

DOCKETED

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STATE OF CALIFORNIA
ENERGY RESOURCES CONSERVATION
AND DEVELOPMENT COMMISSION

DOCKET
79-AFC-3

DATE: MAY 7 1980

RECD: MAY 7 1980

In the Matter of:)
)
Application for Certification)
of PACIFIC GAS AND ELECTRIC)
COMPANY)
RE: Geysers Unit 18)

DOCKET NO. 79-AFC-3

DECISION

In this proceeding, Pacific Gas and Electric Company (PG&E) seeks of the Commission issuance of a Certificate for Geysers Unit 18, under section 25500 of the Public Resources Code.

I. DESCRIPTION OF THE PROPOSED GEYSERS UNIT 18 PROJECT

A. The Facility

The Geysers Unit 18 which PG&E proposes to construct in Sonoma County is a dry steam geothermal power plant with a net normal operating capacity of approximately 110 megawatts. It is scheduled for commercial operation in October 1982. The major structures of the proposed facility are a turbine building, cooling tower, electrical switchyard, and a hydrogen sulfide abatement facility. The turbine building would house the steam turbine generator and other associated equipment required for electrical power production. The mechanical draft cooling tower would dissipate heat from the power cycle. PG&E plans to abate hydrogen sulfide (H₂S) emissions through the use of the Stretford System which scrubs the H₂S from the vent gas stream from

the condenser and catalytically oxidizes the gas to eliminate sulfur. The exhaust gas stream would be ducted to the cooling tower. Any H_2S remaining in the condensate is proposed to be treated with hydrogen peroxide.

The switchyard would step up the voltage of the electrical power from the generator level of 13.8 kV to the 230 kV level required for economical power transmission. Four individual circuit lattice transmission towers would be constructed from the Unit 18 site to an existing transmission line between Units 9 and 10 and the Castle Rock Junction. The 4,000 foot transmission line requires 3,000 feet of new spur roads to the .25 acre tower sites and would include three conductor stringing trails, three to five feet in width.

B. The Site

The site is situated on the west slope of the Mayacamas Mountains above Big Sulphur Creek in Sonoma County. It will occupy approximately five acres of flat graded surface which will be established by excavating approximately 224,000 cubic yards of soil and rock material which will be disposed of on-site and at Socrates Mine. Oatgrass Meadow adjoins the power plant site.

C. The Steam Field

Four wells have been drilled within the Unit 13 steam supply field. Prior to completion of construction, additional wells would be drilled to provide the necessary steam supply. Union Oil, the producer who would be supplying the steam under contract to PG&E, estimates that 15

wells would be required initially. Thereafter, approximately 15 additional wells would be needed over the next 30 years to compensate for steam flow decline in the original producing wells. All of the steam field is located in Sonoma County.

II. THE PROCEEDINGS

The findings and conclusions found in this Decision are derived from the facts established by uncontroverted stipulations of PG&E, the Air Resources Board staff, the Northern Sonoma County Air Pollution Control District, and the Commission staff supported by declarations of competent witnesses.

Stipulations and declarations were submitted on the following matters: Air Quality; Structural Engineering/Reliability; Geotechnical; Biology; Water Resources and Hydrology; Cultural Resources; Safety; Civil Engineering; Solid Waste Management; Transmission Line Engineering; Transmission Line Health; Safety and Nuisance; Socioeconomics; Public Health; Public Health Effects of Transportation; Soils; Noise; Water Quality; Need; Site Selection; and Rate Impacts.

III. CONFORMITY TO THE DEMAND FORECAST

On December 20, 1979, the Commission adopted its forecast of PG&E service area electrical demands in the Biennial Report II. In the Geothermal Policy Report, the Commission adopted a policy to encourage the accelerated development of environmentally acceptable geothermal resources to reduce the need for oil-fired generation and take advantage of the relatively lower bus-bar cost of geothermally generated electric power.

Finding

1. The additional capacity to be added by Geysers Unit 18 is needed to meet anticipated growth in demand for electricity, retirement of older facilities, potential losses from the expiration of contracts for power from the Pacific Northwest, and oil and gas reduction policies shown in the forecast of service area electric power demands adopted pursuant to Public Resources Code section 25309.

IV. ENVIRONMENTAL RESOURCES

A comprehensive record on environmental matters was developed in this proceeding through public hearings, preparation of Draft and Final Environmental Impact Reports by the Commission Staff, and stipulations of the parties supported by declarations.

This Decision includes a series of findings on the environmental impacts of the proposed power plant, avoidable adverse environmental effects, mitigation measures proposed to minimize the impacts, and alternatives to the proposal.

A. Air Quality

Proposed Unit 18 is located within the Northern Sonoma County Air Pollution Control District. Under the terms of the Joint Policy Statement, entered into by the Commission and the California Air Resources Board on January 23, 1979, the Air Pollution Control Officer (APCO) for the District shall review the Applicant's air quality data and make a "Determination of Compliance" whether the proposed facility meets the requirements of the applicable New Source Review Rule and all other applicable District Regulations.

The APCO's February 28, 1980, Determination of Compliance, issued at the time the first Hearing Order in this proceeding was promulgated, stated that the Geysers Unit 18 proposal with an emission limitation of 100 grams/gross MWh would conform to applicable air quality regulations at the time of commencement of operation, October 1982. Achieving the applicable emission limitations and complying with New Source Review Rules requires the facility to employ a surface condenser, Stretford H₂S abatement system, and, if needed, a secondary abatement system.

The Commission Staff and the ARB did not appeal the District's Determination of Compliance as provided in the Joint Policy Statement, but filed testimony and comment respectively in the Commission proceeding that Unit 18 would not comply with the New Source Review Rules of the District in that the facility would cause or contribute to a violation of the hydrogen sulfide air quality standard at Whispering Pines. The ARB requested the District reconsider its February 28, 1980, Determination of Compliance.

Upon reconsideration, the APCO revised the Determination of Compliance to state that Geysers Unit 18, with an emission limitation of 100 grams/gross MWh, would not comply with New Source Review Rules of the District. Based upon the revised Determination of Compliance, the Committee issued a second Hearing Order.

At the first hearing to take testimony on air quality, all parties withdrew their witnesses and entered into the record a stipulation (dated April 18, 1980) of facts concerning compliance with District New Source Review Rules and other air quality requirements.

