarily for recreational purposes. There are five known residences using water from Anderson Creek for domestic purposes on a seasonal or permanent basis. Anderson Springs residents use water from Gunning Creek primarily for domestic consumption. The waters from both creeks are used to a lesser extent for industrial and agricultural purposes.

6. Gunning Creek supplies 50 to 70 percent of the potable water for Anderson Springs community residents. The balance of the potable water comes from other sources in the Anderson-Gunning Creek watershed.

7. The potential primary water pollution sources from the construction and/or operation of this power plant are:

   a. Spills of toxic/hazardous chemicals from the H_2S (hydrogen sulfide) abatement processes, the cooling tower basin, or portions of the condensate reinjection system;

   b. Domestic waste water disposal;

   c. Storm water runoff;

   d. Plume drift deposition; and

   e. Erosion and sedimentation.

   Based upon the EIR and the Soils sections's Findings, Conclusions, and Conditions, full leasehold development could result in significant impacts on Anderson Creek due to erosion, sediment deposition, and turbidity. If the mitigation measures on Well Pad B's fill slope are unsuccessful, adverse impact on Gunning Creek will likely occur.

Conclusions:

1. The power plant and accessory facilities could pose a water pollution hazard to Anderson Creek.

2. Full development of the Occidental leasehold will increase erosion and sediment deposition in Anderson Creek. Successful mitigation measures on the fill slope of Well Pad B will minimize, if not eliminate, erosion and sediment deposition in Gunning Creek.

3. The water quality of Anderson Creek, and particularly Gunning Creek, is good, but degradation due to sediment deposition does occur after heavy rainstorms.

4. Because the people of Anderson Springs rely heavily upon Anderson Creek for recreational purposes and upon Gunning Creek for their domestic water supply, measures should be taken by the Applicant to protect the quality of both streams. Such necessary measures are referenced in Findings 1 and 2 in the Power Plant Site and Steam Field Mitigation section.

5. The location of Well Pad B within 158 feet of a live stream at the headwaters of Gunning Creek and the use of the creek as a domestic water supply for the community of Anderson Springs increase the significance of any adverse impact that may result from the construction of Well Pad B.

Mitigation: Power Plant Site and Steam Field

Findings:

1. Occidental proposes extensive mitigation measures as described in the following documents:

   a. "Application for Certification, Oxy Geothermal Plant No. 1." Sections 1.2.3.1: Drilling procedures, erosion, and groundwater contamination; 1.2.5: Injection of spent geothermal fluids; 1.2.6: Access roads; 1.2.8: Termination and abandonment of sumps and wells; 1.3.6: Storm Drainage System; 1.4.7.6: Sanitary System treatment and reinjection; 1.4.8.1: Liquid Wastes; 5.2.4: Mitigation Measures for hydrology and water quality; 5.4.4: Mitigation Measures for soils and agriculture; 5.5.6.1: Erosion Control and Prevention Measures (in Biology Resources Section 5.5).

   b. "Mitigation and Monitoring Plan for Oxy Geothermal Plant No. 1, Occidental Geothermal, Inc.," Stone and Webster Engineering Corporation, Denver Operations Center, April 1981.

   c. "Mitigation and Monitoring Plan Oxy Geothermal Plant No. 1, Occidental Inc.," Stone and Webster Engineering Corporation, Denver Operations Center, July 1981.

2. Occidental is required to implement the following mitigation measures required under federal and state statute and county ordinances:

   a. USGS Mitigation Requirements (Steam Field)

      Under authority granted them by the Geothermal Steam Act of 1970, the United States Geological Survey requires the following mitigation under terms of the federal lease granted to Occidental:

      - There shall be no construction or surface disturbance during the period from November 1 to March 1.

      - Any water needed for construction or maintenance of Site B and its road should be from a source authorized by the USGS and Bureau of Land Management (BLM), other than Anderson or Gunning creeks.

      - The Anderson Creek crossing by the road from Drill Pad C to B shall be constructed according to California Department of Fish and Game recommendation.

      - No drill pad or sump runoff shall be discharged directly into Anderson or Gunning creeks. Berms shall be constructed around the edges of pads to direct runoff into the sumps. Before sumps become full, excess water shall be pumped into tanker trucks and disposed of in an acceptable disposal area.

      - Subsurface groundwaters will be protected by casing and connecting procedures proposed in the Application to Drill (Form 9-331C) and approved by Office of Geothermal Supervisor, Menlo Park.

   b. Central Valley Regional Water Quality Control Board Mitigation Requirements

      The Central Valley Regional Water Quality Control Board requires the following mitigation and monitoring of impacts by Occidental under terms of Board Order No. 79-228 and its accessory Monitoring and Reporting Program:

      - Waste sumps shall be lined with at least two feet (0.6 m) of compacted clay or soil cement having a permeability of 1×10^{-6} cm/sec or less.

      - A minimum freeboard of three feet (1 m) shall be maintained in the waste sumps.

      - Wastes produced during the drill site preparation, road construction, and road maintenance shall be placed where they cannot be carried into the waters of Anderson Creek, Gunning Creek, or their tributaries.

- The disposal sumps shall be protected from any washout or erosion of waste or covering material and from inundation which could occur as a result of floods having a predicted frequency of once in 100 years.

- Occidental shall establish a station on Anderson Creek at the first county highway below the Anderson Springs swimming pond where the following monitoring and sampling shall be done:

  1. Stream stage will be monitored at six minute intervals;

  2. Turbidity will be monitored at six-minute increments; and

  3. Water quality samples will be collected at ½-hour intervals when turbidity exceeds 25 Nephelometric Turbidity Units and the water stage does not increase significantly.

c. Lake County under their permit authority requires the following mitigation: (Steam Field)

- Subdrains shall be provided under all fills where natural drainage courses and seepage are evident.

- Berms should be constructed around drill pads, and all runoff from the pad surface should be directed into the sump.

- Buffer zones of undisturbed vegetation shall (ordinarily) be maintained 500 feet on either side of streams. No geothermal related construction shall take place within this buffer zone without specific approval.

- A retaining levee of not less than 18 inches in height and 3 feet in base thickness shall be placed on the perimeter of all fill areas, including access road fills, pad site, and reserve pit sites, to prevent storm runoff accumulation from random discharge.

- No water for construction purposes at Site B shall be removed from Anderson or Gunning creeks, their tributaries, or springs in the area without first obtaining approval from the Anderson Springs Water Master and the USGS in consultation with the BLM and Lake County Planning Department.

- Roads bridging or fording any water course or stream shall be surfaced at least 250 feet on either side of such crossing.

a. At the Central Valley Regional Water Quality Control Board station
acent to the Anderson Springs recreational area, the Applicant
agreed to carry out additional work to convert water-stage
i to volumetric measurements and to sample for suspended solids
n water stage or flow rate increases more than 25 percent above
average for the previous 5 days.

4. On Gunning Creek at Ford Flat Road, the Applicant proposes to take quarterly water samples for turbidity and suspended solids analyses.

5. There are currently few, if any, field measurements of soil loss due to erosion or sediment transport in local streams with which to verify the success of similar erosion control plans initiated at geothermal project sites within The Geysers KGRA.

6. To determine the effectiveness of the mitigation measures to be implemented, the Applicant has agreed to spot monitor sediment transport rates and water degradation both off and on the Oxy leasehold.

7. Cooling tower drift has been identified as a potential water pollution source indirectly through vegetation loss and subsequent soil erosion and eventual sedimentation of the waterways. (For more discussion see the Biology section.)

8. The Applicant proposes a water quality monitoring program, which is adequate to characterize on-site power plant water quality impacts.

9. The Applicant has joined a cooperative areawide cumulative impact water quality and aquatic resource monitoring program now being formulated under CEC staff guidance in cooperation with other agencies, power plant, and steam developers.

10. Some of the soils at the power plant site are very deficient in nitrogen, phosphorous, and calcium and moderately so in sulfur, molybdenum, and potassium. Such soil deficiencies inhibit the establishment of vegetative cover unless corrected by the application of fertilizer or soil amendments. The Applicant proposes to correct such soil deficiencies on all cut and fill slopes for purposes of revegetation.

Conclusions:

1. Because of the greater erosion potential connected with unpaved surface roads, less erosion will result if the Applicant paves or chip seals all internal access roads within their leasehold.

2. Because of the extensive mitigation measures proposed and being implemented by Occidental, the potential for soil erosion and degradation has been substantially reduced in Anderson Creek and nearly eliminated in Gunning Creek.

3. Cooling tower drift deposition may directly affect water quality and may indirectly affect water quality through vegetation die-off and increased erosion. However, the significance of these impacts has not been determined. Because of this, the Lake County Air Pollution Control Officer has required in his Determination of Compliance that the Applicant perform deposition measurements within the Gunning Creek drainage.

4. The paved and bermed power plant pad will be adequate to contain any potential spill and all chemicals and wastes and prevent their contamination of surface of groundwaters.

5. The berms around the power plant will not contain spills due to pipeline failures, drilling sump overflows, or vehicular accidents which occur on the Occidental leasehold outside the bermed areas.

6. If Occidental implements the mitigation measures proposed in the AFC and subsequent mitigation and monitoring plans, the project will probably comply with applicable laws, ordinances, and standards.

Conditions:

1. Occidental shall implement the mitigation measures referred to in Finding 1.

2. Occidental shall comply with all mitigation required of them by the USGS, Central Valley Regional Water Quality Control Board, and Lake County.

3. The Applicant shall correct soil deficiencies, as referred to in Finding 10*, by the application of appropriate fertilizer(s) and/or soil amendments.

F. Public Health

V.R. Fesmire sponsored AFC Section 6.0; filed data responses on April 29, 1981; and participated in workshops from May through September 1981. (RT 1,126-1,131) Nancy Post, CEC Facility Planner, examined Applicant's AFC and prepared the FEIR section on Public Health. (RT 1,238-1,275) Based on this review, Applicant and Staff proposed the following Findings, Conclusions, and Conditions:

Findings:

1. The Occidental Geothermal Plant No. 1 will emit and increase existing ambient air concentrations of hydrogen sulfide, radon-222, ammonia, total suspended particulates, mercury, arsenic, boron, anthraquinone disulfonic acid (ADA), vanadium, and benzene in areas near the project. In addition, the project may increase levels of sulfur dioxide, sulfates, silica, and possibly asbestos. When inhaled in sufficient concentrations, these pollutants can adversely affect human health.

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* Corrected by Applicant and Staff attorneys on December 11, 1981.

2. California ambient air quality standards (CAAQS) exist for regulated pollutants, including hydrogen sulfide, total suspended particulates, sulfur dioxide, and sulfates. Because these standards are based in part on public health protection, compliance with the standards should adequately protect public health.

3. For those pollutants which are not subject to adopted ambient air quality standards (nonregulated pollutants), several agencies and research groups have completed studies which suggest safe maximum permissible ambient air concentrations for ammonia, ADA, arsenic, benzene, boron, mercury, vanadium, and silica. Methodologies and criteria for determining these concentrations vary, resulting in a range of values.

REGULATED AIR POLLUTANTS

4. Violations of the CAAQS for hydrogen sulfide already occur in The Geysers KGRA. Oxy No. 1 is not expected to add a "measurable contribution" to these violations. (A measurable contribution has been defined by LCAPCD to be five parts per billion hydrogen sulfide.)

5. Based on previous air quality analyses conducted for similar power plants, CEC staff expects insignificant potential public health impacts due to emission or production of the following regulated pollutants: suspended particulates, sulfur dioxide, carbon monoxide, nitrogen dioxide, oxidant, lead, nonmethane hydrocarbons, and sulfates from the project.

6. The California Department of Health Services (CDHS) requires geothermal developers to periodoically sample and analyze incoming steam to determine radon-222 emission rates from geothermal power plants. This requirement will allow verifying estimated emission rates and estimating cumulative downwind impacts.

7. For at least the first three years of commercial operation, Oxy agrees to sample and analyze on a quarterly basis radon-222 concentrations in noncondensable gases entering the power plant in the incoming steam line, or vent off-gas line, of H_2S abatement off-gas line. The sampling program will comply with the most recent California Department of Health Services, Radiologic Health section, requirements for radon-222 monitoring and reporting.

NONREGULATED AIR POLLUTANTS

8. There is a need to characterize and monitor nonregulated pollutant emissions and ambient air concentrations in order to verify earlier estimates and allow reassessing of public health risk conclusions.

9. The very limited data on actual emission rates, environmental transport, and background ambient air concentrations of nonregulated pollutants in The Geysers KGRA make estimates of nonregulated pollutant impacts from this project tentative.

10. In order to provide data on nonregulated pollutants, the Applicant agrees to the following:

    a. The Applicant agrees to participate in the SMUDGEO No. 1 ambient air monitoring program or a generic ambient air monitoring program for ammonia, arsenic, benzene, boron, fluoride, mercury, silica, and vanadium.

    b. The Applicant agrees to conduct incoming steam monitoring (operational) for ammonia, arsenic, benzene, mercury, silica, and boron quarterly for one year.

    c. After one year of power plant operation, the Applicant, CEC, LCAPCO, and other appropriate agencies will evaluate the need for mass balance measurements and calculations for nonregulated pollutants. This evluation will consider incoming steam quality data, ambient air quality monitoring results, and the accuracy of mass balance methods. If the foregoing evaluation indicates mass balance measurements are appropriate, and if the state-of-the-art for mass balance calculations will allow statistically reliable results, mass balance analysis for nonregulated pollutants will be conducted.

WATER POLLUTANTS

11. Development of geothermal resources can lead to water quality degradation in local creeks. Degradation of creeks which supply drinking water may cause adverse public health impacts if contaminants are present in sufficient concentration and for a sufficient duration.

12. Each pollution incident is different, and potential public health impacts will depend on the toxicity of pollutants involved, the concentration of materials spilled, the degree of dilution, and other factors. In order to measure the impact of any pollution incident, the Applicant agrees to conduct a sufficient monitoring program for stream contaminants that may pose a public health problem.

13. The water quality monitoring program entitled, "Scope of Work for Baseline Water Quality Monitoring, Occidental Geothermal Leasehold, Lake County," (May, 1981) by Brown and Caldwell describes an acceptable baseline water quality monitoring program for public health purposes. The Applicant agrees to add benzene, vanadium, and oil and grease to those pollutants listed in the report, Monitoring for the aqueous constituents in Table 2 of the report will also be done quarterly for one year.

14. Quarterly monitoring of these constituents shall be conducted for one year once the power plant is operational to evaluate impacts of the completed project on the quality of local surface water, particularly drinking water supplies. The data from the first year's monitoring will be evaluated in relation to baseline data, and a decision will be made as to the necessity of continuing monitoring for some or all of the constituents.

15. As amended by Findings 13 and 14, the quarterly water quality monitoring program proposed by Brown and Caldwell is an adequate means of determining the effectiveness of implemented mitigation measures and/or the need for additional measures. The Applicant and the CEC agree to jointly determine the effectiveness of implemented mitigation measures and the need for additional ones.

16. Based on recorded spill events, geothermal development at The Geysers KGRA has caused numerous water pollution incidents, some of which involve potentially toxic or harmful contaminants. Improved mitigation measures reduce, but do not eliminate, the public health concern over potential water pollution incidents.

17. The Applicant has proposed reasonable state-of-the-art mitigation measures to help guard against water degradation that could be caused by construction and operation of the Oxy No. 1 power plant. (See Applicant and Staff's Independent Water Quality sections.)

18. Geothermal Development of the Gunning Creek Watershed increases the potential for the degradation of Gunning Creek and raises public health concerns over Anderson Springs' residents using the creek as a primary source of domestic water.

19. The Applicant has proposed mitigation measures for Well Pad B which, if successfully implemented, will likely prevent the degradation of Gunning Creek by sediment deposition from Well Pad B. However, no erosion control is entirely fail safe. (See Findings in the Soils section.)

20. There are currently efforts under way to study the feasibility of three alternative water supply systems intended to protect the domestic water supply of Anderson Springs from degradation caused by geothermal and other development and natural erosion. (See Findings in the Water Quality section.)

21. The Applicant has already funded a study which examines the feasibility of alternatives to the existing water supply system for Anderson Springs.

22. The Applicant has entered an agreement for bottled water to be available to the Anderson Springs residents on short-term notice in the event any incident related to the Applicant's project renders the Anderson Springs water supply unfit for domestic purposes. The Applicant plans to maintain such an agreement for the lifetime of the project or until an alternative water supply for Anderson Springs has been established. Providing bottled water could mitigate the effects of short-term contamination and disruption of the drinking water supply for Anderson Springs residents if water pollution incidents are immediately identified and reported, if adequate quantities of water are available, and if the distribution plan is adequately designed and immediately implemented. Providing bottled water is unlikely to mitigate contamination and disruption of water supply for other domestic uses.

23. The Applicant agrees to provide Anderson Springs residents and the CEC with a detailed notice describing:

- Agency or person responsible for determining the need for providing bottle water on short-term notice in the event of a water pollution incident;
- The method for determining need and notifying affected water consumers;
- The way in which residents may obtain bottled water; and
- The provisions for consumers initiating the bottled water response if they first detect a contamination problem (particularly ouside of normal working hours).

Conclusions:

1. Even if the Oxy No. 1 power plant meets all California Ambient Air Quality Standards, regulated pollutants from the plant will add to the cumulative impact of such pollutants from all geothermal projects in The Geysers. However, if the air concentrations of such regulated pollutants are maintained in compliance with the standards, a public health problem will not likely occur.

2. Because there is insufficient data on nonregulated pollutants to verify earlier estimates of public health risks posed by nonregulated pollutants, the Applicant should conduct monitoring of nonregulated pollutants as described in Finding 10.

3. If the Applicant follows the proposed water quality monitoring program in the Brown and Caldwell report referred to in Finding 13 and as amended in Findings 13 and 14, the Applicant and the CEC will be able to determine the effectiveness of the mitigation measures implemented to protect against water degradation and also determine the need for additional measures.

4. Implementing an adequate alternative water supply system to protect Anderson Springs' water supply from degradation caused by increased geothermal and other development and by natural erosion in the Gunning Creek Watershed would greatly reduce or eliminate public health concerns over the degradation of the creek as a primary source of domestic water.

