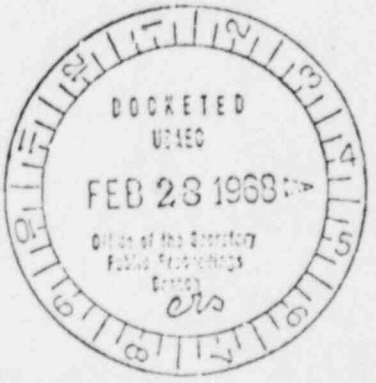
UNITED STATES OF AMERICA

ATOMIC ENERGY COMMISSION

In the Matter of	)	
	)	
PACIFIC GAS AND ELECTRIC COMPANY	)	Docket No. 50-275
	)	
	)	
(Diablo Canyon Nuclear Power Plant)	)	



PROPOSED FINDINGS OF FACT AND CONCLUSIONS OF LAW SUBMITTED BY THE AEC REGULATORY STAFF

The staff has reviewed the "Proposed Findings of Fact and Conclusions of Law Submitted by Pacific Gas and Electric Company", dated February 22, 1968, and has concluded that only the following additions need be proposed.

1. Add to paragraph 13 the following transcript references:

   "Tr. pp. 351-354."

2. Add the following statement to paragraph 15:

   Before operation at any power level in excess of 3250 MW(t) may be undertaken, the Commission will review the matter to assure that the facility can be operated safely at the higher power level and take appropriate licensing action.

3. Add the following transcript references to paragraph 16:

   "Tr. pp. 522-535."

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4. Add the following transcript reference to paragraph 17:

"Tr. p. 324."

5. Add to paragraph 18 the following transcript references:

"Tr. pp. 344-350, 362-364."

6. Insert "particulate" between "and" and "filters" at page 10, line 25, paragraph 20 to clarify the type of filters provided as one of the engineered safety features to minimize the consequences of the hypothetical "loss of coolant" accident. Add the following transcript references to paragraph 20:

"Tr. pp. 325, 467, 483-487."

7. Add to paragraph 22 the following transcript references:

"Tr. pp. 382-389, 396-410, 421 and 438."

8. Add to paragraph 23 the following transcript references:

"Tr. pp. 490-509."

Respectfully submitted,

Troy B. Conner, Jr.

Troy B. Conner, Jr.
Trial Counsel

Dated at Bethesda, Maryland,
this 28th day of February, 1968.

UNITED STATES OF AMERICA
ATOMIC ENERGY COMMISSION

In the Matter of	
PACIFIC GAS AND ELECTRIC COMPANY	Docket No. 50-275
(Diablo Canyon Nuclear Power Plant)	

PROPOSED FINDINGS OF FACT AND
CONCLUSIONS OF LAW
SUBMITTED BY
PACIFIC GAS AND ELECTRIC COMPANY

PRELIMINARY STATEMENT

1. This proceeding involves the application of Pacific Gas and Electric Company (PGandE) dated January 16, 1967, as amended by nine amendments supplemental thereto (the application as amended is hereinafter referred to as the "Application"), for appropriate licenses under Section 104 b. of the Atomic Energy Act of 1954, as amended, to construct and operate a 3250 megawatt (thermal) pressurized water reactor nuclear power plant on a site on the Pacific Coast in San Luis Obispo County, California. (Safety Evaluation by Atomic Energy Commission (AEC) Division of Reactor Licensing, AEC Staff Exhibit 1 (S.E. 1) p. 1; Partial Summary of Application Prepared by Pacific Gas and Electric Company, Applicant's Exhibit 1 (A.E. 1) p. 1; Transcript (Tr.) pp. 4, 60, 149, 171.)

2. The Application was reviewed by the regulatory

staff (Staff) of the AEC which concluded that PG&E has satisfied all AEC requirements for the issuance of a construction permit. (S.E. 1 pp. 63, 64.) The Application was also reviewed by the Advisory Committee on Reactor Safeguards (ACRS) which concluded that the proposed facility can be constructed with reasonable assurance that it can be operated without undue risk to the health and safety of the public. (S.E. 1 Appendix B; Tr. pp. 60, 61, 179, 180.)