Findings

2. Based upon the Determination of Compliance and the stipulation of the parties, Geysers Unit 18, as proposed in the amended Application for Certification, will conform to the applicable limitations for emissions.
3. The Applicant agrees, by amending the Application for Certification, to size its secondary abatement system to limit hydrogen sulfide emissions to 44.0 grams/gross MWh, at which level the normal operation of Unit 18 will not prevent the attainment, interfere with the maintenance, or cause a violation of the state ambient air quality standard for hydrogen sulfide when the Unit commences operation in October 1982.
4. Unit 18 is approved on the basis of a design which includes a surface condenser, Stretford unit and a hydrogen peroxide/catalyst system. If necessary or preferable, the Applicant may use other means of secondary abatement to comply with the limitation on emissions, stated in Finding 3.
5. The Environmental Protection Agency has determined that Geysers Unit 18 is exempt from federal Prevention of Significant Deterioration requirements because it is not a "major stationary source" with the potential to emit 250 tons per year of any pollutant.
6. The substantive requirements of the conditions necessary to ensure compliance with applicable air quality laws and regulations are enumerated in the stipulation dated April 18, 1980 and

Appendix A; the procedures to implement and to review such conditions and to designate the responsible person or agency to conduct such review and ensure compliance shall be enumerated in the Geysers Unit 18 Monitoring and Compliance Report, which shall not conflict with the approved CEC/ARB Joint Policy Statement of Compliance with Air Quality Laws by New Power Plants.

B. Air Quality--Steam Field

Findings

7. The NSCAPCD has sole jurisdiction over the steam field operator and sets limitations on steam stacking (the venting of geothermal steam) which occurs during periods of power plant outage.
8. The steam supplier, Union Oil Company, must obtain all of the air quality permits relating to the steam field from the NSCAPCD. The NSCAPCD has stated that it is likely that the steam supplier will obtain all necessary permits and that the environmental impacts of steam stacking should not be significant if the conditions of the steam field permit are observed.

C. Site Selection

Although under the terms of Public Resources Code section 25540.2, the Applicant need propose only a single geothermal site, the Applicant also has the burden of proving that there are no more feasible, less environmentally impacted alternative sites for the power plant when there are unmitigatable impacts at the proposed site. This requirement of proof is derived from the California Environmental Quality Act (Public Resources Code sections 21000(g) and 21002).

PG&E conducted an in-house, three-phase siting study process which initially considered 18 sites. All but six sites (B, C, I, K, Q, and R) were eliminated in the Phase I review.

Sites B and C, were eliminated based upon the costs of mitigating environmental impacts, uneconomical steam transportation, unacceptable heat losses, and the intrusion of fill material into Birdsong Meadow if the sites were combined.

Sites I and K were eliminated for geologic reasons related to foundation conditions for the facility.

Site R was eliminated for geologic and steam transportation constraints.

Site Q, PG&E's selected site, survived the selection process although its environmental impacts were greater than at Site K, the next preferred site. PG&E considered that the mitigation of environmental impacts on Oatgrass Meadow at Site Q were less costly than overcoming the geologic constraints at Site K.

The California Department of Fish and Game (DFG) proposed an alternate site along a ridge northeast of Site Q. The DFG site would have avoided the environmental impacts to Oatgrass Meadow which adjoins Site Q.

PG&E evaluated the DFG site and found it to be on an active fault. Furthermore, PG&E claimed the DFG site was unacceptable since construction of an adequate pad for the power plant would require extensive cut and fill.

The Commission Committee visited the DFG site through the Hearing Officer and requested an independent review by Staff of PG&E's analysis. Staff analysis concurred with the conclusion of PG&E that the site was infeasible. The DFG withdrew its witnesses on site selection prior to the commencement of hearings.

Findings

9. The DFG site is infeasible as a power plant site based upon the existence of a fault zone and hydrothermally layered rock types within the site which would require extensive excavation and fill which are not good engineering practices in that area.
10. If the mitigation measures enumerated herein (see Biology) are undertaken by PG&E, Site Q is a feasible, environmentally acceptable site, and there are no more feasible, less environmentally damaging alternative sites than Site Q.

D. Biology

Impacts to plant and animal species will occur during the construction of the facility due to site preparation and during power plant operation most particularly at Oatgrass Meadow which adjoins the power plant site.

These impacts include loss of vegetation and habitat in the meadow/forest ecotone, decrease of wet character and values of the meadow, increased erosion and sedimentation in the meadow, and increased human activity associated with power plant and sedimentation pond construction, operation, and maintenance.

PG&E proposed measures to mitigate the environmental impacts in the Application for Certification (AFC), the Geysers Unit 18 Leasehold and Site Specific Studies (PG&E Report 411-78.194) and The Geysers Unit 18 Fish and Wildlife Mitigation and Protection Plan (PG&E revised Report 411-79.178). In addition, PG&E agreed to additional mitigation measures relating to Oatgrass Meadow.

The Commission Staff stipulated with PG&E that the impacts of the power plant construction and operation can be mitigated or compensated by the measures referred to above.

The California Department of Fish and Game (DFG) commented that the impacts from the power plant construction and operation cannot be adequately mitigated. The DFG withdrew its witnesses on biology prior to commencement of hearings.

The Commission Committee through the Hearing Officer physically examined the site and other portions of the leasehold which will be subject to the terms of the combined mitigation measures.

Finding

11. The environmental impacts resulting from the construction and operation of Unit 18 can be mitigated or compensated by the measures referred to in PG&E Report 411-78.194, PG&E Report 411-79.178, the stipulation between PG&E and Commission Staff, the Final Environmental Impact Report, including Appendix F, and by the additional Conditions enumerated below:

Conditions

- a. The conduct of all mitigation measures shall be under the supervision of a PG&E biologist.
- b. All mitigation measures, including but not limited to landscaping, shall be undertaken as early as practicable during the construction of the facility.
- c. Applicant shall provide electrical service to the guardhouse adjacent to Birdsong Meadow as early as practicable and shall plant trees and shrubs to obstruct the view of the guardhouse from Birdsong Meadow. When the guardhouse is not occupied, lighting of the guardhouse and gate during nighttime hours shall be kept to the minimum safe level.
- d. A buffer of mixed forest and vegetation of forage value shall be created at the northwest corner of Oatgrass Meadow simultaneously with the construction of the fill slope for the roadway to the plant site. In conjunction with the planting of new trees and other vegetation, the Applicant shall undertake the experimental transplanting of trees and other vegetation from the plant site for the buffer.
- e. In thinning encroaching woody plants along the edge of Oatgrass Meadow, the Applicant should consider the selective use of "pocketing" techniques.
- f. The Applicant shall develop and enforce a program to prevent the recreational use of Oatgrass Meadow by construction workers.