5. In order to make the bottled water plan referred to in Finding 22 effective, the Applicant should design and implement a plan which allows for prompt identification and reporting of water pollution incidents related to the Applicant's project and which provides bottled water to the Anderson Springs' community in a timely manner.

6. As a way of informing the CEC and Anderson Springs' residents of the details of the bottled water plan, the Applicant should provide a detailed notice as described in Finding 23.

Conditions:

1. The Applicant shall conduct a sampling program for radon-222 in the manner described in Finding 7.

2. The Applicant shall conduct a monitoring program for unregulated pollutants in the manner described in Finding 10.

3. The Applicant shall conduct a water quality monitoring program as described in the Brown and Caldwell report referred to in Finding 13 and as amended in Findings 13 and 14. The monitoring shall be conducted on a quarterly basis for one year prior to and one year after commencement of power plant operation, and shall include monitoring in Gunning Creek downstream of the project area. The need for continued monitoring shall be evaluated in the manner described in Finding 14.

4. The Applicant shall design and implement a plan as referred to in Conclusion 5.

5. The Applicant shall provide Anderson Springs' residents and the CEC with a detailed notice describing the items referred to in Finding 23.

Applicant and Staff witnesses all indicated the overlap between Public Health and Hydrology. (RT November 17, 1981) This interrelationship of issues is particularly noticeable in evaluating the environmental impacts from the proposed project on the community of Anderson Springs, which relies heavily on Gunning Creek for its domestic water supply. (RT 1,254)

Voris Brumfield, representing the Anderson Springs Community Services District, testified at the November 17, 1981 evidentiary hearing. She confirmed that the District is aware of on-going discussions between Applicant and the Lake County Planning Department regarding

Applicant's contribution toward a domestic water system for the Anderson Springs area and encouraged development of a permanent plan to ensure a safe and reliable supply of water. (RT 1,280-1,281)

Because of this concern, Applicant and Staff proposed the following additional Findings, Conclusions, and Conditions:

Findings:

1. While the mitigation measures to be implemented by the Applicant at the power plant and well pad sites are adequate to reduce the likelihood of degradation of Anderson and Gunning creeks to acceptable levels, they will not completely eliminate the possible risks of toxic spills and sediment deposition in the local waters.

2. Because Anderson and Gunning creeks are the two main sources of recreational and/or domestic water for local residents, the possibility of toxic spills or sediment deposition poses a possible risk to the public health of the local residents.

3. The staff of the Lake County Planning Department has suggested that the Applicant, in connection with its steam field development plan, provide up to $100,000* to help fund an intake and storage tank system to be designed and installed by the County for the purpose of providing potable water to Anderson Springs in the event of a pollution incident in Gunning Creek.

4. Such an intake and storage tank system, appropriately placed, would fully mitigate immediate potential public health impacts and disruption of water supply, attributable to the Applicant's project, to the Anderson Springs Community in the event of a pollution incident in Gunning Creek.

5. The Applicant has offered to accept the County's proposal for such funding of a tank system, subject to certain details being settled.

6. Details of the suggested proposal for the tank system are being determined by Lake County and the Applicant.

7. Lake County's staff has drafted an ordinance (Article XXXIII, Chapter 21 of the Lake County County Code) for the equitable distribution of the cost of the intake and storage tank system among geothermal developers in the Gunning Creek Watershed.

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* Lake County's proposed requirement has been changed as follows: "...an approximately 65,000 gallon water storage tank and $78,000 shall be provided by the Applicant to the Anderson Springs Community Services District."

8. The Applicant is only one of several geothermal developers with current or foreseeable projects located in the Anderson Creek and Gunning Creek watershed. These other developers also create the possible risk to public health posed by the potential for toxic spills or sediment deposition. Requiring Occidental to contribute $100,000 for the proposed tank system is reasonable only if Lake County adopts an ordinance for equitable distribution of this cost as described in Finding 6.

9. If Lake County and the Applicant have not agreed upon terms to fulfill the suggested proposal discussed in Finding 3 within one year of certification of the Applicant's project, the Applicant agrees to pay the Anderson Springs Community Services District $100,000 for use by the District for designing and installing an intake and storage tank system, or for use by the District as a contribution towards the construction of a permanently enclosed water system.

Conclusions:

1. The Applicant's payment to the County of up to $100,000, as agreed between the County and Applicant,* for an intake and storage tank system, and the County's enactment of an ordinance as described in Finding 7, provide a means for fully mitigating the immediate risk to public health which could be caused by a pollution incident in Gunning Creek.

2. Applicant's agreement as described in Finding 9 provides another means for fully mitigating the immediate risk to public health which could be caused by a pollution incident in Gunning Creek.

Conditions:

1. The Applicant shall, in accordance with the terms being determined between the County and the Applicant and described in the ordinance,* provide payment of up to $100,000 to Lake County for it to use to design and install a water supply system intended to mitigate immediate risks to public health in the event of a pollution incident in Gunning Creek.

2. If, within one year of certification of the Applicant's AFC, the Applicant has not paid Lake County up to $100,000 pursuant to terms worked out between the Applicant and the County* for the proposal referred to in Finding 3, the Applicant shall provide to the Anderson Springs Community Services District an amount, not to exceed $100,000, determined by the Anderson Springs Community Services District to be necessary for designing and installing an intake and storage tank system, referred to in Finding 3, or at the District's discretion, as a constribution toward construction of a permanently enclosed system.

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* See footnote, page 56.

The text of the County-Applicant Agreement referred to in Condition 1 is now contained in the Lake County Use Permit:

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7. **The applicant shall provide an approximately 65,000 gallon water storage tank and $78,000.00 to the Anderson Springs Community Services District, on behalf of Lake County, for improvements to protect and safeguard the community water supply from accidental spills and/or contamination. Said tank shall be new and appropriately painted (inside and outside) as approved by the Lake County Health Department. The bolted steel tank shall include, but not be limited to, the following fittings: Roof vent, side manhole, top manhole, outside ladder, aluminum gauge board and other required fittings. Water line fittings should be designed prior to purchase of the tank and specifications submitted to Occidental. Said tank shall have at least a one-year no leak warranty. Said tank shall be delivered and erected at a site to be provided by the Anderson Springs Community Services District. The water storage tank shall be provided in a condition acceptable to the Anderson Springs Community Services District and County/State Health Department officials at the time of its erection. Mitigation funding shall be provided within 15 days after the issuance of this use permit. Said tank shall be delivered to the Anderson Springs Community Services District within sixty days of said district's provision of a suitable site. If a suitable site is not provided within twelve months, the applicant shall provide the cash equivalent for said tank, according to the most recent price quotation. Mitigation expenses incurred by the applicant as described in this subject are provided in contemplation of partial reimbursement by subsequent developers pursuant to Lake County Ordinance #1217.**

The text of Lake County Ordinance No. 1217 is included at Appendix D.

G. Biological Resources

V.R. Fesmire sponsored AFC Section 5.5; filed data responses on April 8, 1981; and participated in workshops from May through September 1981. By stipulation on November 12, 1981, Applicant and Staff proposed the following Findings, Conclusions, and Conditions on the undisputed areas of Biological Resources:

Findings:

1. The following federal and state laws are applicable to the preservation and protection of biological resources.

   a. Federal

      (1) Endangered Species Act of 1973 and implementing regulations. 16 USCA 1531 et.seq., 50 CFR part 17.

      (2) Federal Regulation Implementing the Geothermal Steam Act of 1970 (30 USC 1001-1015 and CFR 270.34(k)).

   b. State

      (1) Warren-Alquist Act, Public Resources Code §§ 25003 and 25523.

      (2) Ecological Reserve Act of 1973 and implementing regulations, Fish and Game Code, §§ 2050 through 2055.

      (3) California Species Preservation Act of 1976, Fish and Game Code, §§ 900 through 903.

      (4) California Endangered Species Act of 1970, Fish and Game Code, §§ 2050 through 2055.

      (5) Fully Protected Species Act, Fish and Game Code, §§ 3511, 4700, 5000, and 5515.

      (6) Fish and Wildlife Protection and Conservation, Fish and Game Code, §§ 1600 et. seq.

      (7) Native Plant Protection Act of 1977, Fish and Game Code.

      (8) California Environmental Quality Act, Public Resources Code, §§ 2100 et. seq.

      (9) Guidelines for Implementation of the California Environmental Quality Act of 1970, California Resources Code, §§ 15000 through 15203.

2. Construction of the power plant and associated facilities will require the removal of approximately 21 acres of native vegetation.

3. The loss of vegetation will result in increased erosion and loss of potential habitat for rare plants and wildlife.

4. Erosion resulting from vegetation loss on the Occidental leasehold may cause degradation of water quality and impact aquatic organisms in Anderson Creek.

5. If accidental spills and other releases of toxic materials reach local streams, aquatic resources are also likely to be affected. Such spills are considered unlikely.

6. Water quality changes occurring on the Occidental leasehold could affect aquatic resources for a considerable distance downstream.

7. The extent that aquatic resources and water quality will be affected by erosion and toxic substances cannot be predicted using the current level of information.

8. A systematic monitoring program is the only reliable method for determining the effects, if any, of geothermal development on the Oxy leasehold on the aquatic resources of Anderson and Gunning creeks.

9. The Applicant has agreed to participate as a full member in the Aquatic Resource Monitoring (ARM) program. Participation by the Applicant in the ARM program if begun in 1981 would provide sufficient monitoring of the Oxy plant's impact on aquatic biota.

10. No rare or endangered plants are known to occur on the Occidental leasehold.

11. A small serpentine "barrens" (an area with little or well-spaced woody vegetation) occurs on the leasehold near the power plant site.

12. Serpentine barrens have been identified as an endangered plant community by the Natural Diversity Data Base.

13. Serpentine barrens as identified in Drawing 13876-EY-3B-I should be protected from disturbance.

14. Operation of geothermal power plants in The Geysers region has resulted in injury to surrounding vegetation.

15. There is a possibility that vegetation injury will occur on the Occidental leasehold as a result of cooling tower drift.

16. The effects of cooling tower drift on surrounding vegetation can be determined only through systematic monitoring.

17. Much of the chaparral on the leasehold is in a decadent (overgrown) condition and presents a potential fire hazard. Vegetation in this condition also is of less value to wildlife than vegetation in an earlier successional stage.

18. Prescribed burns in the chaparral areas of the leasehold would improve the carrying capacity for wildlife and would serve as partial compensation for the loss of wildlife habitat.

19. Several large "snags" (a standing dead tree) occur on the leasehold and are valuable as wildlife habitat.

20. Snags should be preserved for their value as wildlife habitat.

21. Occidental must secure permission of the surface land owner in order to implement wildlife mitigation measures (specifically prescribed burning) within the leasehold.

22. The American peregrine falcon, a state and federally designated endangered species, is known to nest and forage in The Geysers-Calistoga KGRA.

23. The distance from the Oxy project site to the only known eyrie (nest site) in The Geysers is such that no adverse effects on the American peregrine falcon are anticipated.

24. No other rare, threatened, or endangered wildlife species are known to exist on the Occidental site.

25. Golden eagle and ringtail are fully protected species by state designation.

26. Golden eagles and ringtail have been observed in The Geysers-Calistoga KGRA.

27. The Occidental leasehold is not a significant breeding or feeding area for the golden eagle. No impacts on this species are anticipated on the leasehold.

28. Studies on ringtail in The Geysers indicate that they occur in riparian zones, use snags, trees, and rock outcrops for dens, and may range over 400 to 500 acres.

29. Habitat features which support ringtail are found on the Occidental leasehold.

30. There is a likelihood that ringtail occur on the Occidental leasehold.

31. Studies have not been conducted on the Occidental leasehold which would confirm the existence of ringtail.

32. Geothermal development in The Geysers KGRA has resulted in significant cumulative effects on the region's fish, wildlife, and vegetation. Increased human activity; increased soil erosion and sediment deposition; decreased air quality; toxic substances from cooling towers, steam wells and spills; and disturbance of vegetation from construction have resulted in losses to biological resources. Most of these losses cannot be quantified at this time because of incomplete data on the long-term nature of the impacts.

33. Mitigation measures proposed by the Applicant to offset project impacts will help reduce cumulative impacts but not to negligible levels.

34. Both prescribed burning (or off-site mitigation as referred to in condition 1.d.) and participation in the Aquatic Resource Monitoring (ARM) program will further help to reduce and quantify cumulative impacts.

35. The Applicant has proposed in the AFC, Sections 5.5.6.1 - 5.5.6.3, and in the Monitoring and Mitigation Plan dated August 1981, various erosion-control techniques, revegetation, and enhancement measures. These measures are reasonable state-of-the-art mitigation measures which, if implemented, would likely reduce significant impacts on biological resources.

Conclusions:

1. The Occidental Geothermal power plant can be constructed and operated in compliance with applicable laws and standards for the protection and preservation of biological resources.

2. Provided that the following conditions are implemented, no significant biological resource impacts are likely to occur.

Conditions:

1. Occidental will implement biological mitigation measures outlined in the AFC, Section 5.5.6, Responses to Data Requests dated March 20, 1981, and May 18, 1981, the Monitoring and Mitigation Plan dated August 1981, and additions to Proposed Mitigation Measures presented by staff at the June 6, 1981, Issues Hearing. These measures include, but are not limited to, the following:

   a. In order to reduce soil erosion, the Applicant shall implement those mitigation measures not limited to the use of mechanical erosion reducing measures and revegetation with hydromulched grass mixtures and antive shrubs, as described in the AFC, Sections 5.5.6.1 - 5.5.6.3, and in the Monitoring and Mitigation Plan dated August 1981.

b. Occidental will monitor the effects of cooling tower drift on surrounding vegetation as described in the Monitoring and Mitigation Plan dated August 1981.

c. Occidental will conduct prescribed burns on the leasehold on an annual rotating basis. Snags will be protected during burning operations, where appropriate. This program is described in the Monitoring and Mitigation Plan dated August 1981.

d. In the event that the surface owner does not permit condition 1.c., Occidental shall implement mitigation measures, comparable in economic and environmental value to that of prescribed burning referred to in condition 1.c., on a site off the Occidental leasehold and in a manner approved by the CEC.

e. The Applicant shall not disturb the serpentine barrens as shown in Drawing 13876-EY-38-1.

2. The Applicant shall conduct a systematic aquatic monitoring program for the purpose referred to in findings 8 and 9. As a way of conducting such a program, the Applicant shall participate as a full member in ARM. If for any reason the ARM program does not continue for two years, the Applicant shall conduct for the remainder of the two-year period an aquatic resources monitoring program comparable in cost and purpose to the Applicant's participation in ARM within the Putah Creek watershed.

3. Occidental shall have an appropriately trained biologist on site as needed to ensure that biological mitigation measures are properly implemented and to guarantee that inadvertent biological damage is avoided. If adverse biological impacts are imminent, work in the immediate area will cease until corrective measures can be taken. Procedures for reporting such incidents shall be followed as outlined in the Compliance Plan.

4. Occidental shall monitor and report to CEC biologists on the effectiveness of mitigation measures. In the event mitigation measures fail, corrective measures will be taken immediately.

The Ringtail

After examining Staff's testimony and without conceding Staff's allegation that the Applicant's project will have a significant effect on the ringtail population, Applicant offered to implement all ringtail-related mitigation measures specified by Staff, other than the proposed study. (RT 1,648) This offer was restated in Applicant's December 10, 1981 Brief as follows:

(1) Clearing vegetation by April 15 or after July 1 in order to avoid disturbing denned ringtails during the birthing period;

(2) Protect undisturbed riparian areas by not constructing within such areas;

(3) Construction and maintenance of a reasonable number of artifical den sites; and

(4) Establishment of additional native plants known to comprise part of the ringtail's diet on disturbed areas.

The Committee notes that one of Applicant's attorneys during the November 19, 1981 evidentiary hearing had described the vegetation clearing process to be done by hand in order to facilitate the natural evacuation of discovered ringtail, if any, from the plant site. The hand clearing process is also implied in Applicant's Initial Brief, page 12. Integration of the above-measures with the proposal made at the evidentiary hearing may be inferred from Applicant's citation in its Initial Brief, pages 17-18.

To cover the possibility that its stipulated mitigation package (just described) was not acceptable to the Committee, Applicant presented Joanne Sorensen, Environmental Scientist with Jones and Stokes Associates, Inc., who testified (RT 1,655-1,780) in support of the following Applicant-proposed Findings, Conclusions, and Conditions:

Findings

1. Information on ringtail distribution and abundance in California has been presented by Grinnell (1937), Schempf and White (1977), Orloff (1980), Belluomini (1980), Koch and Brody (1981), and Belluomini and Trapp (in prep.).

2. The California Energy Commission sponsored a study on the ringtail in The Geysers by Donald Koch and Allan Brody of Natural Systems Investigations. There are two versions of the Koch and Brody Report. One has a consultant's report cover dated September 1981, and the other simply is dated June 30, 1981.

3. The text of the September report contains several word and sentence changes that significantly alter the conclusions contained in the June report. No new data were reported to substantiate these changes in the September report. The data cited in both reports support the conclusions drawn in the June report.

4. Under the Koch and Brody study, the ringtail (Bassariscus astutus) distribution and abundance, habitat utilization, and behavior were studied in the Geysers-Calistoga Known Geothermal Resource Area. The primary goal of the study, as stated in the June report, was to determine the impact of geothermal power development on the ringtail. Results of the June report indicate the KGRA is marginal ringtail habitat supporting an estimated population of 15-20 individuals. The average territory size was 221 hectares. All animals were captured in riparian or closely associated vegetation types. Data obtained from four radio instrumented ringtails indicate proximity to Big Sulphur Creek is the parameter most useful in predicting ringtail distribution in the KGRA. Ringtail used rock piles, trees, snags, and man-made structures for den sites. Small mammals and birds constituted 75.5 percent of the diet. The June report further concludes that the current level of geothermal power development does not appear to have an adverse impact on the ringtail population within the KGRA. Future mitigation measures should strive to protect the integrity of riparian and associated vegetation types.