3. On January 12, 1968 the AEC issued a "Notice of Hearing on Application for Provisional Construction Permit" in the matter of Pacific Gas and Electric Company (Diablo Canyon Nuclear Power Plant), Docket No. 50-275, which sets out the issues to be considered and initially decided by this Atomic Safety and Licensing Board (Board), designated by the AEC to conduct this proceeding, as a basis for determining whether a provisional construction permit should be issued to PG&E. This Notice of Hearing was published in the FEDERAL REGISTER on January 13, 1968 (33 F.R. 516; Tr. p. 4.)

4. Petitions for Leave to Intervene in this matter were filed by the following:

Petitioner	Date Filed
State of California	January 18, 1968
San Luis Obispo Bay Properties, Inc.	January 26, 1968
International Brotherhood of Electrical Workers, Local 1245	January 30, 1968
Scenic Shoreline Preservation Conference, Inc.	January 30, 1968
Frederick Eissler	January 30, 1968

In an order dated February 2, 1968, the Board granted the petition of the State of California for leave to intervene. Pursuant to the Notice of Hearing and in accordance with the requirements of the Act and the AEC's regulations, a prehearing conference was held by the Board in San Luis Obispo, California, on February 6, 1968. At the prehearing conference the petitions of the Scenic Shoreline Preservation Conference, Inc. and Frederick Eissler were stated to be in opposition to the granting of a construction permit to PGandE. The petitions of the above-named petitioners, with the exception of Frederick Eissler, were granted by the Board at the prehearing conference. The petition of Frederick Eissler was deficient under the AEC rules of practice and he was given until February 13, 1968 by the Board to cure the deficiency. Nothing further being filed by Mr. Eissler, the Board, in an order dated February 14, 1968, denied his petition for leave to intervene. (Tr. pp. 114, 115, 129.)

5. This proceeding is a "contested proceeding" within the meaning of 10 CFR 2.104. (Tr. pp. 118, 190.)

6. A public hearing was held by the Board on February 20 and 21, 1968 to consider the issues specified for a contested proceeding in the published Notice of Hearing. (Tr. p. 122A.)

FINDINGS OF FACT

7. PGandE is a large operating public utility

engaged principally in the business of supplying electric and natural gas service throughout most of northern and central California. PGandE is soundly financed and has plentiful resources at its command. PGandE plans to finance the cost of the proposed facility, which it estimates will be approximately $188,400,000, as a part of its continuing construction program. (Lovejoy Testimony pp. 1-5 and Appendix A thereto; Tr. 244ff.)

8. PGandE has had extensive experience in the design, construction and operation of electric generating plants. PGandE personnel have been involved with nuclear power generation for a number of years, and its Humboldt Bay reactor has been in operation since 1963. A number of its personnel hold reactor operator licenses issued by the AEC. The nuclear steam supply system supplier, Westinghouse Electric Corporation, has designed and constructed a number of pressurized water reactors which have been licensed by AEC. (S.E. 1 p. 1; Joint Exhibit A, Vol. I, pp. 3-5.)

9. The site for the proposed plant is adjacent to Diablo Creek on the Pacific Ocean in San Luis Obispo County, California. The exclusion area distance from the reactor to the nearest site boundary on land will be one-half mile. The low population zone radius is six miles and the population center distance is ten miles, which is the distance from the site to the nearest boundary of San Luis Obispo. The site consists of approximately 750 acres. The 595-acre portion

mouth of the creek is leased to PGandE for 99 years with an option to renew for 99 years. PGandE has acquired title to the land within the exclusion area lying north of Diablo Creek and for the proposed switchyard. The deed to this land conveying title in fee to PGandE has been deposited in escrow, along with PGandE's consideration therefor, and the escrow will be closed upon correction of certain descriptions in the deed. (S.E. 1 pp. 3-4; A.E. 1 p. 2; Tr. pp. 287, 288, 482, 483.)

10. The climate of the area is typical of the central California coastal region. The meteorological program proposed by PGandE is adequate to provide a basis for the development of a gaseous radioactive release limit and to confirm the conservatism of diffusion parameters used in the analysis of potential accidental releases. (S.E. 1 pp. 4, 5; A.E. 1 pp. 2, 3.)

11. The plant will be founded on firm bedrock fully capable of carrying the intended loads. The geologic study of the site included excavation of about 2,400 feet of trenches that were excavated through the terrace material a minimum of three feet into bedrock. Several old, small faults can be identified in the bedrock, but no indications of major faulting were found. The evidence indicates there has been no movement in the small bedrock faults at the site for over 100,000 years, and probably much longer. Therefore, the probability of surface fault rupture at the site is so remote that it may be safely disregarded. (S.E. 1 pp. 5, 6; A.E. 1 pp. 3-5.)