- g. The Applicant shall inquire of the steam supplier whether any application by the steam supplier for any permit for any of the three well pads adjoining Oatgrass Meadow (Sites 18-1.3; 18-6.4; and 18-5.3 as shown on development plan dated 11-20-78) has been made, and upon receiving notice from the steam supplier of such application(s), the Applicant shall immediately notify the Commission of such application(s) by the steam supplier.
- h. The Applicant shall not withdraw water from Farm Pond.
- i. The Applicant shall fence the southern and eastern boundaries of Birdsong Meadow and shall landscape along the fence at the southern boundary of the Meadow. Within Birdsong Meadow, the Applicant shall return all roads, not necessary for transmission tower access, to their natural condition. All necessary roadways shall be improved to minimize erosion and to prevent vehicular access to Birdsong Meadow.
- j. Prior to disposal at each site, the Applicant shall file papers with the Commission showing that rights have been acquired for placement of earth and rock materials at each of the disposal sites at Socrates Mine.

E. Water Resources and Hydrology

- 12. All of the water requirements of the proposed project will be satisfied either from natural sources of water near the site (blowout pond), from water obtained from operating units or from the condensate produced at the plant site. The use of natural

sources of water near the site (blowout pond) will not significantly deplete the region's water resources.

13. The proposed project will be adequately protected against damage from floods.

F. Water Quality

14. With the implementation of mitigation measures (see Appendix A) to control discharges or spills of chemicals, condensate, storm runoff, wastewater, and other materials, there will be no significant adverse impact to surface water or groundwater.

G. Socioeconomics

15. The Unit 18 project is consistent with the Sonoma County land use classifications.
16. The Unit 18 project will not cause a significant increase in the number of construction workers in the area and will not cause significant adverse socioeconomic impacts in the Sonoma-Lake County area.

H. Soils

17. With the implementation of mitigation measures (see Appendix A) to control erosion, there is limited potential for high erosion or sediment transport from the plant site to Oatgrass Meadow or existing streams and watershed.

I. Noise

13. With the implementation of mitigation measures (see Appendix A) to control noise, there are no residential receptors in Sonoma or Lake Counties or workers that will be affected by noise from Unit 18.

J. Cultural Resources

19. Construction activity on Unit 18 will not adversely affect any identified archaeological, ethnographic, paleontological, or historical resources.

V. PUBLIC HEALTH

A. Public Health

20. Geysers Unit 18 will emit pollutants which can be adverse to human health when present in sufficient concentrations. The severity of the impact depends upon the concentration, length of exposure and sensitivity of the individuals exposed. These pollutants include: regulated pollutants (pollutants for which there are ambient air quality standards or emissions standards) such as hydrogen sulfide, sulfur dioxide, particulate matter, sulfates, and radon-222; and unregulated pollutants (pollutants for which there are presently no standards) such as mercury, arsenic, boron and ammonia. Hydrogen sulfide abatement systems can result in the emissions of anthraquinone disulfonic acid, vanadium, sulfates and other particulate matter.

21. Due to expected low resultant ambient concentrations of total suspended particulates, sulfur dioxide, sulfates, carbon monoxide, nitrogen dioxide, oxidant, lead and nonmethane hydrocarbons, adverse health impacts should not occur from exposure to these pollutants resulting from the proposed operation of Unit 18. Adverse health impacts should not occur from exposure to hydrogen sulfide resulting from the proposed operation of Unit 18 at the level of abatement required herein.
22. Because emissions of radon-222 from Geysers Unit 18 are not expected to exceed radon-222 effluent standards, significant health impacts are not expected to occur.
23. Exact rates of emission of ammonia, arsenic, boron, mercury, vanadium and ADA are not known for Unit 18.
24. Analysis of incoming steam to Unit 18 will be performed within 45 days of commercial operation to predict incremental additions of unregulated pollutants (except ADA) to ambient air. These incremental additions will be combined with ambient baseline concentrations to determine potential public exposure to ammonia, arsenic, mercury, and vanadium particularly under worst case meteorological conditions.

B. Public Health Effects of Transportation

25. Approximately 75 truck deliveries per year of hydrogen peroxide will be required for Unit 18.

26. Approximately 3,300 truck loads of hydrogen peroxide per year will be required to meet the demand for peroxide for Units 1-18.
27. Approximately 1,472 trips per year will be required to remove the sludge from the cooling tower waste generated at Units 1 through 18.
28. Spills of sludge, hydrogen peroxide and other abatement chemicals transported to and from the site could pose adverse impacts to the environment and to public health and safety.
29. Improvement of the roads by Union Oil in the KGRA and compliance with state highway and local regulations concerning transport of hazardous materials may reduce the risk of spills of these materials.

VI. SAFETY AND RELIABILITY

A. Geotechnical

30. Seismic hazards at The Geysers Unit 18 site are adequately represented by Keith Feibusch Associates, Engineer's Report No. 01-3170-1067.
31. There are no geologic constraints to the construction of the power plant and appurtenant facilities.

B. Structural Engineering

32. The design of Unit 13 for critical structures and components will be adequate to achieve performance criteria requiring that

structures and components withstand a seismic event having a 10 percent probability of being exceeded during the plant design life using the combined sources response spectrum set forth in Keith Feibusch Associates, Engineer's Report No. 01-3170-1067, with minor damage and no structural collapse.

33. The design of Unit 18 for structures and components not designated "critical" will be adequate to achieve the Applicant's performance criteria.
34. Although a final determination of compliance with applicable laws and standards cannot be made until after the preparation of final design plans and calculations which occurs after the AFC, the Applicant's design of Unit 18 will likely comply with applicable laws and standards with respect to structural engineering.

C. Reliability

35. Design and construction of the facility in accordance with applicable design criteria (see Structural Engineering) will ensure an availability factor of 90 percent or greater and a capacity factor of 80 percent or greater at plant maturity.

D. Civil Engineering

36. Applicant's engineering designs are in accordance with accepted engineering practices and comply with all applicable laws and standards.

E. Safety

37. Applicant will implement measures (see Appendix A) which will reduce the hazards due (a) to fire occurring at the plant site, (b) to the handling and storage of hazardous, toxic, and flammable materials, and (c) the exposure of workers to accidents and to high levels of H_2S gas.

