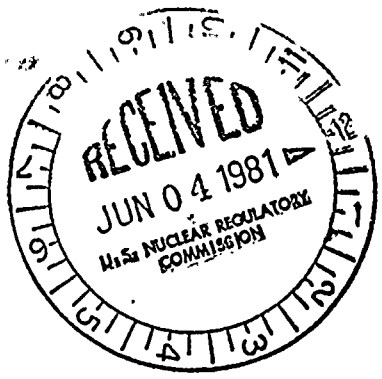

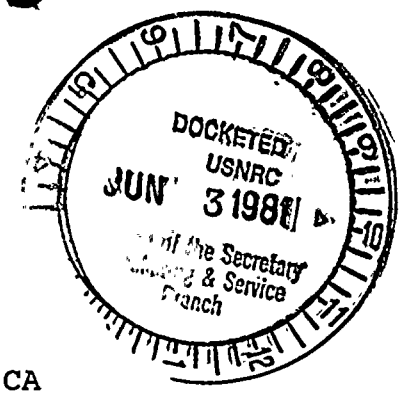

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	)	
	)	Docket No. 50-275
PACIFIC GAS AND ELECTRIC COMPANY	)	Docket No. 50-323
Diablo Canyon Nuclear Power	)	
Plant Units Nos. 1 and 2	)	(Low Power Test Proceeding)
	)	

PROPOSED FINDINGS OF FACT AND CONCLUSIONS OF LAW

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Submitted By

PACIFIC GAS AND ELECTRIC COMPANY

June 1, 1981

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FINDINGS OF FACT

A. Prehearing Proceedings

On July 15, 1980, Pacific Gas and Electric Company (PGandE) filed a motion to permit it to load fuel at its Diablo Canyon Power plant and conduct tests up to 5% of rated power. The motion generated successive waves of pleadings and responses thereto by the Joint Intervenors, Governor Brown as the representative of an interested state under 10 CFR 2.715(c) 1/, the Staff and PGandE. Various orders of the Licensing Board ultimately resulted in a pre-noticed public hearing in San Luis Obispo, commencing May 19, 1981, to consider two contentions advanced by the Joint Intervenors. These contentions are set forth in haec verba in the discussion below.

B. Evidentiary Hearing

The hearing was held in San Luis Obispo May 19 through May 22, 1981. At the hearing, the following exhibits were numbered for identification and, where indicated, received into evidence:

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1/ Governor Brown was admitted to this proceeding as the representative of an interested state pursuant to 10 CFR 2.715(c) by virtue of an ASLB order dated November 16, 1979. For reasons known only to themselves, attorneys for Governor Brown continually misrepresent his status in this proceeding. (Tr. 10704, 10705; see also the first sentence of the opening statement of Byron Georgiou [Tr. 10580].)

PGandE

Exhibit No.		In Evidence
66	View Graph - On Site Monitoring Stations	10772
67	View Graph - Off Site Monitoring Stations	10772
68	View Graph - Real Time Instruments On Site	10772
69	View Graph - Real Time Instruments Off Site	10772

Joint Intervenors

Exhibit No.		In Evidence
111	PGandE Supplemental Answers to J.I. Interrogatories 9A, 11A	10619
112	FES pp. 7-1 through 7-7	
113	Proposed forms of low power licenses for Units 1 and 2	
114A	Kemeny Com. Report § "Overview"	
114B	Kemeny Com. Report § "Commission Findings and Recommendations"	
115	Rogovin Com. Report pp. 147 through 152	
116	Misc. Agreements with State and Local Agencies	
117	Letter R.L. Tedesco to M.H. Furbush 12/16/80	11059
118	Risk Assessment Review Group Report pp. viii through x	11107

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Governor Brown

Exhibit No.		In Evidence
1	Memo - J.W. Macy to J.W. McConnell 3/12/80	11078
2	Letter and Report entitled "EPRI PWR Safety and Relief Valve Test Program"	
3	FEMA-NRC Memo of Understanding 1/11/80	11276
4	Letter to Harold Denton from John McConnell dated February 14, 1980.	11276
5	Letter from Harold Denton to John McConnell dated February 14, 1980	11276
6	Letter to Harold Denton from John McConnell dated March 12, 1980	11276