12. The plant has been designed to withstand the largest earthquakes to be expected along the faults in the general area. Of the possible earthquakes studied it was determined that a magnitude 7-1/4 (Richter) earthquake along the Nacimiento Fault, which is 20 miles from the site, and an aftershock with a magnitude of 6-3/4 at the site resulting from a magnitude 8-1/2 earthquake along the San Andreas Fault, which is 48 miles from the site, produced the maximum ground accelerations at the site. These were calculated to be 0.12 g (adjusted to 0.15 g for design purposes) and 0.20 g, respectively. When the response spectra of the two earthquakes were considered it was found that the hypothetical earthquake along the Nacimiento Fault produced higher accelerations in structures having longer natural periods than the other earthquake. (S.E. 1 pp. 6-8; A.E. 1 pp. 5, 6.)

13. Structures and components important to nuclear safety, failure of which might cause, or increase the severity of, an accident, including structures and components vital to safe shutdown and isolation of the reactor, are classified as Class I. Structures and components important to reactor operation but not essential to safe shutdown and isolation of the reactor are considered as Class II. Structures and components not related to reactor operation or containment are considered as Class III. Class I structures will be designed to withstand horizontal seismically induced loads

obtained by using response spectra of either of the two design earthquakes, whichever controls. Vertical accelerations will be taken as constant equal to two-thirds of the maximum horizontal ground acceleration, and the resulting stresses due to horizontal and vertical accelerations will be considered to act simultaneously and will be added directly. Conservative values of structural damping will be used. After completion of the design a review will be made to assure no loss of function for components necessary for a safe shutdown using a combined response spectrum with acceleration values twice those used in the design. Class II structures and components will be designed on a static analysis basis using a seismic horizontal coefficient of 0.20 g and stresses allowed by applicable codes. Class III structures and components will be designed according to the earthquake regulations of the Uniform Building Code. (S.E. 1 pp. 35, 47-50; A.E. 1 pp. 7, 8.)

14. The plant will be designed so that it will not be subject to damage from either distantly or locally generated seismic sea waves. Most of the plant will be located at or above elevation 85 feet above sea level. Cooling water for the plant will be taken from the Pacific Ocean. Class I equipment located at the intake will be protected by a wall or other suitable means to accommodate a wave runup of 30 feet above mean lower low water. In the event of a drawdown occurring with a seismic sea wave in

crest of minus 20 feet below mean lower low water, the intake structure is designed to provide a reservoir to supply water to the auxiliary salt water cooling system. (S.E. 1 p. 8; A.E. 1 pp. 8, 9.)

15. The proposed reactor is designed to operate at 3250 MWt with an expected ultimate capability of 3391 MWt. PGandE has designed the major components including the containment structure and emergency cooling system for a power level of 3391 MWt, and has used this power level in analyzing postulated accidents in conformance with the guidelines of 10 CFR Part 100. (S.E. 1 p. 1; A.E. 1 p. 31; Tr. pp. 473, 474.)

16. The nuclear steam supply system, as designed by Westinghouse, is similar to that of other PWR systems that have been licensed by the AEC, such as the Indian Point No. 2 Plant of the Consolidated Edison Company of New York. The nuclear steam supply system consists of a light water moderated pressurized water reactor (PWR) which transfers reactor heat to four steam generators. Steam generated in the secondary side of the steam generators passes to the turbine generator. The fuel for the reactor is low enrichment UO_2 pellets enclosed within Zircaloy tubes. There are 193 fuel assemblies, each made up in a 15 by 15 rod array. Reactivity control is accomplished by 53 full-length control rod assemblies, eight part-length control rod assemblies, 1144 fixed burnable poison rods and by liquid poison (boric acid) in the reactor coolant. The full-length control rod

Assemblies provide reactivity control for fast shutdown and changes in reactivity in going from hot zero power to full operating power. The eight part-length control rod assemblies are included for shaping the axial power distribution and controlling potential axial xenon oscillations. The control rod drive mechanisms for this reactor are similar to the drives provided on other Westinghouse-designed reactors. Reactor coolant at 2235 psig is circulated through the core by four centrifugal pumps. (S.E. 1 pp. 9-13, 18; A.E. 1 pp. 10-12; Tr. pp. 334-338, 479, 480.)