5. Although the four-month Koch and Brody study did not sample the eastern part of the KGRA, which drains into Putah Creek, the goals of the study were stated in the Introduction to the June report as being "to collect data on the distribution and abundance, habitat utilization, and behavior of the ringtail within the KGRA." These goals were approached "with the intent of determining the impact of geothermal energy development on the species."

6. Methodology of studying species populations allows for the selection of representative areas (such as the areas selected by Koch and Brody) for drawing conclusions applicable to a much larger similar area (such as the entire KGRA).

7. The ringtail is a small, shy, nocturnal member of the racoon family that is found throughout most of California. Included in the ringtail's geographic range is the Geysers-Calistoga Known Geothermal Resource Area, the largest geothermal energy producing field in the world.

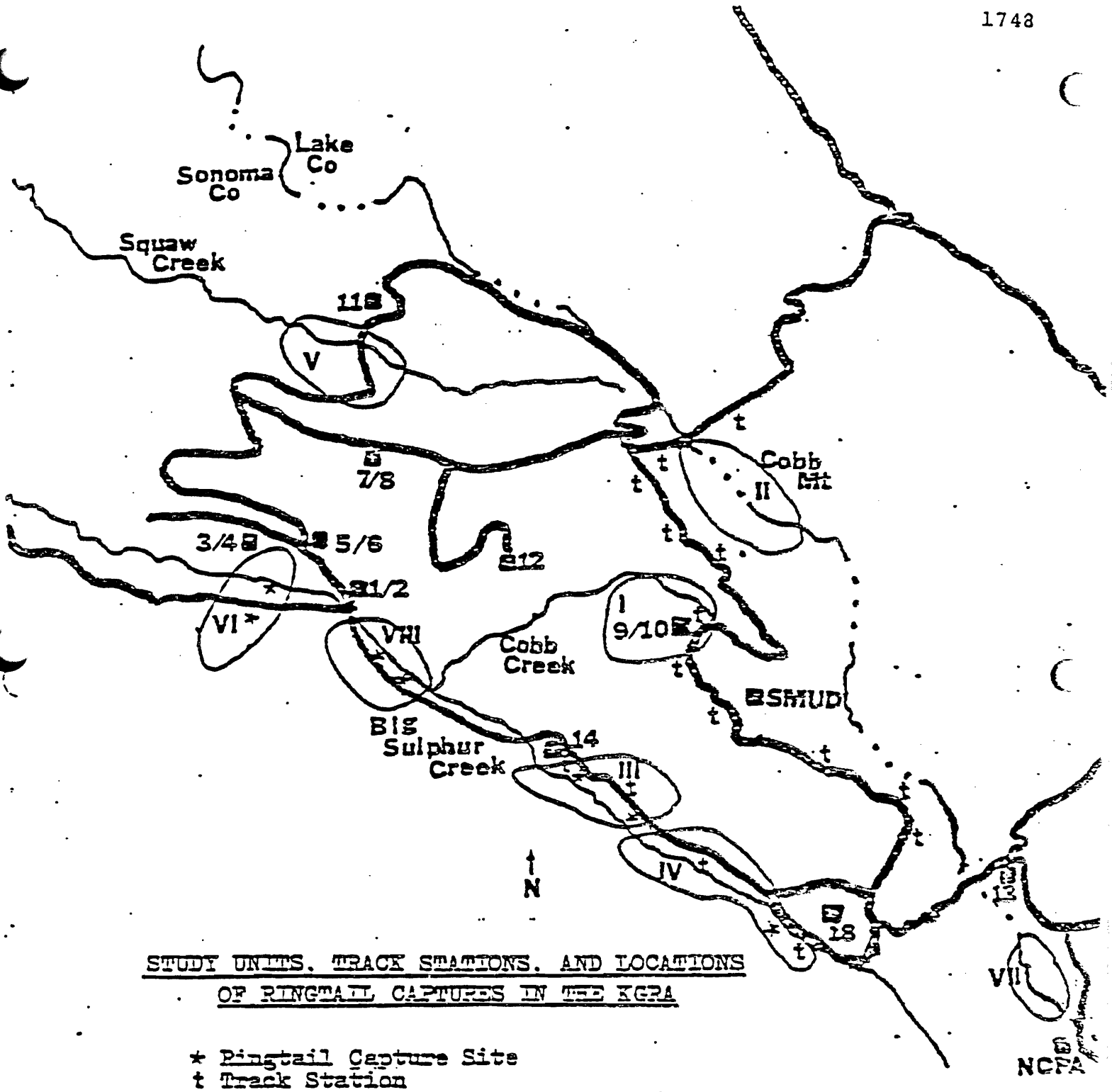
8. Results obtained from live trapping, track stations, and radio-telemetry indicate The Geysers area supports a small but viable population of ringtails. Although ringtails are found throughout a variety of habitats in California, most of which are represented in The Geysers, ringtails were found only along Big Sulphur Creek. These animals occupy a territory of approximately 200 hectares (500 acres).

9. Any potential ringtail habitat of riparian area on the Oxy leasehold which will be removed by leasehold development has already been removed at the Anderson Creek crossing of the road from well pad C to well pad B. No additional riparian area will be affected by construction of the power plant or pipelines.

10. The ringtails studies by Koch and Brody were captured in close proximity to existing geothermal power plants and geothermal wells. This fact establishes the cohabitability of at least some ringtails with geothermal development. See Figure 1 (attached).

11. All the ringtails studied by Koch and Brody were captured in riparian woodland or riparian-influenced vegetation types, not more than 100 meters from Big Sulphur Creek. It is noteworthy that no ringtails were captured in riparian vegetation along Squaw Creek, Cobb Creek, or Hot Springs Creek, despite intensive efforts in those areas. Intensive efforts in the rocky chaparral areas of Cobb Mountain were also fruitless. There is no evidence to date that ringtail inhabit the Anderson Creek riparian area.

12. Fifteen dens were visited by investigators during the Koch and Brody study, most of them more than once. Rock piles were used most often. These rock piles were always large, consisting of many boulders and supplied with a network of tunnels and openings. Both snags and large living trees of various species were used. Two dens were in man-made structures. Study animal #104 denned for at least four days in a pile of milled lumber at the Biegel summer residence on Big Sulphur Creek, and study animal #106 denned many times through the study in a rock pile supporting steam lines on Magma Thermal Well #9 at Big Geysers. This last den is especially noteworthy as it is in the most intensively developed area of the KGRA. Sulphurous steam constantly rises out of cracks in the rocks. The crack that was considered to be the major entrance to the den was ten meters from the heavily used Big Geysers Road and 15 meters from the well valve itself. Noise level was high enough that signs stating that ear protection is necessary have been placed in the area by Union Oil Company. This indicates the cohabitability of ringtail and geothermal development.



STUDY UNITS, TRACK STATIONS, AND LOCATIONS OF RINGTAIL CAPTURES IN THE KGRA

★ Ringtail Capture Site
t Track Station
Power Plant
I 9/10 Study Unit (393 trapnights)
II Cobb Mt. Study Unit (174 trapnights)
III Unit 14 Study Unit (193 trapnights)
IV Pine Flat Study Unit (382 trapnights)
V Squaw Creek Study Unit (180 trapnights)
VI South Geysers Study Unit (169 trapnights)
VII NCPA Study Unit (180 trapnights)
VIII Big Sulphur Study Unit (234 trapnights)
---County Line

Figure 1

13. The hypothesis of the Koch and Brody study that the Geysers ringtail population is at carrying capacity is supported by the apparently high amount of aggression between males. The only sub-adult male collared, study animal #110, has a home range less than a third of the size of the smallest adult home range.

    In addition, the two other sub-adults captured were on the edge or just outside of study animal #110's home range. All three showed recent scars of battle. If more suitable habitat was available, the younger males would probably emigrate and aggression would be reduced. This is significant considering the lack of ringtails in other apparently suitable habitat.

    Results of the Koch and Brody study showed that geothermal development did not seem to have any direct effect on ringtails. They were often found associated with developed areas. Number 102 was on at least one occasion inside the compound at PG&E Unit 14, and #110 denned in a road cut. The most obvious evidence is the behavior of #106, who inhabited the most intensively developed area of the KGRA and denned on a well pad.

14. At present levels, geothermal development does not appear to have any direct impact on ringtails.

15. Both the June and September Koch and Brody reports conclude that ringtails are indifferent to geothermal development at current development levels. The area studied will never be developed more intensively than is now planned.

16. Prescription burning is a technique often used to improve habitat for wildlife (especially deer) in areas where wildfire is suppressed in order to protect developed areas or timber resources. Controlled burns are an integral part of mitigation measures taken by the developers of KGRA on behalf of wildlife. Burning generally occurs on mature chaparral areas; an effort is made to protect riparian areas from these fires. In early May, however, prescription fire conducted by private landowners burned to the banks of Big Sulphur Creek near the confluence with Little Geysers Creek, and burned areas close to Big Sulphur Creek between PG&E Unit 14 and Union Beigel Well #1. A densite of #102 (UTMG coordinate 204926), while not actually destroyed by the fire, was surrounded by the burn. The animal was in the den several times before the fire, but left it on the day of the fire and was not observed there again. From these observations, and the apparent preference for thick cover, it appears that fire does not benefit ringtail.

17. The Conclusion of the June Koch and Brody report pertaining to "Status of the Ringtail in the KGRA" reads, in full, as follows:

    > "The KGRA is apparently marginal ringtail habitat; observed density is lower than in other areas of California. This low density seems to be a function of natural factors such as microhabitat and possibly competition with other carnivores.

"Microhabitat parameters could not be measured in this study; particularly mysterious are the factors that allow ringtails to inhabit the Big Sulfur Creek area while apparently excluding them from other physionomically suitable habitat. Low density does not seem to be a direct function of geothermal development. Geothermal development may, however, be affecting ringtail numbers through intermediates such as vegetation, water quality, or prey base.

"Population size is estimated at 15-20 individuals. Ringtails in the KGRA appear to be territorial, with the sex ratio favoring males. Riparian woodland is the favored vegetation type."

18. The conclusion of the June Koch and Brody report, pertaining to "Mitigation Measures" reads in pertinent part: "At the present, active mitigation measures other than avoidance of preferred ringtail habitat were not demonstrated by the data in the Koch and Brody study."

19. During the Koch and Brody study, there was one study related ringtail mortality observed. An extensive necropsy was performed but, according to the June report, no natural cause for its death was determined. There have been no known ringtail deaths associated with development of the Occidental leasehold. With the likelihood of additional mortality occurring if ringtail studies are continued and with the very close proximity (less than one mile) of the Koch and Brody study area and the Occidental leasehold, it is not prudent to subject the very small KGRA ringtail population to further extensive study.

20. There have been no reported sightings of ringtail cat on the Applicant's lease.

21. The Oxy leasehold is approximately 220 hectares (543 acres). Based on the average size of a ringtail territory, an area this size would only support one ringtail pair. Even if several ringtail pairs were found on site, the sample population would be too small to be statistically valid in any evaluation of data for population trends or for other study purposes.

22. The cost of the two-year ringtail study proposed by the Staff will be approximately $200,000.

23. The ringtail was harvested as a furbearer prior to 1967.

24. "According to past reports of fur trappers the ringtail, although plentiful, was a minor species in the annual fur catch." (Seymour 1977).

25. "Because of its low fur value and high esthetic appeal the legislature has seen fit to classify the ringtail as one of California's fully protected mammals...." (Seymour 1977).

26. Occurrences of ringtail were reported in 49 of 58 counties of California (sightings between 1960 and 1980). (Orloff 1980).

27. "The affinity of ringtails for riparian areas is confirmed by the abundance of sightings along many of the major rivers in California." (Orloff 1980).

28. "Although riparian areas, the preferred habitat of ringtails, are being degraded throughout the state, ringtail populations do not appear to be threatened at present. Abundance data suggest that ringtail numbers are either stable or increasing." (Orloff 1980).

29. In a Nongame Wildlife Investigations report (California Department of Fish and Game) on "Ringtail Distribution" the research recommended that the State "remove the ringtail from the list of fully protected mammals." (Orloff 1980).

Conclusions:

1. Ringtail in California is a common, widely distributed mammal whose population numbers are stable or increasing. The state ringtail population is not threatened by development and local populations are not threatened when impacts to preferred habitat (riparian) are avoided.

2. The Conclusions set forth in the June Koch and Brody report are valid because they are fully supported by the data presented, whereas the altered Conclusions in the September report are not.

3. Although the actual site of data collection for the Koch and Brody study was limited to select areas of the KGRA, that study determines the impact of geothermal power development on the ringtail cat for the entire KGRA. There is no need for studies by Occidental on this subject. The June 1981 Koch and Brody report has shown:

    (a) The KGRA is marginal ringtail habitat.

    (b) The ringtail presently in the KGRA can and does cohabitate with geothermal development.

    (c) Ringtails are indifferent to geothermal development.

    A study of ringtail limited to the Occidental leasehold will not provide data on a population of sufficient size (provided that any ringtail occupy the leasehold) to provide statistically reliable results.

    A study of design similar to the Koch and Brody study would not yield any more conclusive information that could be used to evaluate impacts on ringtail. The study would be redundant. Thus, the high cost of an additional study outweighs the benefits.

4. Geothermal development has not been shown to have any direct impact on ringtail cats.

5. There are no mitigation measures to be applied to protecting the existing ringtail populations, if any, other than to protect the remaining riparian area on the leasehold.

Condition:

1. The Applicant will keep the potential ringtail riparian habitat area on the Oxy leasehold unspoiled and undisturbed during the remainder of development, construction and operation of the project.

Sorensen disputed Staff's proposed ringtail study because:

- The June and September 1981 Koch and Brody reports offered by Staff as bases for the study differ in conclusions regarding the status of the ringtail in the KGRA, even though no new data was presented nor reinterpretation offered to substantiate the conclusion in the latter report. (RT 1,750)

- The proposed study is vague; particularly objectives and study design in light of the outstanding question as to whether there are any ringtails on Applicant's leasehold. (RT 1,750)

- The study contemplates a "before and after" comparison of the leasehold's habitability for ringtails even though the site has already been substantially disturbed by major road building and well pad construction. (RT 1,750)

- The study may cost as much as $200,000, but no less than $75,000. (RT 1,752)

Sorensen concluded her direct testimony by stating:

1. There is only a chance of there being ringtail on the Occidental leasehold;

2. Any chance of impacting ringtail is reduced because the power plant will not be located in riparian or riparian-associated habitats; and

3. The number of ringtail possibly living on the leasehold is small, between one and two given the average territorial habits of the species. (RT 1,752-53)

Because of the above limitations, Sorensen maintains that "there won't be any statistically valid samples with so few individuals, so there can't be any conclusions made about population trends or impacts that can be projected to other places in the KGRA." (RT 1,753)

Jim Nelson, CEC Energy Analyst, testified in support of Staff's separate Conditions proposed to mitigate impacts on the ringtail. (RT 1,527-1,605):

Condition A. The Applicant shall implement the following ringtail mitigation measures on its leasehold:

1. Begin clearing of vegetation by April 15 or wait until after July 1 in order to avoid disturbing denned ringtails during the birthing period; and

2. Protect undisturbed riparian areas by not constructing within such areas.

Condition B. The Applicant shall conduct a field study for one year using trapping and radio telemetry to document the population size and home range of ringtails on the leasehold and locate ringtail during construction. Construction activities shall avoid areas where animals are known to be present based on radio telemetry.

The Applicant or its consultant shall conduct the field study in the following manner:

1. The period of study shall be for no more than two years, the first to begin one month prior to the start of construction, the second year, depending on whether the Applicant implements additional mitigation measures, to begin after the start of power plant operation.

2. All field methods, including trapping, animal handling, scat analysis and use of radio telemetry, shall be patterned after those methods used in the Koch and Brody study.

3. The trapping effort shall be approximately 600 trap nights per quarter.

The CEC and the Department of Fish and Game shall approve all plans for mitigation measures and the field study.

Condition C. If, after one year, the field study fails to document the ringtail occurrence on the leasehold, the Applicant shall have no further obligation with respect to mitigation measures for ringtails. If, on the other hand, the field study shows the occurrence of one or more ringtail on the leasehold, the Applicant shall with the approval of CEC, implement as soon as possible after completion of the first year's study mitigation measures as follows:

1. Construction and maintenance of a reasonable number of den sites in areas away from the power plant site where ringtails are likely to occur. (The CEC and the Department of Fish and Game, in consultation with the Applicant, shall determine the reasonable number of den sites based on data from the first-year field study.)

2. Establishment on disturbed soils near riparian areas additional native plants, e.g., wild berries, grapes, and roses, which are known to comprise part of the ringtail's diet; and

3. Other mitigation measures as agreed to by CEC and the Applicant. Mitigation measures will be designed based upon review of data from the first year's study and in consultation with experts, including the Department of Fish and Game.

Condition D. In addition to implementing the above measures, the Applicant shall resume the field study for one year beginning after the start of power plant operation. The Applicant shall use the same field methodology as in the first-year study. The purpose of the second-year field study shall be to determine whether or not artificial den sites are being used and thus the need to continue maintaining these structures for the life of the power plant. In conducting the second-year field study, the Applicant shall:

1. Note any increase or decrease in population size during the course of the study; and

2. Note whether artificial den sites are being used by ringtails.

Under cross examination, Mr. Nelson explained that Staff does not maintain that the presence of the ringtail on Applicant's leasehold would bar the project (RT 1,568); rather Staff holds that injury to ringtails can and should be avoided:

A "I believe that it is very reasonable to expect that you could avoid directly injuring the animal during construction, and if there did not appear to be a problem--say the animal remained in place for a week and I think that is not to be expected--then I believe that it would be within the realm or responsibility of the Department of Fish and Game to come and check on the welfare of the animals. I suspect since this is a fully protected animal that you would have their cooperation on that.

Q "Then the purpose of that provision, locating and protecting through using trapping, and radio telemetry, is to ensure that no ringtails are hurt during construction of the power plant?

A "That's correct." (RT 1,568-1,569)

Mr. Nelson testified that the proposed study (proposed conditions B and D) is needed, regardless of Applicant's willingness to implement all other mitigation measures because:

A "The studies proposed would provide information on how to implement the proposed mitigation measures as well as leaving a space for negotiating further mitigation measures with Occidental in the event that an additional mitigation measure is warranted, yes."