F. Solid Waste Management

38. The Applicant will store, handle, and dispose of hazardous and non-hazardous solid wastes in compliance with applicable laws and standards.

VII. TRANSMISSION LINE

A. Transmission Line Engineering

39. Construction of a 4,000 foot 230kV transmission line from Unit 18 on a westerly route to a point on PG&E's existing transmission system between Units 9 and 10 and the Castle Rock Junction is preferable to a northerly route connecting to the Unit 13 transmission line since it avoids transmission line losses and environmental impacts to the "Little Geysers" area.
40. The proposed 1,113 kcmil conductor size is reasonable and adequate in that it (1) makes use of standardized conductors; (2) has moderate transmission losses; and (3) will accommodate not only the proposed power plant but could provide for future generation, should such generation be realized.

B. Transmission Line Health, Safety and Nuisance

41. The proposed transmission line will not pose a significant safety or health hazard or be a significant nuisance to the public.
42. The Applicant will comply with California Public Utilities Commission (CPUC) General Order 95 (GO-95) which sets forth minimal safety and reliability related construction standards.
43. The proposed transmission line will comply with all noise, fire protection, grounding, radio and navigation interference laws and standards.

VIII. MISCELLANEOUS FINDINGS

A. Rate Impacts

44. The relatively low cost of Unit 18 proposal in relation to PG&E total rate base will have a negligible effect, if any, upon the rates paid by PG&E's customers.

B. Development Rights

45. The Applicant will construct and operate Unit 18 power plant and related facilities in a manner that will protect public health and safety, and therefore, does not require the Applicant to acquire, by grant or contract, the right to prohibit development of privately owned lands in the areas surrounding the facilities in order to protect public health and safety, pursuant to Public Resources Code section 25528.

C. Load Management Standards

46. The Commission adopted load management standards pursuant to Public Resources Code section 25403.5 on July 9, 1979. None of the reports that such standards require utilities to file as a first step toward compliance will be due until after the close of this proceeding. Therefore, compliance or noncompliance with such standards cannot be determined at this time.

D. Operation Standards

47. No standards of efficiency for operation of the facility have been adopted by the Commission pursuant to Public Resources Code section 15402(d). Therefore, compliance with such standards cannot be determined.

E. Environmental Impact Report

48. During the proceedings, changes or alternatives have been required in, or incorporated into, the proposed facility which mitigate or avoid the significant environmental effects of the facility identified in the Final Environmental Impact Report or the findings and conclusions set forth in the Decision. There are no specific economic, social, or other considerations which make infeasible the mitigation measures identified in the Final Environmental Impact Report or the findings and conclusions. The project, by itself, will not result in significant adverse impacts if mitigated as provided herein.

49. The Final Environmental Impact Report is certified to have been prepared in compliance with the California Environmental Quality Act and all applicable state and Commission guidelines. The Final Environmental Impact Report has been considered in adopting this Decision.

F. Compliance Monitoring

50. The Applicant's performance of all of the acts enumerated in the GEYSERS UNIT 18 COMPLIANCE AND MONITORING REPORT will be required to monitor compliance with all applicable laws and regulations. The Applicant and Commission Staff shall meet and confer with other parties and affected public agencies to establish the elements of the Compliance Monitoring Program. A final Compliance Monitoring Program shall be submitted by the parties 120 days from the effective date of the Decision. Disputes with respect to the contents of the GEYSERS UNIT 18 COMPLIANCE AND MONITORING REPORT shall be submitted to the Commission for resolution.

Conclusions

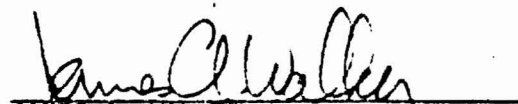
1. The provision of Public Resources Code section 25524, requiring an affirmative showing of conformity to the forecast, has been met.
2. With the application of the mitigation measures agreed to by the Applicant, the proposed Unit 18 can be constructed and operated to comply with all applicable federal, state, regional, and local laws, regulations and standards.

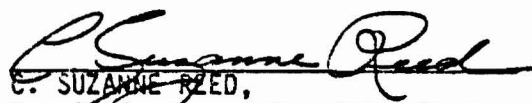
ORDER

1. The Application for Certification for Pacific Gas and Electric Company's Geysers Unit 18 is granted, subject to the condition that the Company shall implement all mitigation and verification measures enumerated in this Decision, the stipulations in the record, Appendix A, and The Geysers Unit 18 Monitoring and Compliance Report. This Decision is effective upon filing with the Commission Secretary.
2. The Executive Director of the Commission is directed to transmit a copy of this Decision and accompanying documents pursuant to Public Resources Code section 25537 and section 1768 of the Commission Regulations.

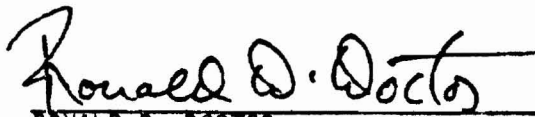
DATED: May 7, 1980


RUSSELL L. SCHWEICKART,
Chairman


JAMES A. WALKER,
Commissioner and Presiding Member


S. SUZANNE REED,
Commissioner and Committee Member


EMILIO E. VARANINI, III,
Commissioner


RONALD D. DOCTOR
Commissioner

APPENDIX A
CONDITIONS OF CERTIFICATION

Fire Safety

1. The Applicant shall provide automatic sprinkler systems for the cooling tower, lube oil reservoir and purifier, seal oil tank, and the main transformer, install an automatic CO₂ purge system on the generator, construct gravel blotters and a retention basin to contain oil leaks from transformers, locate fire hose stations and manually operated fire extinguishers throughout the site, and install three 1,000 gpm fire pumps with two independent power supplies. The Applicant shall install a manual spray wetting system on the cooling tower to be operated during shut down periods so as to reduce the flammability of wooden members.

2. The Applicant shall provide a document from a registered fire protection engineer prior to the commencement of commercial operation of Unit 18, certifying that its design and construction are in reasonable conformance with applicable fire safety codes and standards.