17. The core design for the reactor takes advantage of reduced peaking factors made possible by the use of part-length control rods. With reduced peaking factors it is possible to increase the average power of the core 18% compared to previous designs, yet maintain the peak specific fuel power in line with past designs. (S.E. 1 p. 15)

18. The reactor protection system monitors signals from nuclear and process instrumentation which are indicative of reactor plant conditions. Independent, redundant channels are provided in the protection system so that a failure in any given instrument channel would not prevent a safe shutdown of the reactor. The reactor protection system for the proposed Diablo Plant will differ from those previously described for other Westinghouse-designed plants. Changes were made to the system in accordance with the provisions of the proposed Institute of Electrical and Electronic Engineers (IEEE)

standard on Nuclear Power Plant Protection Systems. Other changes were made as a result of the higher power density and the use of part-length control rods. Circuits which actuate engineered safety features will also be designed to the proposed IEEE Standard. The same channelized approach will be used for these circuits as is proposed for the reactor protection system. (S.E. 1 pp. 18-25; A.E. 1 pp. 16-19.)

19. The reactor containment structure consists of a reinforced concrete vessel with a steel liner which encloses the reactor and the reactor coolant system. The containment structure is a flat-bottomed cylinder with a hemispherical dome with an inside diameter of 140 feet and vertical sidewalls measuring 142 feet. The concrete sidewalls of the cylinder and the dome will be approximately three feet six inches and two feet six inches thick, respectively. The containment structure is designed for an internal pressure of 47 psig and a maximum leakage rate of 1/10th of one percent of the containment volume per day at the design pressure. Pipelines which penetrate the containment have provision for isolation. (S.E. 1 pp. 32-40; A.E. 1 pp. 13-15.)

20. In addition to the containment system, other engineered safety features will be provided to minimize the consequences of the hypothetical "loss-of-coolant" accident. These include a safety injection system, air recirculation coolers and filters, and containment spray equipment. Reliable on-site diesel emergency power is provided for the

engineered safety feature loads in the event of failure of normal station auxiliary power. The control room contains instrumentation and controls necessary for safe operation of the facility. Sufficient instrumentation and controls are available outside the control room to maintain the reactor in a hot standby condition. (S.E. 1 pp. 41-47; A.E. 1 pp. 15-16.)

21. Quality standards of material selection, design, fabrication and inspection will conform to the applicable provisions of recognized codes and good nuclear practice. Materials and components furnished for the work will be reviewed by Westinghouse or PG&E engineers. The construction work will be subject to the independent review of PG&E's Engineering Department. (S.E. 1 p. 51; A.E. 1 pp. 22-24.)

22. The waste disposal system collects, monitors and processes for safe disposal all liquid, solid and gaseous wastes. The system is designed to process fluid wastes for discharge to the environment within the radioactive level tolerances established by applicable governmental regulations. Experience with other similar plants indicates that liquid radioactive wastes will be a factor of about 1/100th of the permissible amount. The system is designed to be flexible to control waste releases as necessary to assure no adverse effects on the environment. Suitable facilities are provided for handling and on-site storage of solid wastes prior to disposal. The activity concentration of liquid and gaseous wastes will be determined prior to discharge to assure

compliance with 10 CFR Part 20. A suitable preoperational and postoperational survey and environmental monitoring program will be conducted by PGandE. (S.E. 1 pp. 53, 54; A.E. 1 pp. 21, 22; Tr. pp. 254-258, 288, 293, 294, 301-304, 408, 416, 417, 419, 422, 426, 430-436, 439, 544.)

23. A number of plant operating transients were considered by PGandE in order to assess the safety margins of the plant design. The criterion for detailed design of the reactor control and protection system is to be able to automatically take corrective action to cope with any of these transients. Preliminary analyses will be recalculated during detailed plant design to verify that transients are within the capabilities of the reactor control and protection systems. In addition, potential accidents which could result in radioactive releases to the environment have been analyzed by PGandE, and the resulting doses fall within the 10 CFR Part 100 guideline dose levels. (S.E. 1 pp. 55-59; A.E. 1 pp. 28-31; Tr. pp. 480-484.)