NRC Staff

Exhibit No.		In Evidence
18	SER Supp. 7	11050
19	SER Supp. 8	11050
20	SER Supp. 9	11050
21	SER Supp. 10	11050
22	SER Supp. 11	11050
23	SER Supp. 12	11050
24	SER Supp. 13	11050
25	SER Supp. 14	11050

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ASLB

Exhibit No.		In Evidence
5	Sheriff's LPZ Evacuation Plan entitled "Standard Operating Procedures for the Nuclear Power Plant Emergency Response"	11329

In addition, the Board took official notice of a document entitled "SECY-81-188-Emergency Preparedness" transmitted from S.J. Chilk to William Dircks, dated April 22, 1981, the report of the Kemeny Commission (Exhibits 114A and B), and the Rogovin Report (Exhibit 115) (Tr. 11269, 11339).

C. The Emergency Planning Issue

Contention 4. Numerous studies arising out of the accident at TMI Nuclear Power plant have shown the need for upgrading emergency response planning. Based upon these studies, the Commission promulgated revised emergency planning regulations effective November 3, 1980. The Applicant has failed to demonstrate that the combined Applicant, State and local emergency response plans for Diablo Canyon comply with those revised regulations ("Final Regulations on Emergency Planning," 45 Fed. Reg. 55402 (August 19, 1980)).

Dr. William K. Brunot and Messrs. James D. Shiffer, Steven M. Skidmore, Will Kaefer, and Robert Patterson presented evidence on this contention on behalf of PGandE. Messrs. Bart Buckley, John Sears, and Norm Lauben testified on behalf of the NRC staff. Governor Brown presented the testimony of Robert E. Paulus, Howard Mitchell, M.D., and Jeffrey Jorgensen. Joint Intervenors chose not to present any direct testimony, although they and the other parties conducted cross-examination.

1. Factual Backgroung

In January 1980 the NRC and the Federal Emergency Management Agency (FEMA) 2/ issued a joint document NUREG-0654/FEMA-REP-1 entitled "Criteria for Preparation and Evaluation of Radiological Emergency Plans and Preparedness in Support of Nuclear Power Plants - For Interim Use and Comment."

Shortly thereafter, PGandE submitted to the NRC staff Revision 2 of the Diablo Canyon Power Plant Emergency Plan. Included as Appendices to that Plan were: (1) the San Luis Obispo County "Nuclear Power Plant Emergency Response Plan," (2) the San Luis Obispo County "Nuclear Power Plant Emergency Evacuation," and (3) the State of California "Nuclear Power Plant Emergency Response Plan."

In February 1980 discussions were had between FEMA and NRC regarding the applicable criteria for determining the necessary level of emergency planning for plants considering low-power testing up to 5% of rated power. These discussions resulted in a memorandum from the FEMA/NRC Steering Committee to Harold R. Denton of NRC and John W. McConnell of FEMA concluding that ". . . in view of the minimal nature of the potential hazard, the development

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2/ On December 7, 1979, President Carter assigned to FEMA the responsibility for assessing and determining the adequacy of state and local radiological emergency plans.

of specific low power testing criteria [was] not warranted." The memorandum also concluded that ". . . for purposes of low-power testing (up to 5% power) at new commercial nuclear facilities that the public health and safety [would be] adequately protected if such facility [was] located in a state which had received a concurrence under the previous voluntary concurrence program . . . [and] that operator plans . . . [were] consistent with both the [then] existing NRC Appendix E to 10 C.F.R. Part 50 and NRC Regulatory Guide 1.101. . . ." The agreement went on to note that California was a concurrence state and that the Diablo Canyon emergency plans were in compliance with Appendix E and consistent with Regulatory Guide 1.101. 3/ (Gov. Brown Ex. 1, Tr. 10946-A).