Because of the continuing dispute between Staff and Applicant over the staff-proposed ringtail study, the Committee invited all parties to file briefs on:

"Whether, as a matter of law, Applicant may be required to conduct a study on the impact of geothermal development on the ringtail in the Geysers area as a condition to certification of the Occidental Geothermal Plant No. 1 Application for Certification."

Staff cited PRC Section 25523(a) and Title 20, California Administrative Code Section 1741(b) to uphold the Commission's legal authority to impose any permit condition that is reasonably related to the proposed project,* and maintained that:

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* "Initial Brief of the Staff of the California Energy Commission, Subject: Ringtail Study", 12/10/81 cited "Staff's Initial Brief."

> "There is substantial evidence in the record to show that the study is a necessary part of a ringtail mitigation plan which is feasible, reasonably necessary, and available to reduce the significant adverse environmental effects of the Applicant's proposed plant." (Staff's Initial Brief, p. 1)

Staff clarified that its proposed study is restricted to mitigating impacts on Applicant's leasehold, and not a study of impacts on the entire Geysers KGRA.* The overall purpose of the study, according to Staff witness, Dr. Gene Trapp, is to locate appropriate areas for artificial den sites, identify proper construction materials, and estimate the number of needed dens. (RT 1,494, 1,496) Dr. Trapp testified that this purpose would be substantially achieved with implementation of Condition B (RT 1,502), and that compliance with Condition D would allow refined application of the proposed mitigation measures while providing "useful data on the effects of ringtail habitat-enhancement measures in the KGRA." (RT 1,496)

"Applicant's Initial Brief in Opposition to Ringtail Study" (filed 12/10/81) contends that the facts in this case prohibit the Commission from applying its permit conditioning authority, either because the condition's purpose is:

1) to gather information for future use in other siting cases, violating the "reasonable relationship" that must be shown between condition and project for the proper exercise of the Commission's licensing authority; or

2) to allow use of future information to reshape Applicant's permit beyond the period of statutory jurisdiction for licensing proceedings.

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* In Applicant's Rebuttal Brief, pages 2 and 3 contend that the site-specific scope of the proposed study conflicts with testimony by Staff witnesses at RT 1,496, 1,504, 1,531-32, 1,609-10 and 1,632-33.

Independent from these objections, Applicant also argues that there is little or no evidence in the record to either support a finding that ringtail exist on Applicant's land or that the project will significantly affect the ringtail population (Applicant's Initial Brief, p. 7)--the latter evidentiary deficiency depriving Commission action of CEQA authority.* Applicant points out that Staff's lead witness, Dr. Trapp, on the basis of a single visit to the leasehold, testified that the ringtail might exist on the Applicant's property (Applicant's Initial Brief, p. 9)

Notwithstanding the legal objections to Staff's proposed ringtail study, Applicant objects that the study would not facilitate on-site mitigation because construction activities will occur during the field investigation; and off-site data extrapolation will be severely limited according to both parties' witnesses (see RT 1,661-1,664, 1,510)

Applicant also characterizes Staff's proposal as an attempt to shift the burden for studying any effect of geothermal development from government to an individual plant operator when PRC Section 21190(g) clearly indicates that the responsibility for reviewing "the potential impact of development projects" (on wildlife habitat) rests with the Environmental Protection Program.

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* PRC Section 21081 states, "Pursuant to the policy stated in Sections 21001 and 21002.1, no public agency shall approve or carry out a project for which an environmental impact report has been completed which identifies one or more significant effects thereof unless such public agency makes one, or more, of the following findings: (a) changes or alterations have been required in, or incorporated into, such project which mitigate or avoid the significant environmental effects thereof as identified in the completed environmental impact report; (b) such changes or alterations are within the responsibility and jurisdiction of another public agency and such changes have been adopted by such other agency, or can and should be adopted by such other agency; (c) specific economic, social or other considerations make infeasible the mitigation measures or project alternatives identified in the environmental impact report."

Applicant distinguishes between the Staff's proposed study condition, characterizing it as an attempt to "determine whether a condition should be imposed at some future time" (Applicant's Initial Brief, p. 28), and a monitoring condition ordered to pursuant to PRC Section 25532; arguing that the former condition violates the 12-month certification limit imposed by PRC Section 25540.2(a).

Staff's rebuttal brief pointed out that Applicant's joint sponsorship of Biological Resources Finding #30 ("there is a likelihood that ringtail occur on the Oxy Leasehold") triggers the Title 14, California Administrative Code, Section 15082(a)* "significant effect" presumption because there is evidence on the record to show that the "project has the potential to substantially reduce the habitat of . . . wildlife species."

Applicant's rebuttal brief noted Staff's representation of the scope of the ringtail study being limited to the leasehold conflicts with the testimony received during evidentiary hearings and should be interpreted by the Committee as "a concession that a study for the broad purpose of collecting data on ringtail in The Geysers is not a proper condition of certification." (Applicant's Rebuttal Brief, p. 3) As to the site-specific purposes of the proposed ringtail study, Applicant suggests Staff's position is paradoxical: adequate habitat information exists to predict probable ringtail presence but not to determine where to plant appropriate food; diet information is adequate to specify what plants the ringtail eats, but not to determine what food sources should be planted; and although the proposed study is said

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* Title 14, Division 6, Chapter 3 of the California Administrative Code contains regulations enacted by the Secretary of the State Resources Agency to explain implementation of the California Environmental Quality Act, PRC Section 21,000, et.seq.

to be needed for a definition of adequate mitigation measures, the September 1981 Koch and Brody Report (conducted near Applicant's leasehold) demonstrates the ringtail's preference for riparian habitat, discusses ringtail diet, and identifies man-made materials actually used by ringtail for denning activities (Applicant's Rebuttal Brief, pages 6-7).

The FEIR Summary states that while "the Oxy leasehold (is) likely to contain ringtail, the impacts to this fully protected species cannot be assessed due to lack of data concerning their existence on the leasehold" (FEIR), p. vi). In the FEIR "Project-Specific Environmental Analysis" Biological Resources Section, staff examined the ringtail as follows:

- SETTING: "Presently, no studies have been conducted on the Occidental leasehold to provide any indication of the ringtail's possible occurrence.... Individuals may tolerate geothermal development and occur near some developments in The Geysers (Koch and Brody, 1981). The Occidental leasehold includes excellent ringtail habitat, so there is a substantial likelihood that ringtail occur on the site." (FEIR, page 87)

- IMPACT: "Use of the leasehold by ringtail is considered likely. Vegetation loss from operation could affect potential breeding and feeding areas near the power plant. Because no estimates of ringtail populations on the leasehold are currently available, impacts on this fully protected species cannot be determined at this time. Due to the likelihood of ringtail occurring on the Occidental site, it is important to monitor the effects of this development on their well-being." (FEIR, page 90)

- MITIGATION: "CEC staff recommends that OXY shall avoid adversely impacting the ringtail by:

  A. Allowing no further disturbance of riparian areas.

  B. Locating and protecting as many ringtail as possible during construction (using trapping and radio telemetry to locate the animals).

C. Starting vegetation clearing either before the birthing period (approximately late April) so that the pregnant ringtail are able to escape from the immediate construction zone or by waiting until after July 1. Furthermore, Oxy will attempt to determine the size of the ringtail population (by trapping) and determine the home range and denning sites of all captured aminals (with radio telemetry). If ringtails are located on the leasehold, the following mitigation measures shall be implemented:

1. Construction of artificial den sites.

2. Establishment of food plants on fill slopes near Anderson Creek.

3. Other methods as agreed to by both CEC and Oxy.

Oxy will then continue the trapping and telemetry efforts for a period of one year after the implementation to document the use of the den sites by ringtail and the need to maintain these structures for longer periods." (FEIR, page 92)

According to the FEIR Introduction editorial notes, the mitigation section cited above from page 92 was added to the EIR following the 45-day comment period on the DEIR. However, FEIR Appendices F and G show no basis for such modification.* On September 30, 1981, William Isherwood, Acting Deputy Conservation Manager--United States Geological Survey, did ask, "Will the impacts to the ringtail be assessed before the power plant is permitted, or are studies of the ringtails in the area to be a part of the recommended approval conditions?" (FEIR, page 365) CEC staff responded, "Ringtail should have been studied prior to certification; failing that, CEC recommends such studies as a condition of certification." (FEIR, page 431)

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* None of Applicant's comments on the DEIR description (FEIR, pages 341, 346, 347, and 354) of the ringtail were the basis for FEIR modifications (see Staff responses at FEIR, pages 416, 421, and 426).

H. Air Quality

1. Lake County Air Pollution Control District's (LCAPCD) Determination of Compliance.

PRC Section 25532(d) requires the Commission to make findings regarding the conformity of a proposed site and related facilities to air quality standards. If the Commission finds that there is noncompliance with any state, local or regional ordinance or regulation, it must consult with the involved agency and attempt to correct or eliminate the noncompliance. If noncompliance cannot be corrected or eliminated, the Commission shall inform the agency if it makes a determination under section 25525 that the "facility is required for public convenience and necessity and that there are not more prudent and feasible means of achieving such public convenience and necessity."

Sections 1744.5 and 1805, Title 20, California Administrative Code (CAC) require an applicant to submit all information required for an Authority to Construct under the applicable district rules, subject to the provisions of Appendix B, part (k) of the CAC. During the Commission's certification process, the local air pollution control officer conducts a Determination of Compliance (DOC) review of the application to determine whether the proposed facility meets the requirements of the applicable new source review rule and all other applicable district regulations. The DOC then specifies the conditions, including Best Available Control Technology (BACT) and other mitigation measures, necessary for compliance.

The local district and the Air Resources Board must provide a witness at the evidentiary hearings to present and explain the determination of compliance. Any amendment to the applicant's proposal related to compliance with air quality laws shall be transmitted to the APCD and ARB for consideration in the Determination of Compliance.

On July 28, 1981, Robert L. Reynolds, Lake County Air Pollution Control Officer (LCAPCO) filed a positive DOC (see Appendix A) on Applicant's project under LCAPCD Rule 608. The LCAPCO also presented the DOC at the November 17, 1981 evidentiary hearing, pursuant to the ARB-CEC Joint Policy Agreement. (RT 1,356-1,372) He clarified that DOC Condition #2* provides a procedural mechanism for post-certification

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* Condition 2: "The hydrogen peroxide/catalyst, stretford/surface condenser, drift eliminators, turbine by-pass, dual generating units with shunt and multiple power source constituting the air emissions control system as proposed in 81-AFC-1 and amendments shall be the equipment used to satisfy the requirements of Condition 1. In the event that Occidental seeks to change the above equipment necessary to control H_2S emissions as proposed prior to operation, they shall request that the LCAPCD Hearing Board hold a public hearing to determine whether the alternate technology is capable of satisfying the requirements of Condition 1. The alternate technology may be used only if the LCAPCD Hearing Board and CEC determine that it is capable of complying with Condition 1. All abatement systems shall be properly winterized and maintained to ensure proper and reliable functioning. Prior to construction, Occidental shall submit approved for construction drawings of the noncondensable gas and condensate H_2S abatement systems quantifying process flows and design capacities. If additional resource discoveries necessitate increased H_2S abatement capacity because of higher H_2S levels in the steam, such capacity shall be incorporated in the air emissions control system."

modifications to air emissions control equipment, which designates the LCAPCD Hearing Board as the appeals board for District activities.

As to CEC participation, he stated:

> "I will for the record indicate that it is my understanding that the appeal would go to our Hearing Board, a decision would be made in our jurisdiction. The condition does recognize the role of the CEC in changing a DOC condition, and it simply states that the CEC will determine whether it is acceptable to them as well.
>
> * * * *
>
> "We can't uncertify anything you have certified nor change your conditions, so that has to be left up to you in your choice of what you should do next." (RT 1,360-1,361)

After examining Applicant and Staff's Jointly-Proposed Air Quality Stipulations, Finding number 26,* the following exchange took place:

> Q. It doesn't conflict then with your Condition number 2?
>
> A. That's kind of a legal opinion, and it seems like legal opinions can always be offered one way or another. It may well indeed conflict if you interpreted it to say that indeed after the District gave approval that you could somehow change our approval. I do not read that condition to say that. It just says that we both must approve. If that's how you interpret it, I guess I would say it is not inconsistent with our Condition 2. If you interpret it as though you might have a separate proceeding, I would say that, at a minimum, it would probably be redundant." (RT 1,363)

Mr. Reynolds requested that the DOC be incorporated into the Commission's Compliance Plan.** (RT 1,371)

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* Finding 26: "Occidental has committed to use a Hydrogen Peroxide process (with or without catalyst) but is investigating alternative secondary H_2S controls, condensate stripping and condensate pH control. If the testing of these alternative processes show one to be economically and technically superior to the hydrogen peroxide process, Occidental may change its design after obtaining approval from the LCAPCD and CEC."

** "Staff-Proposed Compliance Plan for OXY Geothermal Plant No. 1", October 14, 1981 (Revised December 4, 1981), Commission Publication No. P800-81-010.

2. Air Quality

V.R. Fesmire sponsored AFC Section 5.1; filed data responses on April 29 and June 11, 1981; and participated in workshops from May through September 1981. (RT 1,374-1,377) Richard K. Buell, CEC Associate Mechanical Engineer, reviewed Applicant's AFC and data responses and prepared the FEIR Air Quality section. (RT 1,378-1,468) Based on this review, Applicant and Staff proposed the following stipulations:

Findings:

Compliance with Air Quality Laws

1. The Oxy Geothermal Plant No. 1 is proposed to be located in the Lake County Air Pollution Control District (LCAPCD). The following laws are applicable to the Oxy Geothermal Plant No. 1:

   a. Clean Air Act and implementing regulations;

   b. California Health and Safety Code and implementing regulations; and

   c. LCAPCD Rules and implementing regulations.

      Specific rules of concern are:

      (1) 411
      (2) 412
      (3) 421.2.A
      (4) 430
      (5) 601, 604, and 605 (New Source Review)
      (6) 608

2. Oxy No. 1 has applied for a federal PSD permit.

3. LCAPCD Rule 411 limits emissions of particulate matter to whichever is the lesser of:

   a. 0.2 grains per standard cubic foot of gas; or

   b. 40 pounds per hour.

4. The maximum expected particulate emission rate from the proposed facility, assuming an oxidizer and evaporative cooler are used for the Stretford process, is 7.6 lbs/hr, or 0.00003 grains per standard cubic foot and 0.003 grains per standard cubic foot from the cooling tower and the evaporator respectively. This emission rate will comply with LCAPCD Rule 411.

5. LCAPCD Rule 412 limits emissions from any sulfur recovery unit producing elemental sulfur to the following:

   a. 300 ppmv of sulfur compounds calculated as SO_2;

   b. 10 ppm H_2S by volume; and

   c. 100 pounds per hour of sulfur compounds calculated as SO_2. The Air Pollution Control Officer (APCO) interprets Rule 412 as applying to Stretford and EIC units.

6. Specifications for the Stretford Unit will require that H_2S in the tail gas will be controlled to 10 ppmv or less.

7. LCAPCD Rule 421.2.A (as revised April 1981) limits H_2S emissions from a geothermal power plant receiving an Authority to Construct on or after January 1, 1981, to not more than 50 grams per gross megawatt hour (g/GMWh). Occidental has agreed to operate the facility such that H_2S emissions will not exceed 8.0 lbs/hr, or approximately 41 g/GMWh.

8. A general emissions limitation contained in LCAPCD's Rule 430 prohibits the discharge of any contaminant in an amount which causes injury, detriment, nuisance, or annoyance to any considerable number of persons or which causes injury or damage to business or property.

9. Complaints from the Anderson Springs-Cobb area as a result of H_2S air pollution continue, although H_2S standard violations have been markedly reduced in the past one to two years. The LCAPCD and Northern Sonoma County Air Pollution Control District (NSCAPCD) specifically regulate H_2S emissions to attain and maintain the California Ambient Air Quality Standards (CAAQS) for H_2S, which is based in part on a nuisance emission threshold. Compliance with the H_2S standard and compliance with Determination of Compliance (DOC) conditions of the LCAPCD are adequate to ensure compliance with Rule 430.

10. Occidental has applied for a permit under Rule 608. Notwithstanding New Source Review rules (Rules 602, 604, and 605(c)), Rule 608 allows the LCAPCD to permit a geothermal facility, provided the facility uses BACT and meets the following criteria:

    - Power plants and geothermal fluid transmission lines must limit on a continuous basis the hydrogen sulfide emission rate to no more than five pounds per hour 5 lbs/hr per one million pounds per hour of steam flow received.

    - The power plant is not located within 0.6 miles of a permitted geothermal power plant (within the district) and is not located within 1.0 miles of a populated area (as defined in Chapter 21 of the Lake County Code, Article XXV, Section 21-73.6A(1)).

- Geothermal development wells must limit the hydrogen sulfide emission rate on a continuous basis during air drilling, clean-out, initial testing, and reworking to no more than five (5.0) pounds per hour (2.3 kilograms per hour).

- Wells on standby vent shall be located no closer than 0.5 miles from a populated area (as defined in Chapter 21 of the Lake County Code, Article XXV, Section 21-73.6a(1)), and emissions shall be no greater than an average of one (1) pound per hour per well based on the number of completed wells for the associated power plant's steamfield.

- In the judgment of the APCO, the facility must be able to readily show compliance with all other rules and regulations which limit emissions other than hydrogen sulfide.

- Within 30 days of being notified, no individual property owner or legal resident within a one-mile radius of the proposed power plant site makes a request for a New Source Review of the project.

11. The power plant (within LCAPCD) nearest to the proposed Oxy No. 1 site is PGandE Unit 13, which is approximately 1.25 miles away. The nearest populated area to the proposed Oxy No. 1 site is Whispering Pines, which is approximately 2.3 miles away. The Oxy No. 1 project therefore meets the locational requirements of LCAPCD Rule 608.

12. Occidental has agreed to limit H_2S emissions to 5 lbs/hr per million pounds steam received (8.0 lbs/hr based on 1.6 million pounds steam input to the facility) and meet the steam field requirements of Rule 608.