Handling and Storage of Hazardous, Toxic, and Flammable Materials

3. The Applicant shall store hydrogen gas in the cylinder in which it is transported to the site.

4. The Applicant shall store anthraquinone disulfonic acid (ADA), vanasol (38.5 percent vandium), caustic soda (sodium hydroxide); and hydrogen peroxide (if hydrogen peroxide secondary H₂S abatement system is necessary) in storage tanks and

pressure vessels designed, fabricated, constructed and anchored in accordance with the applicable laws and design standards listed below:

- a) Title 8 of the California Administrative Code, Chapter 4 (pressure vessels);
- b) American Petroleum Institute (API) Standard 650 (Stretford System Tanks);
- c) Manufacturing Chemists Association -- chemical safety data sheet SD-53 (hydrogen peroxide storage tanks);
- d) Technical Information Document (TID) 7024, Chapter 6 (seismic design of all storage tanks); and
- e) Section 8.3 of ATC-3-06, or if necessary to a more stringent criteria (anchoring criteria for all storage tanks). The value of P, as used in E qn. 8-2 of ATC-3-06 shall be equal to 1.0.

5. The Applicant shall provide all persons handling H_2S abatement materials with eye protection, rubber gloves, and rubber aprons and to install emergency eye-wash and shower stations adjacent to chemical work stations. The Applicant also shall post labels and warnings on piping systems and tanks to store chemicals.

6. The Applicant shall submit the following documentation to the Energy Commission:

- a) A document stamped by a registered civil, mechanical or industrial engineer attesting to the following:
 - 1) H_2O_2 storage tank(s) have been fabricated and constructed in accordance with MCA Chemical Safety

Data Sheet SD-53 and TID 7024, Chapter 6, and anchored in accordance with ATC-3-06, Section 8.3, or if necessary, to a more stringent criteria.

2) Stretford system pressure vessels have been fabricated and constructed in accordance with Title 8, CAC, Chapter 4, and TID 7024, Chapter 6, and anchored in accordance with ATC-3-06, Section 8.3, or if necessary, to a more stringent criteria.

3) Stretford system tanks have been fabricated and constructed in accordance with API 650 and Title 8, CAC, Chapter 4, and TID 7024, Chapter 6, and anchored in accordance with ATC-3-06, Section 8.3, or if necessary, to a more stringent criteria.

b. Copies of Certified Code papers for pressure vessels.

Worker Safety

7. The Applicant shall implement its on-going accident prevention program.

8. The Applicant shall request the Cal/OSHA Consultation Service to review sections of its accident prevention program for conformance with Section 3203 of Title 8, CAC. These sections refer to chemical handling and storage, and include provisions for hazardous materials and airborne contaminant exposure based on Section 5155, Title 8, CAC.

9. The Applicant shall submit to the Commission, not later than 150 days prior to commencement of operation of Unit 18, a letter from the Cal/OSHA Consultation Service verifying the review

specified in Condition 8 above, and a letter from Cal/OSHA Consultation Service or Cal/OSHA verifying compliance with the requirements of Section 3203 of Title 8, CAC.

10. To prevent exposure of workers to H_2S gas above the levels set in Cal/OSHA regulations, the Applicant shall:

- a) Post warnings in areas where levels of H_2S gas could possibly exceed the limits set in the Cal/OSHA regulations;
- b) Require employees to secure entry permits and the approval of the operating foreman before entering a restricted area;
- c) Set alarms to ring when H_2S gas levels exceed 10 ppm;
- d) Discontinue work unless approved breathing apparatus is worn; and
- e) Instruct employees about the hazards of H_2S .

Hydrology

11. The Applicant shall install a 24-inch diameter CMP or greater outlet pipe at the plant site, and maintain the size of the retention basin at 52,000 cubic feet.

Soils

12. The Applicant shall implement the erosion control measures described in Sections 5.4.2.1 and 5.5.2.2 of the Geysers Unit 18 AFC. The Applicant shall also construct three sedimentation ponds, as shown in Figures 4.4-2 and 4.4-3 of the AFC, to catch sediment from the plant site and the disposal areas.

13. The Applicant shall quantify the amount of sediment accumulated from the proposed sedimentation ponds and annually shall provide this information to the Commission and the NCRWQCB for the first three (3) years of commercial operation. At that time the Applicant, the CEC, and the NCRWQCB will review the need for additional reports.

14. If the sediment yield information or other data supplied to the Commission indicates that the proposed mitigation measures appear to be ineffective, the Applicant, the Commission staff, and the NCRWQCB will evaluate the need for alternative mitigation measures. If an agreement on mitigation measures cannot be reached, the matter will be submitted to the Commission for resolution.

Water Quality

15. To prevent spills of Stretford process material from leaving the immediate vicinity, the Applicant shall surround the H₂S abatement process area with an impermeable concrete barrier. The Applicant shall design the facility so that spilled Stretford material will drain to a sump where it will be pumped to a chemical storage tank for reuse in the Stretford process, or disposed of off-site at an approved Class II-I solid waste disposal site.

16. Rainwater entering the Stretford process area shall be reused in the process or pumped to the cooling tower basin.

17. To prevent spills of condensate and other materials from leaving the site, the Applicant shall construct an impermeable retention barrier (concrete or asphaltic concrete) around the plant. The Applicant shall also pave the site (except the switchyard) with two inches of asphaltic concrete.

18. The Applicant shall design the proposed retention basin to retain at least the maximum condensate spill expected to occur before plant personnel can correct the cause of the spill.

19. The Applicant shall design the facility so that a spill of condensate or other materials will flow to a 1,000 gallon, concrete lined catch basin located at the lowest point in the plant site. The catch basin shall be equipped with a 100 gallon-per-minute pump to return spilled material to the cooling tower basin for reinjection.

20. If a spill occurs which is larger than the capacity of the pump, the Applicant shall use a portable pump to remove excess material.

21. The Applicant shall install an alarm system to notify plant operators when a spill has occurred and when the catch basin pump has started. PG&E shall employ roving operators to respond to the alarms within 30 minutes and to shut down the plant, to reduce the load of the plant, or otherwise to correct the problem.

22. To minimize the potential adverse impacts of storm runoff on the quality of the surface water on or near the leasehold, the Applicant shall return runoff from the plant site to the cooling tower basin for subsequent injection into the geothermal reservoir. When the capacity of the return system is exceeded and a spill has not occurred, runoff may, if necessary be released from the site through a manually-controlled valve or pumped back to the cooling tower basin.

23. The Applicant shall dispose of domestic waste water by injection into the steam supplier's reinjection system. The wastes shall be treated in a septic tank to remove solids, passed through a rock filter, and discharged to the reinjection line at a point between the condensate surge pond and the reinjection well.