In June 1980 the Commission published NUREG-0694 "TMI-Related Requirements for New Operating Licenses," which set forth the requirements for fuel-loading and low-power testing. NUREG-0694, III.A.1.1 and III.A.1.2. The NRC staff determined in SER Supp. 10 (NUREG-0675) issued in August 1980 that PGandE met all requirements for low-power operation according to NUREG-0694. (Staff Ex. 21, Tr. 11050). In August 1980 the NRC issued a new 10 C.F.R. 50.47 together with a revised Appendix E effective November 3, 1980. 45 Fed. Reg. 55402.

3/ The then effective Appendix E of 10 C.F.R. Part 50 was promulgated December 24, 1970, 35 Fed. Reg. 19518 and amended January 11, 1973, 38 Fed. Reg. 1272. The NRC retains authority over on-site emergency plans.

In November 1980 the Commission issued NUREG-0737, "Clarification of TMI Action Plan Requirements" which among other matters listed the new emergency planning requirements including the requirement that licensee applicants comply with the requirements of the new Appendix E to 10 C.F.R. Part 50 prior to fuel load. An accompanying letter to NUREG-0737, signed by Darrell G. Eisenhut and dated October 31, 1980, directed that an applicant seeking relief from any element of the new criteria should submit a request for relief, along with supporting justification. By letter dated February 27, 1981, PGandE requested relief from Items III.A.1.1 and III.A.2 of Enclosure 2 to NUREG-0737. The staff granted that request for relief. (NRC Staff Ex. 21, pp. III-2, III-3).

On April 22, 1981, the Nuclear Regulatory Commission by a 4-0 vote approved SECY-81-188-Emergency Preparedness. (Tr. 11269.) By that action, the Commission clarified the emergency planning requirements for fuel load and low power testing of NUREG-0737. In that document the Commission explicitly stated that an applicant for a fuel load and low-power testing license need not meet each emergency planning standard of 10 C.F.R. 50.47. [SECY-81-188, pp. 2-3.]

PGandE takes the position that the present level of emergency preparedness is sufficient to warrant issuance of a fuel-load and low-power testing license even though it

does not meet all the standards and criteria of 10 C.F.R. 50.47 and Appendix E thereto. PGandE relies on the provisions of 10 C.F.R. 50.47(c)(1) that permit an applicant

> an opportunity to demonstrate to the satisfaction of the Commission that deficiencies in the [emergency] plans are not significant for the plant in question, that adequate interim compensating actions have been or will be taken promptly, or that there are other compelling reasons to permit plant operation

to support its application for fuel load and low power testing authorization.

The staff supports PGandE's application on the grounds that: (1) the FEMA/NRC Steering Committee has specifically approved the emergency preparedness at Diablo Canyon for low-power testing and (2) if an accident occurred during low-power testing, it would release only a fraction of the small fission product inventory which would produce insignificant off-site doses and require only minimal off-site protective actions which are already in place.

The Joint Intervenors and Governor Brown oppose the application contending that all the requirements of 10 C.F.R. 50.47 and Appendix E must be met prior to fuel-load and low-power testing and that the existing off-site emergency response plans are unworkable.

2. Risks at Low-Power Operation vs. Full-Power Operation

PGandE has proposed a series of eight tests to be conducted at no greater than five percent of rated power.

Pursuant to the test program profile submitted by PGandE the tests would be conducted for no longer than one month and in actuality would probably take no more than eighteen days. [Tr. 10726-10728.] During this period four of the tests would be conducted at around three percent power, two tests at about one and one-half percent of power and two tests at shutdown or zero-zero power levels. [Tr. 10727.]

Relying, in part, on the foregoing information, Dr. Brunot concluded that based upon his analysis of the large reductions of risk during low-power testing in both the probability and consequences of a wide range of accidents which are considered possible at full-power operation, the potential exposures due to design basis accidents do not require emergency planning for distances much beyond the site boundary and certainly not beyond the low population zone (LPZ) (six miles) for plume exposure or ingestion pathway exposure. [Brunot Testimony following Tr. 10595, p. 21.]

Dr. Brunot based his conclusion with regard to the reduced potential risks at Diablo Canyon on the following factors:

1. Lower fission product inventories.
2. Reduced decay heat after shutdown.
3. Time available for emergency actions.
4. Reduced hydrogen production rate.