13. The LCAPCO has determined that Occidental's proposed H_2S controls constitute BACT and the facility will comply with all other rules and regulations which limit emissions other than hydrogen sulfide.

14. As of July 28, 1981 no individual property owner or legal resident within one mile of the proposed power plant has requested a New Source Review of the project.

15. The proposed Oxy Geothermal Plant No. 1 and steam field meet the prescriptive requirements of LCAPCD Rule 608 and are therefore exempt from New Source Review (LCAPCD Rules 602, 604, and 605). Nevertheless, the parties have examined the environmental impacts of the proposed project which are summarized below.

Environmental Impacts

16. It is not expected that emissions of TSP, nonmethane HC, or SO_2 will prevent the attainment, interfere with the maintenance, or cause a violation of any AAQS for these pollutants.

17. To determine whether the proposed project's H_2S emission will result in a violation or measurable contribution to a continued violation of the state H_2S AAQS, Systems Applications Incorporated (SAI) assessed air quality impacts at nearby receptor areas based on the 9.7 lbs/hr (H_2S) emission rate initially proposed. This impact assessment used tracer tests and computer modeling.

18. LCAPCD, Occidental, ARB, and CEC staff agreed that the meteorological conditions which would produce the worst-case impact from the Oxy #1 power plant are limited mixing conditions.

19. Based upon the tracer test and computer modeling (including examination of the tracer and modeling studies performed for the SMUDGEO #1 facility) a reasonable estimate of the worst-case incremental impact of the Oxy #1 facility is 2 to 3 parts per billion (ppb) H_2S at receptor areas (based on a 9.7 lbs/hr H_2S emission rate). Because of the inherent uncertainties in the above studies used to predict the incremental impact, a conservative estimate of the worst-case incremental impact is less than 5 ppb H_2S at receptor areas (based on a 9.7 lbs/hr H_2S emission rate).

20. To evaluate whether operation of the Oxy #1 facility will result in or contribute to a violation of the H_2S, AAQS, the Oxy #1 impact must be added to the expected ambient H_2S level of 1984 when the facility comes on line. During the SMUDGEO #1 proceedings, the SAI Hybrid Model projected the H_2S ambient air quality in 1984, using worst-case meteorology and the expected emission rates from the Wild Well and units operated by PG&E, DWR, SMUD, and NCPA. The projected ambient H_2S from the sources was just over 24 ppb at the sensitive receptor areas.

21. The ARB, which sets and enforces state ambient air quality standards, has determined that ambient concentrations of H_2S which equal or exceed 25 ppb constitute violations.

22. The projected worst-case background ambient of approximately 24 ppb H_2S, in light of the modeling uncertainties, is sufficiently close to 25 ppb that it is likely that a violation will occur in 1984 when Oxy #1 becomes operational. The Oxy #1 incremental impact will not add a measurable contribution to this violation as defined by LCAPCD rules.

23. SAI also estimated the likely ambient H_2S levels in 1985-86 resulting from NSCAPCD's requirement that PG&E retrofit its existing Units 1, 2, 7, 8, 9, and 10. Based on these emission rates the predicted H_2S level in 1985 - 1986 is 10 to 15 ppb in the receptor areas. Provided that PG&E retrofits these units, these levels are sufficiently below 25 ppb that it is likely that under normal operating conditions the Oxy #1 project will neither cause nor contribute to an H_2S violation after 1984.

Abatement Systems

24. Occidental proposes to use the Stretford process to abate H_2S emissions from the noncondensible gas stream and the Hydrogen Peroxide process to abate H_2S emissions from the cooling tower. Occidental also proposes dual turbine generators, and a turbine bypass mechanism to reduce stacking and corresponding emissions.

25. The H_2S in the steam supply, after it is exhausted by the turbine, separates (partitions) into both the noncondensible gas stream and the liquid condensates stream. The expected H_2S abatement efficiency of the Stretford Unit is 99+ percent of the H_2S in the noncondensible gas stream. The Hydrogen Peroxide process is capable of abating 95 to 98 percent of the H_2S in the liquid condensate stream. The partitioning efficiency (i.e., the percentage of H_2S in the noncondensible gas stream) experienced at PG&E Unit 15 is approximately 65 percent and at PG&E Units 13 and 14, is 80 to 90 percent. Based even on the lower partitioning efficiency, it can reasonably be expected that these controls will achieve H_2S emissions of no more than 8.0 lbs/hr.

26. Occidental has committed to use a Hydrogen Peroxide process (with or without catalyst) but is investigating alternative secondary H_2S controls, condensate stripping and condensate pH control. If the testing of these alternative processes show one to be economically and technically superior to the hydrogen peroxide process, Occidental may change its design, after obtaining approval from the LCAPCD and CEC.

27. The turbine bypass system will route steam around the turbines to the downstream abatement systems during unit outages and start-ups. If only one turbine is out of operation, the remaining turbine could use the excess steam from the other turbine for power production. This dual turbine/turbine bypass design will virtually avoid stacking events and provide greater operational flexibility.

28. The turbine bypass system is presently in the preliminary design stage. Such a system has never been used before on a geothermal power plant, although it has been used successfully on other power-generating facilities. The turbine bypass system is expected to operate reliably. However, successful avoidance of emission exceeds during unit outages will depend on the reliability of the proposed abatement systems.

29. PG&E, at a recent workshop on NSCAPCD proposed rule changes, indicated that they are experiencing corrosion effects on stainless steel screens located downstream of the hydrogen peroxide system on Unit 15. LCAPCD indicates this may also be a problem on PG&E Unit 13. Occidental recognizes potential corrosion problems; design of the facility will address any problems resulting from the abatement system chosen.

30. The design of the proposed H_2S abatement systems will provide for sufficient redundancy and capacity for critical components; the abatement systems should operate reliably and within the range of their expected abatement efficiency.

31. Drift eliminators will be installed on the cooling tower, which will limit the drift to 0.001 percent of the circulation water flow rate. This level of control is the current state-of-the-art. The use of this control measure will reduce particulates and some pollutants of concern to public health.

Conclusion

1. If Occidental implements the measures specified above and complies with the conditions below, it is likely that:

   a. the abatement systems will perform effectively; and
   b. the plant will conform to all applicable air quality laws.

Conditions

1. The LCAPCD shall perform all duties and functions normally conducted by the APCD and shall have the authority to issue a Permit to Operate, collect the permit fees, levy fines, order correction of operational or mechanical procedures or functions, and perform compliance tests. The established LCAPCD appeal procedures shall apply for all contested LCAPCD actions.

   Verification:

   Occidental shall summarize in a periodic compliance report (See Compliance Plan) interactions with the LCAPCD. Occidental shall immediately inform the CEC and ARB of any formal appeals filed with the LCAPCD.

2. Occidental shall comply with the requirements specified in the Lake County Air Pollution Control District document entitled, "Determination of Compliance," dated July 28, 1981. (A copy of conditions specified in this document are appended to this compliance plan.)

   Verification:

   Occidental shall annually request a letter from the Lake County Air Pollution Control Officer verifying the status of Occidental's compliance with the conditions of the Determination of Compliance. Occidental shall provide the CEC with a copy of this letter in the annual compliance report. In addition, Occidental shall provide the CEC with a copy of all quarterly reports and testing/monitoring summary reports submitted to the LCAPCD.

3. Occidental shall obtain written approval from both LCAPCD and CEC before using any equipment other than the hydrogen peroxide/catalyst, Stretford surface condenser system and dual turbine/turbine bypass system, as proposed in the AFC to control H_2S emissions (re: DOC Conditions).

   Verification:

   Occidental shall file a copy of the written approval from the LCAPCO with the CEC prior to beginning construction of any alternative H_2S emissions abatement system, as specified in DOC Condition 2.

4. Occidental shall submit approved-for-construction drawings of the power plant secondary H_2S control system to the CEC only if requested by the CEC.

   Verification:

   If requested, such drawings shall be submitted by Occidental to the CEC at least 30 days prior to commencing construction of the system.

5. DOC Conditions 3 and 6 require submittal of a detailed plan for testing the performance of the Oxy #1 H_2S emissions abatement system at normal full load operation. If continuous H_2S monitors are available, Occidental shall ensure that the detailed plan includes the following test parameters: (1) the test data shall reflect a minimum of 30 days (not necessarily consecutive days) operation at a minimum of 80 percent of the gross electricity generating capacity, and (2) in the event that at least 30 days of qualifying data could not be obtained during the 90-day test period specified in the Determination of Compliance, Occidental shall continue to collect test data until the required information has been obtained. (The application for a Permit to Operate shall be filed as specified in DOC Condition 10 and need only include the results of the performance test conducted during the initial 90 days of commercial operation.)

   Verification:

   Occidental shall provide the CEC with a copy of the detailed plan submitted to the LCAPCO for review and approval and a copy of the plan as approved. In addition, if the test period extends beyond the initial 90 days after commercial operation, Occidental shall file a supplementary report with the CEC and the LCAPCO which reflects all the results of the performance test.

6. Occidental shall, if requested by the Lake County Air Pollution Control Officer, install, operate, and maintain an on-site meteorological station capable of determining wind direction, wind speed, and temperature.

   Verification:

   Occidental shall furnish such data in a form acceptable to the LCAPCO. The submittals shall be noted in periodic compliance reports filed with the CEC.

LCAPCD Determination of Compliance Conditions; Dated July 28, 1981

Condition 1

Occidental shall install and operate the power plant and air emissions control system described in 81-AFC-1 in the manner necessary to limit H_2S emission on a continuous basis from Oxy Geothermal Power Plnat No. 1 to eight (8) pounds of H_2S per hour. This same emissions limitation shall apply during power plant outages, unless LCAPCD Rule 510 is complied with.

Condition 2

The hydrogen peroxide/catalyst, Stretford/surface condenser, drift eliminators, turbine by-pass, dural generating units with shunt and multiple power source constituting the air emissions control system as proposed in 81-AFC-1 and amendments shall be the equipment used to satisfy the requirements of Condition 1. In the event that Occidental seeks to change the above equipment necessary to control H_2S emissions as proposed prior to operation, they shall request that the LCAPCD Hearing Board hold a public hearing to determine

whether the alternate technology is capable of satisfying the requirements of Condition 1. The alternate technology may be used only if the LCAPCD Hearing Board and CEC determine that it is capable of complying with Condition 1. All abatement systems shall be properly winterized and maintained to ensure proper and reliable functioning. Prior to construction, Occidental shall submit approved for construction drawings of the noncondensable gas and condensate H_2S abatement systems quantifying process flows and design capacities. If additional resource discoveries necessitate increased H_2S abatement capacity because of higher H_2S levels in the steam, such capacity shall be incorporated in the air emissions control system.

Condition 3

Occidental shall install when practicable continuous monitoring devices indicating total volume flow rates and H_2S concentrations at the following locations: (a) outlet of Stretford unit; and (b) in the treated condensate or in the circulating water upstream of the cooling tower. A log of such monitoring shall be maintained and made available to the LCAPCD staff upon request. The H_2S monitoring devices must have an accuracy of plus or minus 1 ppm, provide measurements at least every 15 minutes, and be readily accessible to LCAPCD staff. Flow rate measuring devices shall have accuracies of plus or minus 5 percent at 40 percent to 100 percent of the total flow rate, and calibrations must be performed at least quarterly. A Houston-Atlas or equivalent type instrument shall be acceptable for use in monitoring Stretford tail gas for H_2S. Calibration records shall be made available to LCAPCD staff upon request.

Alternatively a performance plan as specified in LCAPCD Rule 655 shall be developed to ensure operation in compliance with specified emissions limitations.

Condition 4

The power plant cooling towers shall utilize drift eliminators with a guaranteed drift rate of 0.001 percent or less and the Stretford cooling tower a guaranteed drift rate of 0.002 percent or less.

Condition 5

Occidental shall provide safe access to sampling ports that enable representatives of the LCAPCD or ARB to collect samples from the treated condensate or the circulating water upstream of the cooling tower, cooling tower stacks, the noncondensable exit gas from the Stretford unit, and the direct off-gas vent.

Condition 6

At least 60 days prior to scheduled commercial operation of the second generating unit, Occidental shall submit to the LCAPCD for approval a detailed plan for testing the performance of the OXY Geothermal Plant No. 1's abatement system at normal full load operation. A copy of the plan shall also be sent to the ARB for comment. Normal full load for this purpose is defined as operating at a minimum of 90 percent of the 1.6×10^6 lbs/hr steam flow capacity. This one time test shall incorporate tests for emission from the cooling tower of components of potential concern in geothermal steam including H_2S. The LCAPCO shall approve, disapprove, or modify the plan within 30 days of receipt from Occidental. Occidental shall complete the performance test approved by the LCAPCO within 90 days or as soon as possible following the date of commercial operation.

Condition 7

If a generic monitoring program for H_2S and/or other constituents of concern is initiated in The Geysers KGRA by responsible agencies (NSCAPCD, ARB, CEC, and LCAPCD), Occidental shall participate to the extent equitable with other parties in funding or causing to be performed such a program.

Condition 8

Occidental shall install and operate for one year in the Gunning Creek drainage a wet/dry deposition sampler and analyze a monthly composite of both wet and dry samples for soluble solids, boron, flouride arsenic, silica, and mercury. The sampler utilized shall comply with or exceed the guidelines of the National Atmospheric Deposition Program.

Condition 9

Occidental shall perform biannual tests to determine the content of steam components as listed below upon written request of the LCAPCO and as required in the geothermal fluid transmission line permit. The continued need for such tests shall be reviewed after two years of operation. Copies of all tests shall be forwarded to the ARB and CEC. Such monitoring is not intended to be redundant.

STEAM CONDENSATE OR TOTAL STEAM	GAS PHASE
Ammonium (total)	Particulate mass in mocrograms per kilograms of steam
Arsenic (total)	
Asbestos (total)	Arsenic from particulates above
Benzene	Lead from particulates above
Boron (total)	Cadmium from particulates above
Hydrogen Sulfide (total)	Sulfur from particulates above
Fluorides (total)	Mercury vapor
Mercury (total)	Total methane and nonmethane hydrocarbons
Carbon dioxide (total)	Other nongases as indicated by condensate
Total dissolved solids	NESHAP pollutants as requested
Total suspended solids	

Condition 10

Occidental shall file an application for a Permit to Operate with the LCAPCD within 90 days after the commercial operation date or as soon as possible thereafter and submit appropriate permit fees. The application shall include the results of the performance test referenced in Condition 6.

Condition 11

Occidental shall issue quarterly reports to the LCAPCO detailing a) hours of operation; (b) any periods of significant abatement equipment malfunction, reasons for malfunctions, and the corrective action; (c) types and amounts of chemicals used for condensate treatment; (d) periods of scheduled and unscheduled outages and the cause of the outages if known; (e) a summary of any irregularities that occurred with the continuous emission monitors, if used; and (f) if any, the dates and hours in which Oxy Geo #1 H_2S emission rate was in excess of the emissions limitations specified in Condition 1.

Condition 12

Occidental shall allow authorized representatives of the LCAPCD and ARB to enter the premises where the source is located, within one hour of notification, to inspect the plant for compliance with the conditions of this Determination of Compliance.

Condition 13

Occidental shall comply with all applicable federal, state, and local laws, standards, and ordinances in the operation of Oxy Geothermal No. 1.

I. Noise

V. R. Fesmire sponsored AFC Section 5.6; filed data responses on April 29, 1981; and participated in workshops from May through September 1981. (RT 1427-1431) Richard K. Buell, CEC Associate Mechanical Engineer, evaluated Applicant's AFC and prepared the DEIR section on noise impacts. (RT 1432-1468). Based on this evaluation Applicant and Staff submitted the following stipulations:

Findings

1. The following standards are applicable to the proposed Oxy Geothermal Plant No. 1:

   a. The Noise Element of the Lake General Plan;
   b. The Draft Lake County Noise Ordinance;
   c. Title 8, Cal. Admin. Code, Article 105 (State Occupational Noise Limits); and
   d. Occupational Safety and Health Act of 1970, 29 CFR 1910 et. seq., (Federal Occupational Noise Limits).

2. Lake County adopted a Noise Element to the County General Plan which establishes an acceptable ambient noise level for residential receptors of 55 dBA L_{dn} from all sources. Lake County is currently considering a draft ordinance. At this time, it is speculative as to when and in what final form Lake County might adopt the ordinance. However, Occidental agrees to comply with the draft ordinance standards, which are 55 dBA for daytime hours (7 a.m. - 10 p.m.) and 45 dBA for nighttime hours (10 p.m. - 7 a.m.) for residences.

3. The applicable state regulations are the CAL/OSHA occupational noise exposure regulations, Title 8, Cal. Admin. Code, Article 105. The provisions of CAL/OSHA are enforced by the Division of Occupational Safety and Health (DOSH) of the Department of Industrial Relations, insofar as these provisions relate to construction and operational employee noise hazards.

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

5. The ambient noise levels at sensitive receptors in the vicinity of the site are presented in Oxy #1 AFC Tables 5.6-1 and 5.6-6 and in the Draft Environmental Impact Report.

6. The closest identified sensitive receptor to the proposed plant site is a residence off the Socrates Mine Road (survey point 5), approximately 9,130 feet east of the site. The estimated construction and operational noise levels projected to this receptor will comply with applicable noise standards and will not adversely affect the receptor.

7. Communities or single family residences along the access routes to the proposed site may be exposed to intermittent noise levels from construction traffic, which will exceed the nighttime standard of the Lake County draft noise ordinance. Occidental Geothermal, Inc., agrees to limit construction traffic on the access routes to daytime hours (7 a.m. to 10 p.m.). Exceptions to this schedule are permissable where work conditions require.

8. Noise levels associated with steam field development and operation are identified in the EIR for the Oxy Geothermal Plant No. 1. Noise levels from steam field development and operation generally exceed those from power plant construction and operation. Because the site is remote, these noise levels will not adversely affect sensitive receptors.

9. Based upon the Occidental Geothermal, Inc.'s proposed mitigation measures, the proposed project will comply with CAL/OSHA regulations.