Cultural Resources

24. The Applicant shall maintain the existing fence around Archaeological Site CA-SON-793.

25. If deep excavation for plant construction is necessary in the small area about 500 feet southwest of the proposed plant site which may contain microfossil chert the Applicant shall mitigate the impact by arranging for a qualified geologist to determine if any fossil-bearing chert is present. If fossiliferous chert is found, a qualified geologist shall collect samples for archiving at the Sonoma State University Geology Department. At least five samples will be taken from each significant body of chert.

26. The Applicant shall conduct subsurface testing only in the portions of the Socrates Mine road where construction will have a direct impact on an area which, for topographic reasons, could have been a site on either the cemetery or the Chinese cemetery. Selection of these areas will be left to the discretion of Dr. Frederickson.

27. The Applicant shall arrange for the presence of a qualified archaeologist, during stripping of vegetation and topsoil from the plant site, to advise the Applicant's General Construction Department of the significance of any cultural resource which may be discovered. The archaeologist shall conform to on-site safety procedures, as directed by the Resident Engineer. If cultural resources are discovered during such land alteration activities, said operations in the potentially impacted area shall cease until the archaeologist evaluates the significance of the resource. The Applicant shall notify the CEC within 24 hours of any significant discovery.

If the Applicant's activities threaten to impact a significant cultural resource, the Applicant and CEC Staff shall meet to discuss the Applicant's proposed mitigation plan within 48 hours. If agreement is reached on a mitigation plan, the Applicant shall institute such action and construction may proceed. If agreement between the Applicant and CEC Staff cannot be reached by the 7th day following discovery, the matter shall be submitted to the Commission for its resolution. Construction activity in the potentially impacts area shall remain stopped during the pendency of the Commission's determination. The Commission shall render a

decision on an appropriate mitigation plan within 20 days following discovery. A mitigation plan shall be developed which can be accomplished within 60 days.

Solid Waste Management

28. The Applicant shall supply the Commission, the Solid Waste Management Board, and the DOHS Hazardous Materials Management Section with the site(s) selected for hazardous waste disposal before operation of the plant begins.

29. The Applicant shall seek alternative sites at which to dispose of hazardous wastes if the sites initially selected by the Applicant reach capacity during the lifetime of the plant.

30. The Applicant shall implement measures to ensure that the hazardous wastes are taken to a facility permitted by the Department of Health to accept such wastes.

Noise

31. The Applicant shall implement the following noise mitigation measures:

- a) Path treatment will be installed on the exterior surfaces of the steam jet ejectors and will consist of mineral wool and an impervious membrane (aluminum and/or lead jacket).
- b) Thermal (high density) insulation will be installed on the exterior surfaces of the steam turbine.
- c) A sound proof office space will be built on the turbine-generator floor inside the building.

- d) Stream-drain lines will be routed back into the atmosphere during unit start-ups.
- e) During unit outage conditions, steam will be routed through a rock muffler system installed and operated by the steam supplier.

32. PG&E will require its employees to comply with the requirements of Cal/DOHS for hearing conservation through administrative controls and/or the use of hearing protectors, whenever necessary.

33. To verify compliance with standards for the protection of employees from noise impacts the Applicant shall perform a noise evaluation as required by Title 8, California Administrative Code, Article 105, to determine the magnitude of employee noise exposure. The results of the evaluation shall be available within 180 days of the time the facility has reached its rated power generation capacity and construction is complete. The results of the noise survey shall be maintained by the Applicant and shall be made available to DOSH or CEC upon request.

34. The Applicant shall limit the use of heavy earth moving equipment to daylight hours whenever possible.

35. In order to monitor compliance with the Sonoma County Noise Element, the Applicant shall undertake the following measures:

- a) Within 90 days after the plant reaches its rated power generation capacity and construction is complete, the Applicant shall conduct noise surveys at 500 feet

from the generating station and at the nearest sensitive receptor:

- 1) The survey shall cover a 24-hour period during which the plant is operating
- 2) Results of the survey shall be reported in terms of L_x , L_{eq} , and L_{dn} levels
- 3) The Applicant shall provide a report of the survey to the Energy Commission and Sonoma County. If the report indicates that a county standard is being exceeded, the report shall contain a mitigation plan and schedule to correct the non-compliance.
- 4) The Applicant need not provide any additional noise surveys or reports of the off-site operational noise of the plant unless the public registers complaints or the noise from the project is suspected of increasing due to change in the operation of the facility.

36.. In the event that the Applicant receives public complaints of the noise due to construction, the Applicant shall immediately conduct an investigation to determine the extent of the problem. The Applicant shall take reasonable measures to resolve the complaint. In the event that the Applicant is informed that public complaints have been registered with a public official or agency, and the applicant fails to resolve the problem, the Applicant shall so inform the Sonoma County Planning Department. If requested by the Department, the Applicant shall perform the monitoring procedures outlined below:

- a) Conduct noise surveys at the sensitive receptors registering the complaints and at the facility property line nearest the complaining receptors. Surveys shall be taken for the period of construction working day and under similar circumstances that the complaints were registered. Survey should be reported in terms of L_x and L_{eq} levels.
- b) Notify Sonoma County and the CEC of the results of the surveys, of the public complaints, of the feasible mitigation measures which the Applicant has applied to resolve the impact, and of the results of mitigation plans.

Transmission Line Health, Safety, and Nuisance

37. The Applicant shall ground fences following the procedures listed in figures 5.2-6 through 5.2-10 of the AFC.

Biology

38. The Applicant shall implement the biological mitigation measures contained in the following documents:

- a) the AFC;
- b) The Geysers Unit 18 Leasehold and Site Specific Studies (PG&E Report 411-78.194);
- c) The Geysers Unit 18 Fish and Wildlife Mitigation and Protection Plan (PG&E revised Report 411-79.178).

39. To minimize impacts at Oatgrass Meadow, the Applicant shall also implement the following mitigation measures:

- a) Maintenance of overflow from the proposed sedimentation pond No. 1 to course through existing natural drainage pathways;
- b) Development of erosion control measures (e.g., gully plugs) for the meadow to protect it from the concentrated flows from the pond or adjacent roads;
- c) Utilization of the access route to sedimentation pond No. 1 in Oatgrass Meadow as an unprepared roadbed and the return of the route to a natural state after each use; limitation of access to the pond via this route to those vehicles needed for emergency maintenance and sediment removal only;
- d) Revegetation of the disturbed meadow forest ecotone with preexisting species and if possible with native species only;

40. To compensate for the loss of the lupine, the Applicant shall seed the rare lupine in suitable areas.

41. To ensure that vegetation in the little Geysers area is not directly disturbed, the Applicant shall limit access to the area during construction of the power plant.