5. No spent fuel pool accidents.

6. Lack of activated corrosion products.

7. Lack of radioactive inventory in waste systems.

8. Lack of radioactive inventory in the steam generators and secondary systems.

9. Few "wear out" problems.

[Ibid. pp. 6, 7.]

In addition to the foregoing risk reduction factors the following factors were considered by Dr. Brunot which tend to increase the risk of an accident during the initial testing period:

1. Break-in failures.

2. Plant modifications. 4/

3. Emergency plan arrangements.

4. Uncertainties in performances parameters for components and systems.

[Ibid. p. 8; Tr. 10625, 10626.]

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4/ At the hearing, Dr. Brunot withdrew this risk increasing factor. [Tr. 10623, 10624.]

Dr. Brunot evaluated the specific decreases and increases in overall risk due to each of those factors and concluded that during low power testing (1) the factors which decrease overall risk are much greater than those which tend to increase risk, and (2) that the overall risk of events leading to accidental releases, as well as the quantity of radioactive materials involved, is greatly reduced. [Brunot Testimony following Tr. 10595, pp. 6-9.]

Utilizing accident evaluations previously conducted by PGandE and the staff for full-power operation pursuant to 10 C.F.R. Part 100, 10 C.F.R. Part 50, and 10 C.F.R. Part 20 predicated upon full-power isotope inventories and reducing these inventories by a factor of 20 to 400 for low-power testing, Dr. Brunot determined that comparing these full power accident scenarios with those that might occur at low power, the exposure risk at both the site boundary and the LPZ would fall well within permissible prescribed Environmental Protection Agency and State of California exposure limits. Additionally, he concluded that if the many other risk reduction factors at low power as well as the actual power profile for low-power testing are also considered, there would be an even further reduction in any accident dose exposures. [Ibid. pp. 9-11.]

Thus, the size of the plume exposure and ingestion exposure zones which would be appropriate for emergency response should an accident occur at Diablo Canyon during

low-power tests would be much smaller than those required for full-power operation under 10 C.F.R. Part 50.47. [Tr. 10855-10858.]

Dr. Brunot's testimony in this regard is also supported by the testimony of Mr. Shiffer discussing the risk reduction factors of (1) additional operator time available to take necessary action to mitigate any accident conditions, and (2) the reduced isotopic inventories produced during low power testing. In his testimony, Mr. Shiffer indicated that more than three hours would be available to take action to prevent loss of adequate core cooling under the accident scenarios developed by the Westinghouse safety analysis. [See Shiffer, et al. Testimony following Tr. 10604, pp. 33-37.]

Additional testimony on risk reduction was given by the NRC staff witness Mr. G. Norman Lauben. According to Mr. Lauben, the NRC staff has carefully examined the relative risks associated with low-power testing and full power operation. The conclusion they reached was that three major factors contribute to a substantial reduction in risk for low-power testing as compared to full-power operation. Those three factors are:

1. Additional time available for operators to correct loss of important safety systems.

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2. The reduction in risk associated with significant postulated events during low-power testing.

3. Reduction in required capacity for mitigating systems at low power.

[Lauben Testimony following Tr. 11014, p. 2.]

Mr. Lauben examined a number of dominant accident scenarios, i.e., small break LOCAs, transients with total loss of feedwater, and failure of double check valves between the reactor coolant system (high pressure) and the residual heat removal system (low pressure) which result in a LOCA outside containment. He estimated an overall reduction in risk to the public of a factor 400 to 1,500 for a plant operated at 5% power from initial start-up for six months compared to continuous full power operation. Furthermore, based upon his understanding of the actual power history of other reactors conducting low-power testing at a peak power of 3-4% for a maximum of 20 days, he concluded that the public risk is further reduced by a factor of about 400-3,000 as compared with long-term full power operation. [Ibid. pp. 2-4.]

Additionally, he testified that analyses by Sandia Laboratories for LOCAs with severely degraded ECCSs showed that a large amount of time would be available at 5% power for diagnosis and corrective action to prevent significant

core damage. For example, a small four-inch cold-leg break LOCA would not produce a boil-off condition for about one hour and core uncovery would be delayed until about three hours. Furthermore, severe core damage would not occur until 15 hours. For similar conditions at Diablo Canyon, he testified that uncovery would not occur until about four to five hours, and 20 hours would elapse before significant core damage would occur based upon extrapolations from maximum power and duration profiles for actual low-power testing at the Sequoyah facility. [Ibid. p. 6.]