10. Occidental has proposed mitigation measures specified in Section 1.4.4 of the AFC, which are incorporated herein.

11. In implementing its proposed mitigation measures, Occidental agrees to do the following:

    a. Except for the turbine generator set, which shall be specified for 90 dBA, require equipment manufacturers, where applicable, to supply equipment with a maximum sound level of 85 dBA at 3 feet. If the manufacturer cannot meet this specification, Occidental shall undertake appropriate mitigation measures to conform with OSHA/DOSH standards;

    b. Route the steam drain lines from the turbine to the condenser so that steam will not be discharged into the atmosphere during unit start-ups; and

    c. Utilize to the maximum extent feasible a rock muffler or an equivalent noise reducer to mitigate noise during unit outages.

12. To comply with CAL/DOSH requirements, Occidental agrees to do the following:

    a. Post signs on all unavoidably high noise areas.

    b. Provide hearing protectors for employees, whenever necessary.

    c. Periodically check the hearing of employees, who are routinely subject to high noise levels.

13. a. In the event LCAPCD or Oxy receives public complaints of the noise due to construction, the LCAPCD (if requested by the complainant) and Oxy agree to promptly conduct an investigation to determine the extent of the problem. Oxy shall take reasonable measures to resolve the complaints.

    b. Oxy agrees to develop and submit to the Lake County Air Pollution Control Officer (LCAPCO) a procedure for handling public complaints. The LCAPCO will notify Oxy and the CEC when the LCAPCO deems the Oxy plan acceptable.

14. a. Within 10 days of a request by the LCAPCO, Oxy agrees to conduct noise surveys at the sensitive receptors registering complaints and at the facility property line nearest the complaining receptors. Surveys shall be conducted for the period of the construction working day and if possible under circumstances similar to those when the complaints were perceived. The survey should be reported in terms of the L_x and L_{eq} levels (x = 10, 50 and 90). Based on this survey, Oxy shall identify and implement feasible mitigation measures necessary to assure compliance with the county standards.

    b. Oxy agrees to promptly forward to the LCAPCO the survey results, the mitigation measures applied to resolve the problem, and the results of these efforts. LCAPCO shall advise the CEC of any continuing noncompliance conditions.

15. a. Within 90 days after the plant reaches its rated power generation capacity and construction is complete, Oxy agrees to conduct a noise survey at 500 feet from the generating station or such a point acceptable to Oxy, CEC and the LCAPCD. The survey will cover a 24-hour period with results reported in terms of L_x (x = 10, 50 and 90), L_{eq} and L_{dn} levels.

    b. Oxy agrees to prepare a report of the survey that will be used to determine the plant's conformance with county standards. In the event that county standards are being exceeded, the report shall also contain a mitigation plan and a schedule to correct the noncompliance.

    c. No additional noise surveys of off-site operational noise are required unless the public registers complaints or the noise from the project is suspected of increasing due to a change in the operation of the facility.

    d. Within 30 days of the noise survey, Oxy agrees to submit its report to the LCAPCO.

16. a. Within 180 days after the start of commercial operation, Oxy agrees to prepare a noise survey report for the noise-hazardous areas in the facility. The survey shall be conducted by a qualified person in accordance with the provisions of Title 8 CAC Article 105. The survey results will be used to determine the magnitude of employee noise exposure. If employee complaints of excessive noise arise during the life of the project, CAL/DOSH, Department of Industrial Relations, shall make a compliance determination.

    b. Oxy agrees to notify CAL/DOSH and the CEC of the availability of the report.

Conclusion:

If Occidental implements its proposed mitigation measures specified in Section 1.4.4 of the AFC and those measures specified in Findings 11, 12, 13, 14, 15 and 16 of the proposed project will comply with applicable laws, ordinances, and standards.

During the hearing the LCAPCO questioned the operation of Finding No. 13b and expressed doubt about Compliance Plan Verification 16-1. (RT 1466-1468) Verification 16-1 proposed by CEC Staff, reads:

> "Occidental shall develop and submit to the Lake County Air Pollution Control District (LCAPCD) a procedure for handling public complaints. The LCAPCD will notify Occidental and the CEC when the LCAPCD deems the Occidental plan acceptable."

On December 17, 1981, the LCAPCO requested that "the second sentence of Condition 16-1 (be changed) to indicate LCAPCD involvement only when complaints are received by the LCAPCD."

J. Transportation

V. R. Fesmire sponsored AFC Section 5.8; prepared data responses on April 29, 1981; and participated in workshops from May through September 1981. (RT 1316-1323) Under cross-examination Mr. Fesmire stated that Applicant's project no longer plans to use the Healdsburg-Geysers Road for access to its plant as originally described in AFC page 5-91. (RT 1320) He testified that unless access through Union Oil property were obtained by early-December 1981, there would be little probability of Applicant using the Sonoma County side access route for the construction phase. During operation and maintenance phases Mr. Fesmire estimated that about 20 workers (split into three shifts) would be at the plant. (RT 321)

Brian Bell, CEC Energy Facility Planner, evaluated Applicant's AFC and prepared the DEIR analysis of Occidental's transportation impact. (RT 1323-1349) He noted that if roads within county jurisdiction deteriorate, developers may be asked to participate in improvement and maintenance costs. Meanwhile, Applicant has agreed to schedule project traffic to avoid school traffic as much as possible. (RT 1334) Socrates Mine Road is being improved under an agreement with Lake County, Aminoil, SMUD, Occidental, Shell, and NCPA.

Staff and Applicant proposed the following Findings, Conclusions, and Conditions:

Findings:

1. Oxy will provide bus service for its workers in order to reduce the number of project-related autos and light trucks per day. As a result, approximately 65 project related autos/light trucks per day are projected to use Socrates Mine Road.

2. All heavy construction equipment/materials and plant components will reach the Oxy site over Socrates Mine Road. Socrates Mine Road is presently below Lake County Standards and is in need of substantial improvements in order to meet those standards.

3. Negotiations are presently under way between the County of Lake and the Socrates Mine Road users, including Oxy, for the upgrading and improvement of the road.

4. The ridgetop fire road past the Oxy site has been improved by SMUD, and Oxy has agreed to participate in the costs.

5. Butts Canyon Road is the access to the Middletown waste disposal site and a portion is in poor condition. Lake County approved $163,000 for the improvement of this road.

6. Unless scheduled to avoid school bus traffic, project-related vehicles may pose a hazard to school buses using the same roads.

Conclusions:

1. The bus service provided by Oxy for its workers will reduce the light traffic impacts on Socrates Mine Road.

2. The increase in heavy traffic on Socrates Mine Road will aggravate conditions, and significant adverse impacts to transportation and safety will result.

3. The improvement of the ridgetop fire road will alleviate dust problems and decrease erosion and sediment transport to streams.

4. The proper scheduling of project-related vehicles to avoid school bus traffic will reduce the adverse impacts on transportation and safety.

Conditions:

1. Occidental shall participate, as part of the group of major road users, in the upgrading and improvement of Socrates Mine Road.

2. Occidental shall participate with SMUD in improvements to the ridgetop fire road which provides access to the Oxy site.

3. Occidental shall require subcontractors and request all others to schedule truck trips so as to avoid school bus schedules. Exceptions to the schedule are permissible where work conditions require. To the extent possible, Occidental will notify the Middletown school district of the exceptions.

Sonoma County presented John D. Morelli, Assistant Director of Public Works for Sonoma County, to testify in support of the following proposed Findings, Conclusions, and Conditions:

Findings:

1. The Healdsburg-Geysers Road is currently inadequate access for the vehicle traffic required for the construction and maintenance of Oxy Geothermal Power Plant No. 1.

2. It is not foreseeable that it is or will be within the financial resources of the County of Sonoma to bring the Healdsburg-Geysers Road to an adequate standard to handle such vehicular traffic.

3. The cumulative impact to the Geysers-Healdsburg Road resulting from geothermal development will be significant.

4. No vehicular traffic generated by either the construction or the maintenance of Oxy Geothermal Plant No. 1 will reach the site using the Healdsburg-Geysers Road.

Conclusion:

1. There will be no impact on the Healdsburg-Geysers Road as a result of the construction and operation of Oxy Geothermal Plant No. 1.

Condition:

1. No project-related vehicles may use the Healdsburg-Geysers Road.

Mr. Morelli testified primarily on the inadequate conditions of the Healdsburg-Geysers Road. (RT 1350-1356)

In a "Post-Trial Brief" Sonoma County argued that although Staff determined that Applicant's project will have no direct impact on the Healdsburg-Geysers Road, its recognition of a significant cumulative impact should be holstered with a condition prohibiting Applicant's use of the Road. (Brief, p.10)

COMMITTEE CONCLUSIONS ON ENVIRONMENTAL IMPACTS

Public Resources Code Section 25523 and Title 20, California Administrative Code Section 1752(b) requires the Commission to make findings and conclusions on public health and safety standards. Based on Applicant's presentation, CEC staff analysis, and the Final Environmental Impact Report, the Committee finds that the conditions proposed in the areas of Aesthetics, Cultural Resources, Soils, Waste Management, Hydrology/Water Quality, Public Health, and Noise are adequate to avoid significant adverse impacts and ensure conformity with all applicable laws and regulations.

Biological Resources

The Committee adopts the Applicant-Staff proposed Findings (1-35), Conclusions (1-2), and Conditions (1-4) as adequate to ensure that the OXY project can be constructed and operated in compliance with PRC Section 25523 requirements protecting environmental quality and assuring public health and safety.

The extensive dispute between Applicant and Staff over adequate mitigation measures to avoid significant impact on the Ringtail demands that the Committee carefully explain its deliberation. First, it is important to note the undisputed facts:

1) There is a likelihood that ringtail occur on the Occidental leasehold. (Joint Finding No. 30)
2) The impacts on ringtail on Occidental's leasehold "cannot be assessed due to lack of data concerning their existence on the leasehold." (FEIR, p. vi, emphasis added.)

Second, a review of applicable law governing the Commission's authority is helpful. Public Resources Code Section 25523(a) requires that the AFC Decision contain "specific provisions relating to the manner in which the proposed facility is to be designed, sited, and operated in order to protect environmental quality and assure public health and safety." Section 25523(d) requires findings that the project conforms "with other relevant local, regional, state, and federal standards, ordinances or laws." For the ringtail, the most specific state law is the Fish and Game Code, Section 4700, which designates the species as "fully protected" - a legal classification providing the animal more protection than common mammals, but less than that afforded to rare or endangered species (RT 1531).

Dr. Gene R. Trapp explained that existing law may not effectively protect the ringtail population; that beyond the statutory protection, efforts should be taken to "protect or enhance their habitats" and gather more specific information needed to ensure the animal's survival (RT 1488-1490).

With this background, the Committee concludes that Staff's proposed study (Staff Conditions B and D) is not necessary to reduce "a significant adverse environmental effect."* This determination merely confirms the assessment offered in the Final Environmental Impact Report. Even where the the EIR identifies a substantial adverse change in the environment, governmental agencies are instructed to apply on a discretionary basis a variety of responses which range from requiring changes in the proposed project to permitting the project even after identifying that the project impact will have an unavoidable, significant environmental damage (Title

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* Staff's Initial Brief, page 1.

14, California Administrative Code Section 15002). Assuming for the moment, however, that the FEIR had identified the Applicant's project as having a significant effect on the ringtail, then state policy clearly would require mitigation "to the extent it is feasible to do so." (Title 14, California Administrative Code Section 15011.6(b))

The Committee therefore concludes that the following measures come close to the conditions that could be imposed if the evidence showed Applicant's project would have a significant adverse effect on the ringtail, and are adequate to reasonably avoid any significant effect on ringtails which may be present:

1) Applicant shall clear all construction and operation area vegetation by hand between April 15 and July 1 to avoid disturbing denned ringtails during the birthing period;
2) Applicant shall avoid undisturbed riparian areas, except when and where directed by CEC staff for the planting of food plants and siting of artificial den sites;
3) Applicant shall construct a reasonable number of den sites on its property and maintain them so long as the ringtail retains its protected status under California law. A reasonable number of den sites shall be no less than four unless authorized by the Commission, and no more than ten.
4) Applicant shall establish additional native plants known to comprise part of the ringtail's diet on disturbed areas and undisturbed riparian areas of its leasehold where feasible.

These conditions are ordered as feasible measures; to ensure their effectiveness, the Committee instructs the Commission's Compliance Unit to coordinate with the Department of Fish and Game and Applicant. All measures must be completed within two years after certification of this Application.

Air Quality

The Committee adopts the Lake County Air Pollution Control District's July 28, 1981 positive Determination of Compliance and orders it to be incorporated in the CEC Compliance Plan for the Oxy No. 1 Power Plant License. Post-certification changes related to satisfying DOC Condition #1 may be sought by Applicant pursuant to Condition #2 and shall be presented to the Commission in accordance with the verification procedure established for Air Quality Requirement 1-3 and subject to the Dispute Resolution Procedure specified in Compliance Plan, pages v-vii.

The Committee also accepts the Applicant-Staff proposed stipulations and pursuant to PRC Section 25532 adopts Conditions 1-6 (which incorporate by reference the LCAPCD DOC) as adequate to ensure that Applicant's project can be constructed and operated in compliance with air quality standards.

Transportation

The Committee adopts the Findings, Conclusions and Conditions proposed by Applicant and Staff as satisfying the requirements of PRC 25532 and Title 20, California Administrative Code Section 1752(b). Sonoma County's proposed Findings, Conclusion and Condition are not adopted by the Committee because it is unnecessary to make conclusions on matters beyond the impact of an Application for Certification. The determination of relevance is based on acceptance of Staff's witness's testimony that there will be no significant impacts on the Sonoma County road system and the concurring position in the

Final Environmental Impact Report. The Committee will not prohibit activities for which a license is not being requested.

Sonoma County's concern, however about future use of its road system by this project may be addressed under Public Resources Code Section 25534.

III. COMMUNITY IMPACTS

A. Public Services

Greg Newhouse, CEC Senior Environmental Planner, testified that Applicant's project will have insignificant impacts on most public services (RT 1294). On-site fire and police protection will be provided by the California Department of Forestry, the Middletown Volunteer Fire Department, and the Lake County Sheriff Department. The increased population in the four-county area (Lake, Sonoma, Mendocino, and Napa) is not considered a significant impact because CEC staff expects geothermal workers to reside throughout these counties. Mr. Newhouse predicts that Applicant's project will pay $678,000 in Lake County property taxes during its first year of operation. He pointed out that continued geothermal development may have negative fiscal impacts, specifically, in the area of increased demands for public services. However, he stated that the four-county area rapid general population growth overshadows public service impacts directly related to geothermal development (RT 1295).

Under cross-examination by Sonoma County, Mr. Newhouse defended his determination that the population growth related to Applicant's project will not be cumulatively significant in Sonoma County because of the lack of access from Sonoma County to Lake County (RT 1302).

Sonoma County presented G.James Moore, Senior Administrative Analyst in the County Administrator's Office, to testify on public services impacts (RT 1305 - 1316). According to Mr. Moore, Sonoma County received $530,000 in AB 1905 funds during 1981-1982, which is four-tenths of one percent of the county's total budget of $129,643,869. The road budget is $10,159,246 (7.8% of the total county budget); which is composed of $4,847,189 from the County Road

Fund and $5,312,057 from the discretionary General Fund. The county estimates upgrading costs for the three roads in the Geysers area as follows:

Cloverdale Geysers Road	$7,000,000
Healdsburg Geysers Road	7,000,000
Pine Flat Road	6,000,000
Total:	$20,000,000

The total length of these three roads is 40.4 miles: 2.8% of the 1,463.8 mile county-wide system. Therefore, the county maintains that it is inconceivable for it to continue bearing the impact of geothermal development:

> "The current amount of geothermal revenues are (sic) inadequate to finance road improvements necessary to assure traffic safety in the Geysers area and do not provide funding for a host of other governmental services, including public protection, law enforcement, health and welfare.*
>
> "Propositions 13 and 4 have reduced property tax revenues, made counties more dependent on state aid, and restricted the expenditure and collection of tax revenues." (RT 1313)

In its "Post-Trial Brief" (page 3), Sonoma County requested modification of Applicant-Staff Jointly-Proposed Socioeconomic Conclusion No. 2 as follows:

> "The proposed project, in conjunction with other geothermal developments in the Geysers, will result in substantial, but currently indeterminate adverse socio-economic impacts on the housing, schools, and other public services provided by the local government agencies of the four counties." (underline indicates proposed modification)

The County promotes this revision to reflect what it maintains is the "acknowledged lack of information and analysis regarding the extent of those cumulative impacts..." (Brief, page 3).

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* Mr. Moore noted that even if Sonoma County allocated all AB 1905 revenues to reconstruction and repair of the Geysers roads, it would take 38 years to accomplish that goal, assuming that the County received $530,000 a year from AB 1905 revenues and road construction costs remained static (RT 1310).

Sonoma County also urged revision of the Joint Socioeconomic Conclusion No. 5 to reflect the limited availability of AB 1905 funds to alleviate the impact of geothermal development:

> "AB 1905 monies are available to help mitigate impacts of geothermal development. The responsibility for disbursement of these funds lies with the Board of Supervisors of the respective counties. In any case, AB 1905 monies are insufficient to mitigate all impacts, including socioeconomic impacts cumulative or otherwise resulting from geothermal development at the Geysers." (Brief, page 4) (underline indicates proposed modification)

With the above-modifications, the County then proposed the following condition to certification:

> "At such time as this Commission has completed the study of cumulative impacts at the Geysers or has been presented with specific evidence regarding cumulative impacts, the Commission shall require and Occidental shall provide measures to mitigate such impacts." (Brief, page 4)

B. Socioeconomics*

1) Applicant

V. R. Fesmire sponsored AFC section 5.8; participated in workshops from May through September 1981; and testified in support of the following Staff-Applicant proposed Joint Findings, Conclusions and Conditions: (RT 738-754 and 800-817)

Findings:

1. The land-use plan and local ordinances applicable to the Occidental Geothermal plant #1 are the 1969 Lake County General Plan, interim conditions thereto of the Governor's Office of Planning and Research (OPR), and Lake County's zoning ordinances. Geothermal development is a permissible use under each of those items.