24. Research and development work is being carried out to develop and confirm (i) the design of the emergency core cooling system, (ii) the final core thermal-hydraulic, nuclear and mechanical design parameters, and (iii) the details of the containment spray system. The information to be developed under these programs will be submitted periodically for review by the AEC Staff and it will be set forth in the Final Safety Analysis Report, which will be

prepared and filed in support of PGandE's application for an operating license. All of the information to be developed under these programs, except for the LOFT test program on blowdown forces, will be available in 1968 or 1969. This will permit the safety questions these programs were designed to resolve to be answered before completion of construction of the Diablo Canyon Plant late in 1971. The results of the LOFT test program are expected to be available in 1971. These results are desirable to show the amount of conservatism in the design of the Diablo Plant to withstand accident blowdown forces. However, these results are not necessary to complete the design of the Plant. (S.E. 1 pp. 58-60; A.E. 1 pp. 24-27; Tr. pp. 316-337, 445, 462, 466, 492-502, 504-520, 541-543.)

25. The principal architectural and engineering criteria for the design of the proposed facility have been described by PGandE. The ACRS report has identified certain areas requiring further review by the AEC Staff as the plant design details are developed or as the additional information becomes available. These items will be reviewed with the Staff and by the ACRS prior to issuance of an operating license. (S.E. 1 pp. 60-61; A.E. 1 pp. 31-46; Tr. pp. 339-340, 355-369.)

26. PGandE is a California corporation, and all of its directors and officers are citizens of the United States. It is not owned, controlled or dominated by an alien, a foreign corporation or a foreign government. The Application

contains no restricted or other defense information, and PG&E has agreed that it will not permit any individual to have access to restricted data until a determination has been made by the AEC that permitting access to such data by any individual will not endanger the common defense and security. Special nuclear material to be used in connection with the proposed facility will be subject to AEC regulation. Safeguards exist against possible diversion from their intended use of materials produced in the reactor or special nuclear material. (S.E. 1 p. 62; A.E. 1 pp. 46-47; Tr. pp. 92, 447-450.)

CONCLUSIONS AND ORDER

Upon consideration of the entire record in this proceeding, and in the light of the findings and discussions set out above, this Atomic Safety and Licensing Board has concluded that:

1. In accordance with the provisions of 10 CFR 50.35(a),

(a) PG&E has described the proposed design of the facility adjacent to Diablo Creek, including the principal architectural and engineering criteria for the design, and has identified the major features or components incorporated in the proposed facility for the protection of the health and safety of the public;

(b) Such further technical or design information

as may be required to complete the safety analysis and which can reasonably be left for later consideration, will be supplied in the Final Safety Analysis Report;

(c) Safety features or components, which require research and development have been described by PGandE and PGandE has identified, and there will be conducted, a research and development program reasonably designed to resolve any safety questions associated with such features or components; and

(d) On the basis of the foregoing, there is reasonable assurance that (i) such safety questions will be satisfactorily resolved at or before the latest date stated in the Application for completion of construction of the proposed facility and (ii) taking into consideration the site criteria contained in 10 CFR 100, the proposed facility can be constructed and operated at the proposed location without undue risk to the health and safety of the public;

2. PGandE is technically qualified to design and construct the proposed facility;

3. PGandE is financially qualified to design and construct the proposed facility; and

4. The issuance of a permit for the construction of the facility will not be inimical to the common defense and security or to the health and safety of the public.

Pursuant to the Act and the AEC's regulations,

IT IS ORDERED THAT:

1. Subject to review by the Commission upon its own motion or upon the filing of exceptions in accordance with the "Rules of Practice," 10 CFR 2, Pacific Gas and Electric Company is authorized to construct the facility in accordance with the Application and with the evidence and representations entered in the record at the hearing;

2. The Director of Regulation is directed to issue a provisional construction permit pursuant to Section 104 b. of the Act substantially in the form of Appendix A to the "Notice of Hearing on Application for Provisional Construction Permit" in this proceeding, within 10 days from the date of issuance of this decision; and

3. In accordance with 10 CFR 2.764, good cause not having been shown to the contrary, this initial decision shall be immediately effective.

ATOMIC SAFETY AND LICENSING BOARD

Hugh C. Paxton

Thomas H. Pigford

Algie A. Wells, Chairman

Dated at

this day of 1968.