41 To minimize adverse impacts on vegetation, the Applicant shall construct a cooling tower which has the manufacturer's guarantee of a maximum drift rate of 0.002 percent.

42. As a condition of certification of Geysers Unit 17, the Applicant must conduct cooling tower drift studies. If the proposed Unit 17 drift studies are successful, the only additional monitoring the Applicant must perform in this case is the direct observation of foliage damage at or near the Unit 18 site, including damage to vegetation in Oatgrass Meadow. This additional monitoring shall be undertaken for at least 3 years after the power plant begins operation.

If the Unit 17 drift studies yield inadequate data, for Unit 18 concerns, additional drift monitoring programs may be required. If additional studies are needed, the Staff and the Applicant will meet to discuss the scope of such studies. If agreement between the Applicant and the Staff cannot be reached as to the need for additional studies or the proper scope of such studies, the matter will be submitted to the Commission for its resolution.

43. Six weeks prior to beginning construction related to the proposed power plant project, the Applicant shall submit five copies of a detailed field implementation and monitoring plan for mitigation measures proposed in various documents submitted to the CEC during the AFC process. The level of detail provided should be the same as the level of detail required in Geysers Unit 17's Wildlife Mitigation Plan. Staff will review the mitigation plan, and will meet with the Applicant to discuss any comments the Staff may wish to make. The Department of Fish and Game will be invited to participate in all discussions. If

disputes arise between the Applicant, the Staff or DFG which cannot be resolved after good faith efforts to do so, the matter will be referred to the Commission for its resolution.

Structural Engineering

44. The Applicant shall design and construct Unit 18 and its related facilities in accordance with:

- a) Geysers Unit 18 AFC, Section 4.3.2.6., "Civil and Structural Engineering Design" (as amended 8 November 79 and 8 December 79), and Appendix B entitled "Civil Design Criteria and Guidelines for Geysers Geothermal Projects Beginning with Unit 16" (and its appendices);
- b) "Applicant's 28 June 79 Response to Staff Interrogatories", 79-AFC-3 and Applicant's 30 July 1979 Supplemental Response to Staff Interrogatories (Technical Area: Safety #3.a.), 79-AFC-3.
- c) Uniform Building Code, 1976 Edition (UBC 76), excepting Section 2312. (Note: The UBC 76 is adopted by Title 24, California Administrative Code (CAC) as the minimum legal state building standard.)
- d) Sonoma County Ordinance No. 2395 excepting Section 2312 of the reference adopted in Section 4-14(a) (UBC 76).
- e) American Society of Mechanical Engineers' Boiler and Pressure Vessel Code (ASME BPV Code). (Note: The ASME BPV Code is adopted by Title 8, CAC.)
- f) American National Standards Institute "B 31.1 Power Piping Code" (ANSI B 31.1).
- g) American Concrete Institute (ACI) "Building Code Requirements for Reinforced Concrete" (ACI 318-77).

- h) ACI "Building Code Requirements for Structural Plain Concrete" (ACI 322-72).
- i) ACI "Commentary on Building Code Requirements for Reinforced Concrete" (ACI 318C-77).
- j) American Institute for Steel Construction (AISC) "Specification for the Design, Fabrication, and Erection of Structural Steel for Buildings", November 1978 (AISC SDFESS 78).
- k) AISC "Commentary on the Specification for the Design, Fabrication, and Erection of Structural Steel for Buildings" (AISC CSDFESS 78).
- l) AISC "Specification for Structural Joints Using ASTM 325 or A490 Bolts", April 1978 (AISC SSI 78).
- m) American Iron and Steel Institute (AISI) "Specifications for the Design of Light Gauge Cold Formed Steel Structural Members" (AISI SDLGCFSS).
- n) Steel Joint Institute "Standard Specifications and Load Tables" (SJI SSLT).
- o) American Welding Society "Structural Welding Code AWS D.1.1-79" (AWS D.1.1-79).
- p) "National Design Specification for Stress-Grade Lumber and Fastenings 1977" (NDS 77).
- q) American Association of State Highway and Transportation Officials "Standard Specifications for Highway Bridges", 1977 Edition (AASHTO BRIDGE 77).
- r) Structural Engineers Association of California (SEAO), "Recommended Lateral Force Requirements",

45. In the case of discrepancies between the criteria contained in Condition 44, subparts (a) through (b) and the criteria contained in Condition 44, subparts (c) through (r), the Applicant shall use the highest design criteria in the final design of the facility.

46. When using ATC-3-06, equation 8-2, the Applicant shall use a value of 1.0 for the coefficient "P".

47. The Applicant has agreed to design and construct Unit 18 so that critical facility structures and components (structures and components, set forth, essential to continued power generation, or whose replacement cost or time is excessive) will be able to withstand a seismic event having a 10% probability of being exceeded during the plant design life using the combined sources response spectrum set forth in Keith, Feibusch Associates, Engineer's Report N. 01-3170-1067 (design life of 40 years for structures and 30 years for equipment components) with minor damage and no structural collapse.

48. The Applicant shall use the following standards and documents as guides in the design of Unit 18 and related facilities:

- a) Seismic Safety Commission, Policy on "Locating Designing, and Operating Critical Facilities and Lifeline Facilities", 1978.
- b) Joint Committee on Seismic Safety, "Final Report of the Legislature, State of California", 1974 (CDMG Sp No. 45).
- c) "Earthquake Design Criteria for Structures", G.W. Housner and P.C. Jennings, EERL 77-06, CIT.

- d) Applied Technology Council, "Tentative Provisions for the Development of Seismic Regulations for Buildings", ATC 3-06, 1978.

49. If the Applicant proposes to use a design for the cooling tower other than that approved by the CRC for Unit 17, the Applicant shall:

- a) Provide a cooling tower design using the following criteria:
 - 1) working stress criteria;
 - 2) equivalent lateral force static design; and
 - 3) spectral forces obtained from the combined sources response spectrum set forth in Keith, Feibusch Associates, Engineer's Report No. 01-3170-1067 for a 10% probability of exceedance event during the 40-year plant design life and a damping ratio of 7%.
- b) Provide a design check for the cooling tower using the following criteria:
 - 1) ultimate strength criteria;
 - 2) dynamic analysis using conventionally acceptable methods;
 - 3) the combined sources response spectrum set forth in the Keith, Feibusch Associates Engineer's Report No. 01-3170-1067 for a 5% probability of exceedance event during 30 years, and a damping ratio appropriate for the anticipated stress level.
- c) Submittals of dynamic analysis methods, design check and final design calculations and drawings shall be as set forth in The Geysers Unit 17 AFC Decision, Structural Engineering Section, Finding 6.