2. Development of the proposed project will occur during the period when three other facilities in the Geysers are also under construction. Socioeconomic impacts resulting from the proposed Oxy #1 facility are part of the larger cumulative impacts resulting from these geothermal developments in the Geysers.

3. Construction workers for the four facilities will primarily come from the existing workforce in the four county area (Napa, Mendocino, Lake, and Sonoma counties) about the KGRA. The remainder will be in mitgrating labor.

4. Rapid population growth due to nongeothermal development within the four county area has increased the need for housing, schools, and other public services have been impacted. Population growth due to geothermal development will further stress these services.

5. The proposed power plant project will contribute $678,000 in property taxes for the first full year of operation. This level will increase 2 percent per year for the life of the facility. Tax revenues from steam field development in 1980 were $44,600.

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*At the November 17, 1981 evidentiary hearing, Applicant presented William H. Keller to testify that legislative intent demonstrates ". . . AB 1905 funds are the sole source of mitigation of geothermal development impact . . ." (RT 725) Motions to exclude this testimony were made by CEC Staff on the grounds of relevancy (RT 718); by Lake County Schools on grounds of relevancy and procedure (RT 720); and by Sonoma County schools on the grounds of relevancy (RT 722). The Committee excluded the testimony after finding that the language of AB 1905 contained no apparent ambiguity that would invite evidentiary examination (RT 736) but advised applicant that upon reviewing the Committee's Proposed Decision, ". . . if at that point, it appears as though something determined by the Committee hinges on what you perceive to be an ambiguity within the statute, you would certainly have the right at that point to petition for a further hearing on this issue, either to the Committee or to the full Commission." (RT 737)

6. Growth due to cumulative geothermal development will peak between 1981 and 1984. The proposed project construction period begins during this time. Therefore, it occurs when the cumulative growth effects from geothermal development are reaching their peak.

7. The majority of these in migrating workers are expected to reside in Lake and Sonoma Counties. Within each county, however, the workers will reside in various communities.

8. Currently available bus service for power plant geothermal workers within the four county area gives these workers the opportunity of working on geothermal projects while living anywhere within the four county area.

9. The Lake County Office of Education has indicated that project-related school costs are $136,500 for facilities and $60,000 for transportation. AB 1905 (1979) funds, under control of the Lake County Board of Supervisors and the CEC, are potentially available to cover these costs. Increased operational costs are generally covered by state funds.

10. The proposed project also contributes to AB 1905 funds. In 1984, the amount is projected to be approximately $373,000 rising to $615,000 in 1985 and $677,000 in 1986.

11. AB 1905 monies are available to Sonoma and Lake Counties to help alleviate impacts resulting from geothermal development. The 1981 allocations are shown in Appendix A. There is no assurance that future funds will be allocated in the same manner.

Conclusions:

1. The proposed project complies with the applicable general plan provisions and zoning ordinances of Lake County.

2. The proposed project, in conjunction with other geothermal developments in the Geysers, will adversely affect housing, schools, and other public services within the four county area.

3. Bus transportation for geothermal construction workers to the site will allow the workers to locate throughout the four county area (e.g., where housing is available to them), dispersing impacts to various communities instead of concentrating in only one community.

4. While the Lake County Office of Education has indicated impacts will occur, it has not demonstrated that the Applicant must mitigate over and above AB 1905 monies available to Lake County.

5. AB 1905 monies are available to mitigate these impacts, and the Lake County Board of Supervisors has already granted a portion of the funds to mitigate adverse impacts. The responsibility for disbursement of these funds to the school district, as a mitigation measure, lies with the Board of Supervisors.

Mr. Fesmire's testimony in the area of labor force impacts was supplemented by Robert F. Ward, Vice-President of Occidental Geothermal, Inc., and Project Manager for OXY No. 1. (RT 757-800) Both witnesses were cross-examined by the Lake and Sonoma County School Districts on their predictions of peak labor force periods. In addition, Mr. Fesmire was cross-examined by the County of Sonoma on Applicant's examination of the project's impact on Sonoma County public services (housing, health and emergency services), concluding with the following question:

Q. Did you investigate with respect to the total cumulative impact, both primary and secondary growthwise, the impacts on public services provided by local government?

A. The types of public services that you have just described are those that are countywide and would not be severely impacted by any nominal increase in population in any one area. The total numbers of people that we are talking about compared to the populations as a whole of the counties involved is three or four or five significant digits less than the county totals. (RT 815)

Mr. John Eckhardt testified for Applicant on the potential impact of Oxy No. 1 on the Lake County School Districts. (RT 818-875) Based on interviews with local and state officials* he concluded:

- The inadequacies of existing facilities are primarily due to a failure to provide necessary construction over a number of years.
- The school districts and the counties do not appear to have exhausted all alternative sources of funding.
- Assuming the data in Occidental's Application for Certification the increase in student population which may be attributable to Occidental would not result in substantial impact to the school systems. (RT 824)

To support his conclusion that facility inadequacy in Lake County Schools reflects long-standing needs exceeding the impact of Applicant's project, Mr. Eckhardt cited pending applications under the Leroy F. Greene State School Building Lease-Purchase Law of 1976:**

District	Application
Kelseyville	$ 310,000.00
Konocti	3,213,022.00
Lakeport	1,902,592.00
Middletown	3,692,326.00

*Dr. Eckhardt interviewed: 1) C. E. Donaldson, Kelseyville Unified School District Superintendant; 2) Wiliam C, Carlé, Konocti Unified School District Superintendant; Dale F. Jensen, Lakeport Unified School District Superintendant; Dr. William H. Cornelius, Middletown Unified School District Superintendant; William Wood Merrill, Lake County Schools Attorney; Mr. Urvan Rodriguez (Field Representative) and Ralph Askin (Staff Architect) of the Department of Education, Division of School Facilities Planning; and Harold Weaver, Chief of the Special Services Section, California State Allocation Board, Office of Local Assistance. (RT 820-821)

**Most of the $248 million appropriated for this law was "unallocated" by the Governor in October 1981.

Dr. Eckhardt stated that a precise evaluation of impact on the Lake County school system from the 42 school-age children predicted in Applicant's AFC is not possible without knowing these children's actual residence location.* (RT 832) Assuming that the children live in more than one district and are in different grade levels, Dr. Eckhardt concludes that "the probable impact on any school, or district, will be almost nonexistent."

2) CEC Staff

Greg Newhouse, CEC Senior Environmental Planner, evaluated Applicant's AFC and prepared the DEIR Socioeconomic section. He presented his analysis of socio-economic impacts on the following issues: population, housing, and public services.

a. Employment

A peak employment impact of 230 workers will begin in April 1982; after construction is completed, only four employees will needed for operation and maintenance of the power plant facility. (RT 1056) His estimate of overall employment activity is illustrated in the chart on the following page.

During 1983, the peak cumulative labor demand period, Newhouse estimates the following new residential impacts.

	Sonoma	Lake	Napa	Mendocino	Total
Single workers	67	54	7	7	135
Workers with Families	67	54	7	7	135
Spouses	67	54	7	7	135
Children	100	80	10	10	200
Total	301	242	31	31	605

*From Lake County there are seven elementary schools, two junior highs, and four high schools who have intervened in this proceeding. From Sonoma County nine schools have intervened. (RT 831)

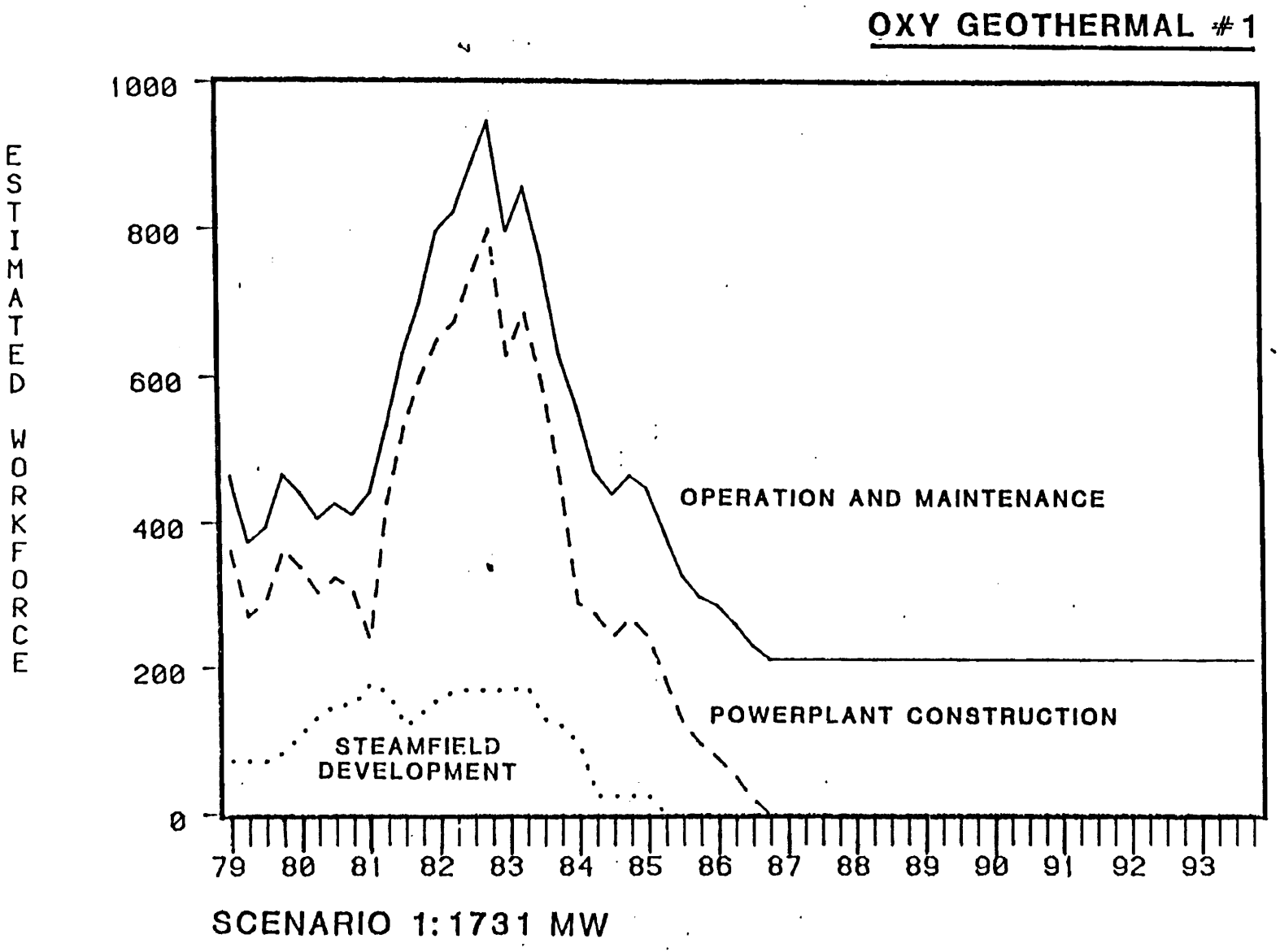

FIGURE 1: SOCIOECONOMICS-Cumulative Development Workforce/the Geysers KGRA

He summarized his analysis by stating that the Oxy project will not significantly impact the labor supply in the four-county area.

b. Housing

Preliminary 1980 census data indicate very limited housing is available in the counties of Sonoma, Lake, Napa, and Mendocino. Newhouse testified, however, that "no adverse affects will occur in Sonoma County and only temporary adverse effects may occur in Lake County." (RT 1060) He further stated that conversations with union representatives, analysis of housing costs in general, and the overall state of the economy, lead him to expect that few construction workers will move into Sonoma and Lake Counties on a permanent basis. Because staff analysis predicts only a temporary adverse impact on housing in the four-county area, it did not recommend any mitigation measures. Newhouse did note that the housing issue will be examined further in the Commission's Geysers Cumulative Impact proceeding.

c. Schools

Newhouse identified the Middletown Unified School District as probably the worst-impacted by geothermal development. (RT 1060) He noted that the Middletown and Konocti School Districts received $46,500 from the County Board of Supervisors in 1981 from AB 1905 funds. In contrast, he described Sonoma County Schools as having declining enrollment since 1977, and overall, beneficiaries of increased tax revenues until the passage of Proposition 13. Newhouse declared that Applicant and the Lake County Schools were the most appropriate parties for determining the impact and mitigation of increased student enrollment in Lake County's schools. (RT 1061). In the absence of such determination,* he recommended a mitigation plan similar to that imposed as a condition to certification of the Department of Water Resources' South Geysers Power Plant (81-AFC-2).**

*The mitigation agreement at Appendix C was proposed after the Committee examined Socioeconomic issues.
**See Commission Publication No. P800-81-008.

Under cross-examination Newhouse agreed that the mitigation plan recommended for Lake County Schools would be appropriate for Sonoma County if: a) one or more school districts in Sonoma County was presently operating at capacity and b) students enrolled in those districts because of Oxy's project. (RT 1089) He discounted the occurence of these events, however, because a) Oxy has not negotiated a right-of-way through Union Oil property to facilitate Sonoma to Lake County travel and b) he disagrees with testimony that some Sonoma County schools are at or near capacity.*** He rejected Sonoma County Schools' suggestion to take each school district as it exists at the time of application, by stating:

> "I think one has to look at the cause and effect. What we are saying in Lake County is that there seems to be a definite, direct cause and effect between the Applicant bringing in more people and having more students there; not a direct cause and effect that says that regardless of the number of rooms and students you have, you are going to do these programs. And therefore, change what you do. I see those as two separate cause and effect relationships, in terms of dealing with mitigation." (RT 1092-1093)

Mr. Newhouse further stated that he did not think the estimate of 42 new students in Sonoma County as described in Applicant's AFC is accurate, testifying that because ofthe lack of access through Union Oil property he predicted no "Oxy-related population increase in Sonoma County." (RT 1098) However, he did not object to imposing a condition to certification for Sonoma County Schools similar to the condition recommended for Lake County Schools if a mechanism were included to activate the condition only when the affected Sonoma County Schools reached capacity because of Applicant's employees' presence. (RT 1101)

***Specifically, Mr. Newhouse questioned descriptions of the Cloverdale Unified School District and Healdsburg Union School District as near capacity, because his investigation showed continually decreasing enrollments from 1970 to 1981. (RT 1091) After continued questioning Mr. Newhouse stated that his analysis of Sonoma County school enrollment figures reflects discussions with Sonoma County School Superintendants and scrutiny of past enrollment figures for the represented districts during the period from 1970 to 1981. (RT 1094)

d. Land Use

CEC staff presented Joe O'Hagan, Assistant Energy Facility Siting Planner, who analyzed the AFC and data submittals of Applicant and prepared the DEIR to determine that the proposed project meets all applicable land use requirements. (RT 1114-1117)

3) Lake County School Districts

Lake County presented Dr. William H. Cornelison, Middletown Unified School District, who testified that enrollment at all levels of school exceed the standards specified in the state Education Code Sections 16047, 16052, and 16054:

Grade Level	Actual Enrollment	Recommended State Capacity Standard
High School	28,964 ft^2	34,300 ft^2
Middle School	5,879 ft^2	7,275 ft^2
Elementary School	13,036 ft^2	17,820 ft^2

(RT 886)

Lake County Schools also presented William C. Carle (Konocti Unified School District Superintendant, RT 920-936), Russell E. Pullman, Sr. (Lake County Schools Director of Business Services, RT 937-953), Charles C. Donaldson (Kelseyville Unified School District Superintendant, RT 954-967), and Dale Jensen (Lakeport Unified School District Superintendant, RT 968-985). This testimony was introduced to support Lake County Schools' Proposed Findings and Conclusions.*

*Filed September 9, 1981.

Following the evidentiary hearings, Applicant and Lake County Schools filed a "School Impact Mitigation Agreement" (see Appendix C) "for the purpose of mitigating the significant adverse impact on the public school facilities in Lake County expected to result from the construction and operation of a geothermal power plant . . . by Oxy, Oxy having applied for permission to construct and operate such a power plant to the State of California Energy Resources Conservation and Development Commission; . . . and from the development, construction, and maintenance of a steam well field with attendant steam collection and distribution system for which a use permit is being sought from the County of Lake . . .". A signed copy of this agreement is expected by January 18, 1981 at which time it will be incorporated in the record.

4) Sonoma County School Districts

Sonoma County Schools presented Dr. Walter Eagan (Sonoma County Superintendant of Schools, RT 986-999), Robert H. Hileman (Geyserville Unified School District Superintendant, RT 1008-1013), James D. McAuley (Cloverdale Unified School District Superintendant, RT 1014-1020), Norman H. Ginsburg (Windsor Union School District Superintendant, RT 1021-1032), Dr. Jerome Schroeder (Healdsburg Union High and Union School Districts' Assistant Superintendant, RT 1033-1041), and Terry Kneisler (Principal of the West Side School District, RT 1042-1050).

Dr. Eagan testified that the following districts are operating at or near capacity: Piner-Olivet Union School District, Healdsburg Union High School District, Cloverdale Unified School District, Geyserville Unified School District, Windsor Union School District, and Santa Rosa City School District. Of these districts, Cloverdale, Geyserville, and Healdsburg are immediately adjacent to the Geysers area. (RT 989). He stated that enrollment impact can be most effectively mitigated with additional classroom and playground facilities and additional transportation. Under cross-examination, Dr. Eagan said that until a survey of students is completed, he is unable to testify as to the impact of geothermal on the Sonoma County Schools. (RT 998-999)

Mr. Carey agreed under cross-examination that a study is needed to determine the specific impacts of geothermal development on his school district. (RT 1007)

Mr. Hileman stated that his schools are near the Geysers Area and that only the elementary school is at capacity. He explained under cross-examination that his district uses smaller class load standards than those recommended by the State (RT 1013) because of the Board of Education's determination of educational requirements.

Although Mr. McAuley testified that his district is operating "at capacity" he explained under cross-examination that this term was district-specific, relating to rooms being used rather than numbers of students. (RT 1019) He also agreed that without a survey he could not specifically identify the impact of geothermal development on his district. (RT 1020)

Mr. Ginsburg testified that his use of the term "at capacity" is the same as Mr. McAuley's. (RT 1030) He explained that without a survey, he cannot determine how many students are in his district because of geothermal development. (RT 1032) Dr. Schroeder testified that his 32 schoolrooms are being utilized, 18 of which are within one or two students of capacity. (RT 1039)

Mr. Kniesler testified that all of his facilities are at capacity but without a survey he is unable to determine the impact of geothermal development. (RT 1046-1047)

The testimony above was submitted to support the following proposed Findings, Conclusions, and Conditions:

(1) Alexander Valley Union School District, Cloverdale Unified School District, Geyserville Unified School District, Healdsburg Union School District, Healdsburg Union High School District, Piner-Olivet Union School District, West Side School District and Windsor Union School District are presently operating their school facilities at capacity and will be adversely impacted if additional students enroll in the schools of said districts.

(2) A significant probability exists that Oxy's proposed development will increase the enrollment of one or more of said districts.

(3) Because of the adverse impact caused by the enrollment of the children of workers associated with the Oxy Project, said districts must construct additional facilities and provide additional bus service beyond their present capacity. The cost of providing such additional facilities is six thousand four hundred twenty-one and no/100 dollars ($6,421.00) per additional pupil.

(4) In order to mitigate the adverse impact on the schools of Sonoma County caused by the Oxy proposed development, Oxy shall pay to the impacted school districts the sum of six thousand four hundred twenty-one dollars and no/100 ($6,421.00) for each additional child enrolled in said districts whose presence in said districts is related to the Oxy project.

Based upon the findings and conclusions set forth above, Sonoma County Schools propose the following condition to tbe imposed upon Oxy and attached to their permit:

(1) Oxy shall pay to each of the above-named school districts the sum of six thousand four hundred dollars and no/100 ($6,421.00) for each additional pupil who enrolls in the district and whose presence in the district is related to the Oxy project.

(2) Oxy shall cooperate with the above-named school districts by providing such districts with a list of Oxy employees and employees of contractors, sub-contractors, and any other employers involved in said development. This list must be submitted annually on or before October 1 and may be submitted to the Sonoma County Office of Education.

(3) On or before November 1 of each year, any of said school districts desiring impact fees from Oxy shall submit a list of pupils enrolled in said districts whose enrollment in the district is related to the Oxy development.

(4) On or before December 1 of each year, Oxy shall remit to said districts the above-specified impact mitigation sum.

(5) Any disputes between an individual school district and Oxy as to a particular pupil or any other question arising under this condition shall be resolved by the County Superintendent of Schools of Sonoma County. The determination by the County Superindendent of Schools shall be final.

In its "Post-Hearing Brief" Sonoma County Schools renewed their request for mitigation and emphasized that it would be operative only if and when Applicant's employees' enrolled their children in "at capacity" schools. The schools pointed out that CEC staff's determination that Sonoma County will not be impacted is based largely on the nonavailability of Sonoma-to-Lake travel via Union Oil property; which the Sonoma County schools consider a contingency capable of change (Brief, p.3) In an "Initial Brief on Socioeconomic Issues Raised by Sonoma County and Sonoma County Schools" Applicant urged the Committee to reject the Sonoma School's proposed mitigation measures because the record fails to show any eivdence that the Oxy No. 1 project will cause any impact on Sonoma County schools. Applicant pointed out that during cross-examination, all school witnesses admitted either that no students whose parents are employed in the geothermal industry are enrolled in their districts or that they could not testify to the specific impacts of the geothermal development industry in the Geysers on their respective districts. (RT 1007, 1012, 1020, 1032, 1041 and 1046-1047)." (Brief p.5)

Applicant also filed a "Rebuttal Brief to Sonoma County's Post-Trial Brief and Sonoma County Schools' Post-Hearing Brief." This rebuttal characterized the schools' proposed mitigation plan as a "condition against a contingency that the record demonstrates is highly remote." (Rebuttal Brief, p.8) Applicant cited Title 20, California Administrative Code Section 1748(f) which states:

> "The proponent of any additional condition, . . . relating to the manner in which a proposed facility should be designed, sited, and operated in order to protect environmental quality and ensure public health and safety shall have the burden of making a reasonable showing to support the need for and feasibility of the condition, modification, or provision."

and argued that neither the Commission's Final Environmental Impact Report nor the CEC staff witness supported the Sonoma Schools' contention that the Applicant's project will have a significant adverse affect on Sonoma schools.

5) Sonoma County

Christine Gouig, Executive Director for the Sonoma County Housing Authority, testified that a severe housing shortage exists in Sonoma County. (RT 1,933-1,950) Ms. Gouig agreed that workers arriving in Sonoma County may have a beneficial as well as adverse impact. (RT 1,945) Under Committee questioning the following exchange took place:

> "CHAIRPERSON SCHWEICKART: I think in response to an earlier question, you indicated that the hypothetical posed by Ms. Millspaugh to Mr. Newhouse regarding the combined or joint responsibility, since these workers, construction workers, move from one plant to another as the construction work progresses, that there is a joint responsibility. You referred I believe to the cumulative impact study that is going on at the Commission. Would you see the determination th n in any specific case, or are you able to distinguish the impact of any particular geothermal construction project?
>
> THE WITNESS: I would see it in a cumulative way.
>
> CHAIRPERSON SCHWEICKART: Are you familiar with the referendum--I guess it was 3 November--in which Sonoma County imposed certain taxes on geothermal development?
>
> THE WITNESS: I am generally familiar with it. I was not in the country at the time of that election, so I'm not very specifically knowledgeable of it.
>
> CHAIRPERSON SCHWEICKART: Can you inform me as to whether any of that tax revenue will be utilized in dealing with impacts of geothermal development of various kinds?
>
> THE WITNESS: I don't know."
>
> (RT 1,948)

Sonoma County proposed the following proposed Findings, Conclusions. and Conditions.

Finding:

1. Finding No. 5 should be amended to read as follows:
   The proposed power plant project will contribute $678,000 in property taxes to Lake County for the first full year of operation. Tax revenues from steam field development in Lake County in 1980 were $44,600. The proposed power plant project will not contribute any property tax money to Sonoma County.

Conclusions:

1. Conclusion No. 2 should be amended to read as follows:
   The proposed project, in conjunction with other geothermal developments in The Geysers, will result in substantial, but currently indeterminate adverse socioeconomic impacts on the housing, schools, and other public services provided by the local governmental agencies of the four counties.

2. Conclusion No. 5 should be amended to read as follows:
   AB 1905 monies are available to help mitigate impacts of geothermal development. The responsibility for disbursement of these funds lies with the Board of Supervisors of the respective counties. In any case, AB 1905 monies are insufficient to mitigate all impacts including socioeconomic impacts, cumulative or otherwise, resulting from geothermal development at the KGRA.

Condition:

1. At such time as this Commission has completed its study of cumulative impacts at The Geysers or has been presented with specific evidence regarding cumulative impacts, the Commission shall require and Occidental shall provide measures to mitigate such impact.

CONCLUSIONS ON COMMUNITY IMPACTS

The Committee accepts the testimony of Staff's witness, who also prepared the relevant portion of the FEIR, to conclude that Applicant's project will have no significant unmitigated impacts on public services in Lake County

and only insignificant impacts in Sonoma County. Among mitigated public service impacts, the Committee notes the agreement entered into by Applicant to improve and protect the Anderson Springs Community water supply (see Public Health section). As in earlier cases, the Committee approves this agreement without discussing its merits. As the evidentiary presentations by Applicant and Lake County Schools were conflicting, the Committee treats the agreement in Appendix C as similar--for evidentiary purposes--to statements of fact or issue presented under Title 20, California Administrative Code, Section 1747.

Lake County School Districts' presentation during the evidentiary hearing highlights a growing tension over the role of AB 1905 funds in mitigating impacts directly related to geothermal development. In this case, however, Applicant's agreement to mitigate the effect of its project on Lake County Schools makes it unnecessary for the Committee to resolve questions on the role of AB 1905 funds. Nonetheless, the Committee is sensitive to the comments made by Mr. Merrill on behalf of the Lake County School Districts regarding Joint Conclusion No. 4.

The only other conditions proposed in the Socioeconomic area are from the County of Sonoma and the Sonoma County Schools, that when cumulative impacts are ascertained Applicant be required to provide mitigation measures. Instead of adopting prospective conditions to mitigate impacts which are still speculative or unclearly identified, the Committee refers all parties to the December 30, 1981 Order Instituting Hearings (OIH) to consider geothermal development and its cumulative impacts at the Geysers KGRA. The OIH constitutes the Commission's continuing examination of cumulative impacts begun on November 5, 1980, when it approved the Camp Beaverbrook Petition.

Thus, with the mitigation provided in Appendix C, the Commission's passage of the Geothermal OIH, and the FEIR analysis, the Committee concludes that Applicant's project can be constructed and operated in conformity with applicable laws, standards and ordinances. To reflect the Committee's adoption of the Applicant-Lake County School Districts' agreement (Appendix C), the Committee has revised section 3 of the Compliance Plan, and notes that the post-certification dispute resolution procedure in Part I of the Compliance Plan applies.

Appendix A:

Lake County Air Pollution Control District
Determination of Compliance

LAKE COUNTY AIR POLLUTION CONTROL DISTRICT

DETERMINATION OF COMPLIANCE

FOR

OCCIDENTAL GEOTHERMAL PLANT NO. 1

July 28, 1981

Robert L. Reynolds, Air Pollution Control Officer
Donald L. Saderlund, Deputy APCO/Meteorologist

Submitted by: Robert L Reynolds

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TABLES, FIGURES, ATTACHMENTS

LAKE COUNTY AIR POLLUTION CONTROL DISTRICT
255 N. Forbes Street
Lakeport, CA 95453
(707) 263-2391

STATE OF CALIFORNIA

ENERGY RESOURCE CONSERVATION
AND DEVELOPMENT COMMISSION

In the Matter of:	)	Docket Number 81-AFC-1
	)	POSITIVE DETERMINATION OF
Application for Certification	)	COMPLIANCE BY THE LAKE COUNTY
of Occidental Geothermal Inc.,	)	AIR POLLUTION CONTROL DISTRICT
Re: Oxy Geothermal Project #1	)	

The Lake County Air Pollution Control District has reviewed relevant laws and regulations, participated in CEC and other public workshops, reviewed the proposed Oxy Geothermal Power Plant No. 1 project and prepared a written assessment, and hereby issues a positive Determination of Compliance with conditions below.

Signed by:

Dated: July 28, 1981

Robert L Reynolds
Robert L. Reynolds
Lake County Air Pollution Control Officer

Condition 1

Occidental shall install and operate the power plant and air emissions control system described in 81-AFC-1 in the manner necessary to limit H_2S emission on a continuous basis from Oxy Geothermal Power Plant No. 1 to eight (8) pounds of H_2S per hour. This same emissions limitation shall apply during power plant outages, unless LCAPCD rule 510 is complied with.

Condition 2

The hydrogen peroxide/catalyst, stretford/surface condenser, drift eliminators, turbine by-pass, dual generating units with shunt and multiple power source constituting the air emissions control system as proposed in 81-AFC-1 and ammendments shall be the equipment used to satisfy the requirements of Condition 1. In the event that Occidental seeks to change the above equipment necessary to control H_2S emissions as proposed prior to operation, they shall request that the LCAPCD Hearing Board hold a public hearing to determine whether the alternate technology is capable of satisfying the requirements

of Condition 1. The alternate technology may be used only if the LCAPCD Hearing Board and CEC determine that it is capable of complying with Condition 1. All abatement systems shall be properly winterized and maintained to ensure proper and reliable functioning. Prior to construction, Occidental shall submit approved for construction drawings of the non-condensable gas and condensate H_2S abatement systems quantifying process flows and design capacities. If additional resource discoveries necessitate increased H_2S abatement capacity because of higher H_2S levels in the steam, such capacity shall be incorporated in the air emissions control system.

Condition3

Occidental shall install when practicable continuous monitoring devices indicating total volume flow rates and H_2S concentrations at the following locations: (a) outlet of the Stretford unit; and (b) in the treated condensate or in the circulating water upstream of the cooling tower. A log of such monitoring shall be maintained and made available to the LCAPCD staff upon request. The H_2S monitoring devices must have an accuracy of plus or minus 1 ppm, provide measurements at least every 15 minutes, and be readily accessible to LCAPCD staff. Flow rate measuring devices shall have accuracies of plus or minus 5 percent at 40 percent to 100 percent of the total flow rate and calibrations must be performed at least quarterly. A Houston-Atlas or equivalent type instrument shall be acceptable for use in monitoring Stretford tail gas for H_2S. Calibration records shall be made available to LCAPCD staff upon request.

Alternatively a performance plan as specified in LCAPCD rule 655 shall be developed to ensure operation in compliance with specified emissions limitations.

Condition 4

The power plant cooling towers shall utilize drift eliminators with a guaranteed drift rate of 0.001 percent or less and the Stretford cooling tower a guaranteed drift rate of 0.002 percent or less.

Condition 5

Occidental shall provide safe access to sampling ports that enable representatives of the LCAPCD or ARB to collect samples from the treated condensate or the circulating water upstream of the cooling tower, cooling tower stacks, the noncondensable exit gas from the Stretford unit and the direct off-gas vent.

Condition 6

At least 60 days prior to scheduled commercial operation of the second generating unit, Occidental shall submit to the LCAPCD, for approval, a detailed plan for testing the performance of the OXY Geothermal Plant No. 1's abatement system at normal full load operation. A copy of the plan shall also be sent to the ARB for comment. Normal full load for this purpose is defined as operating at a minimum of 90% of the 1.6×10^6 lbs/hr steam flow capacity. This one time test shall incorporate tests for emission from the cooling tower of components of potential concern in geothermal steam including H_2S. The LCAPCO shall approve, disapprove or modify the plan within 30 days

of receipt from Occidental. Occidental shall complete the performance test approved by the LCAPCO within 90 days or as soon as possible following the date of commercial operation.

Condition 7

If a generic monitoring program for H_2S and/or other constituents of concern is initiated in the Geysers KGRA by responsible agencies (NSCAPCD, ARB, CEC and LCAPCD), Occidental shall participate to the extent equitable with other parties in funding or causing to be performed such a program.

Condition 8

Occidental shall install and operate for one year in the Gunning Creek Drainage a wet/dry deposition sampler, and analyze monthly composite of both wet and dry samples for soluable solids, boron, flouride arsenic, silica and mercury. The sampler utilized shall comply with or exceed the guidelines of the National Atmospheric Deposition Program.

Condition 9

Occidental shall perform biannual tests to determine the content of steam components as listed below upon written request of the LCAPCO and as required in the geothermal fluid transmission line permit. The continued need for such tests shall be reviewed after two years of operation. Copies of all tests shall be forwarded to the ARB and CEC. Such monitoring is not intended to be redundant.

STEAM CONDENSATE OR TOTAL STEAM	GAS PHASE
Ammonium (total)	Pariculate mass in mocrograms per kilograms of steam
Arsenic (total)	Arsenic from particulates above
Asbestos (total)	Lead from particulates above
Benzene	Cadmium from particulates above
Boron (total)	Sulfur from particulates above
Hydrogen Sulfide (total)	Mercury vapor
Fluorides (total)	Total methane and non-methane hydrocarbons
Mercury (total)	Other non-gases as indicated by condensate
Carbon dioxide (total)	NESHAP pollutants as requested
Total dissolved solids	
Total suspended solids	

Condition 10

Occidental shall file an application for a Permit to Operate with the LCAPCD within 90 days after the commercial operation date or as soon as possible there after and submit appropriate permit fees. The application shall include the results of the performance test referenced in Condition 6.

Condition 11

Occidental shall issue quarterly reports to the LCAPCO detailing: a) hours of operation; b) any periods of significant a atement equipment malfunction, reasons for malfunctions and the corrective action; c) types and amounts of chemicals used for condensate treatment; d) periods of scheduled and unscheduled outages and the cause of the outages if known; e) a summary of any irregularities that occured with the continuous emission monitors, if used; and f) if any, the dates and hours in which Oxy Geo #1 H_2S emission rate was in excess of the emissions limitations specified in Condition 1.

Condition 12

Occidental shall allow authorized representatives of the LCAPCD and ARB to enter the premises where the source is located, within one hour of notification, to inspect the plant for compliance with the conditions of this Determination of Compliance.

Condition 13

Occidental shall comply with all applicable federal, state, and local laws, standards, and ordinances in the operation of Oxy Geo #1.

Conclusion

A review of the materials originally submitted in the AFC and subsequent amendments in addition to Occidental's early commitment to utilization of BACT and mitigation of air quality concerns has resulted in the issuance of a positive Determination of Compliance (DOC) for the Oxy Geothermal Plant No. 1. Conditions attached to the DOC will ensure that the Oxy Geothermal Plant No. 1 project will not have a significant detrimental effect on air quality, and that potential air quality problems will not go unaddressed.

A review of tracer tests, coincident meteorology, monitoring data, existing control strategy, emissions inventory data and future development indicates that the Oxy No. 1 plant will likely contribute to expected exceeds of the CAAQS for H_2S, but in an amount less than 5 ppb at the allowable emissions rate. As such, in the District's opinion, the subject Determination of Compliance can be issued consistant with LCAPCD Rules and Regulations.

Since the Oxy Geo #1 plant can reasonably be expected to contribute to an expected H_2S AAQS exceed, Best Available Control Technology is required. The H_2S emissions control system and design of the power plant as proposed by Oxy constitutes, in the District's opinion, Best Available Control Technology. Oxy is both the steam supplier and plant operator enabling the plant design with twin turbines and by-passes to effectively address concerns over stacking emissions and normal operating emissions. The major concern remaining is possible failure of the Stretford Unit which has had a good operating record at Unit #13.

Emissions of small quantities of non-criteria (As, Si, etc.) pollutants in the drift are of concern, but considering that stacking will be avoided a great majority of the time, even these emissions are less than what could be expected from a typical older geysers plant. Oxy Geo #1 will have conditions requiring that the drift rate be determined by actual physical measurements within the Gunning Creek drainage.