50. The Applicant shall demonstrate in the final design calculations and construction drawings conformance with the criteria set forth in Conditions 44, 45, 46, 47, 48, and 49, above.

51. The Applicant shall submit design calculations and drawings for review pursuant to the following review procedures:

- a) The Applicant shall furnish to the Commission and Sonoma County Chief Building Official four complete sets of final structural design plans, specifications, and design calculations for each structure or structure foundation. The plans, specifications and calculations shall be filed not later than 120 days prior to the intended start of each structure or foundation, and shall be developed using the approved structural design criteria, structural analysis methods, seismic performance criteria, seismic design criteria, and seismic analysis methods. The design calculations shall clearly reflect the inclusion of approved criteria, assumptions, and methods used to develop the design. The Chief Building Official, in consultation with the CEC, will review the submittals to determine conformance with the criteria and standards set forth in these findings. The Applicant shall make in-lieu payments to Sonoma County equivalent to the fees set forth in Chapter 3, Section 303 of the UBC (1976 Ed.) for review of the submittals. One copy of the approved plans and calculations shall be returned to the Applicant.

b) The Applicant shall provide, through the General Construction Department, a staff of field engineers and inspectors to monitor conformance with all contract specifications. Field engineers and/or inspector will be present on-site at all times to monitor construction activities. The Sonoma County Chief Building Official; his agent, or the CEC Staff may, upon reasonable notice, inspect the site at any time. Upon completion, PG&E will prepare and submit to Sonoma County and the CEC Staff the following:

- 1) summary of soils compaction tests;
- 2) "as-built" grading drawings;
- 3) summary of concrete strength tests;
- 4) copies of concrete pour sign-off sheets;
- 5) bolt torque inspection reports;
- 6) weld (field) inspection sheets;
- 7) "as-built" drawings for the construction of civil and architectural work (changes approved by the Building Official shall be identified on the "as-built" drawings); and
- 8) a monthly summary of construction progress.

Air Quality

52. Hydrogen sulfide emissions from the power plant shall be no greater than 44.0 gm/gMW-hr.

53. Applicant shall return all untreated steam and/or condensate to injection points such that hydrogen sulfide will be treated up to the standards of Rule 455(a) during normal power plant operation, plant start-up and plant shut-down.

54. During downwash conditions emissions of H_2S shall not exceed 75 lbs H_2S /hr. Excess of 75 lbs/hr, such as occurs during certain hydrogen sulfide control equipment failures, shall be avoided by means approvable by the District. Downwash conditions for the purpose of the condition shall be neutral stability winds between 5.0 and 10.0 meters/second from the west ($270^\circ \pm 11.25^\circ$). The Applicant shall establish and maintain a meteorological station and appropriate system to properly implement this 75 lb/hr limitation.

55. Applicant shall install and operate a continuous H_2S monitoring device in the off-gas vent to the atmosphere and the off-gas vent to the cooling tower. The gas analyzer shall have an accuracy of $\pm 10\%$ of full scale for the 1000-5000 ppmv range. The flowmeter shall have an accuracy of $\pm 10\%$ of full scale for the appropriate acfm range. Data shall be logged on a strip chart or other similar device which will be available for inspection on site upon request. Applicant shall design for a target data capture of 85% on an annual basis.

56. Although Unit 18 may be licensed on the basis of a hydrogen peroxide/catalyst and Stretford/surface condenser system, the Applicant may use other means to comply with the hydrogen sulfide emissions limitation of 44.0 gm/gMW-hr. The Applicant will submit, no later than two years prior to the scheduled commercial operation date of Unit 18 project, the conceptual design of the finally selected abatement system including data demonstrating that compliance with the emissions limitation of 44.0 gm/gMW-hr can be met. Design shall not proceed until it is determined that the material submitted is adequate to demonstrate compliance with the H₂S emissions limitation. Such data shall be submitted at least 30 days prior to the date intended for commencement of design of the proposed system.

57. Applicant approved-for-construction drawings of the secondary abatement system shall be submitted at least 30 days prior to the date intended for commencement of the system. Construction shall not proceed until it is determined that the drawings submitted are adequate to demonstrate compliance with the applicable limitations.

58. Applicant, within 60 days of commercial operation, shall demonstrate that the applicable emissions limitations of NSCAPCD rules are being maintained during normal plant operations. Applicant shall submit a detailed performance test plan at least 30 days prior to such tests. Applicant's proposed test plan must receive approval before such tests may be conducted to achieve compliance. During performance of the compliance testing the NSCAPCD shall have the right to be present. For purposes of these conditions, "normal" operation is defined as operation of the facility with all abatement equipment installed and operating to specifications enumerated herein.

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STATE OF CALIFORNIA
ENERGY RESOURCES CONSERVATION
AND DEVELOPMENT COMMISSION

In the Matter of:

Application for Certification
of PACIFIC GAS AND ELECTRIC
COMPANY re: Geysers Unit 18

Docket No. 79-AFC-3

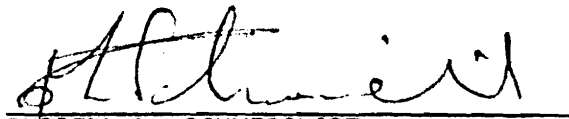
ORDER CORRECTING TYPOGRAPHICAL
ERROR

Pursuant to the joint request of the Applicant and Commission staff, filed June 9, 1980 and upon a showing of good cause, IT IS HEREBY ORDERED that the Commission Decision in the above entitled matter be corrected to read as follows:

Appendix A, Condition 9,

"9. The Applicant shall submit to the Commission; not later than 150 days prior to commencement of operation of Unit 18, a letter from the Cal/OSHA Consultation Service certifying the review specified in Condition 8 above, and a letter from Cal/OSHA Consultation Service or Cal/DOSH verifying compliance with the requirements of Section 3202 of Title 8, CAC." (correction is underlined)

Date: June 17, 1980



RUSSELL L. SCHWEICKART,
Chairman