For other transients, i.e., turbine trip, loss of feedwater, steam line break, steam generator tube rupture, rod ejection, and ATWS events, Mr. Lauben testified the total risk reduction is about 1,000 to 20,000 lower compared to full-power operation. He stated further that even in the highly unlikely event of a total loss of feedwater and a failure of the reactor system to scram, it would take 45 minutes to complete boil-off of water in the steam generators. This amount of time would still allow for corrective action to terminate the event before the onset of severe core damage. [Ibid. pp. 7-9; Tr. 11126-11131.]

Based on the risk reduction factors enumerated above, Mr. Lauben concluded that (1) abundant time (at least 20 hours) is available to take corrective action to mitigate or terminate the most likely accident scenarios during low-power testing, (2) for some sequences of concern at full

power no action would be required at low power, and (3) the risk to the public is so small at low power that there is virtually no need for a qualified emergency plan. [Ibid. p. 9; Tr. 11120-11122.]

Thus, the collective judgment of Dr. Brunot and Messrs. Lauben and Shiffer, who were the only witnesses to testify on this issue, was that the overall risk to the public from accidents during low power testing was greatly reduced as compared to full power operation. Further, they all concluded that the level of emergency planning as well as the area for which such planning was required was substantially reduced or virtually unnecessary when compared to the requirements of 10 C.F.R. 50.47 for full power operation.

3. Comparison of PGandE's Plan With the Standards of 10 C.F.R. 50.47.

PGandE presented testimony on the sixteen (16) planning standards enumerated in 10 C.F.R. 50.47(b) as they are discussed in Revision 2 of its Emergency Plan. 5/ [Shiffer Testimony following Tr. 10604, pp. 4-32; Tr. 10823-10862.]

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5/ At the Board's request, applicant identified those parts of its prepared testimony on the Emergency Plan which pertained to the 16 emergency planning standards of 10 C.F.R. 50.47(b).

This testimony outlined the Company's organizational structure [ibid, pp. 4-6], facilities [ibid pp. 7-10], communications system including dedicated telephone lines to the County Emergency Operations Center at the Sheriff's office, the State office of Emergency Services and the NRC [ibid. pp. 12-15], radiological monitoring capability [ibid. pp. 16-20; Tr. 10755-10786], and post-accident sampling capability [ibid pp. 21-23] which would be available to response to any radiological emergency during low power testing. The arrangements for medical services for injured and contaminated personnel [ibid. pp. 24-25] as well as the training sessions and drills held during the past few years for emergency response personnel [ibid. pp. 30-31] were identified. Additionally, PGandE outlined the additional training, drills and exercises scheduled to commence in June 1981 and expected to culminate in a full-scale Company, state and local exercise in August 1981 [ibid. pp. 31-32]. Finally, the emergency procedures for prompt notification of the Sheriff by site personnel in situations where an evacuation of the LPZ would be recommended and the response plans of the Sheriff were identified and discussed [ibid. pp. 33, 38-39].

The major areas of deficiency in Revision 2 which were noted by the NRC in its review of the Plan for full power operation were identified as items (b)(5) and (b)(7) which require a fast public alerting system (15 minute

public notification capability) and a public information program. (Tr. 10837-10844; Sears Testimony following Tr. at 10604, p. 26.]

While the public notification system has not yet been installed and the public information program has not been implemented as required by 10 C.F.R. 50.47 work is ongoing in these areas. Permits for installation of the notification system are expected soon and a draft of the revised county plan has been completed which should permit work on the public information program to proceed. [Shiffer Testimony following Tr. 10604, p. 26; Tr. 10696, 10800, 10818-10819]

However, these deficiencies are not significant in the context of low power operation. The fast alert system is not a problem since there is abundant time to notify residents within the LPZ should there be an accident during low power testing requiring any protective action including evacuation. There is in effect a County Evacuation Plan for these approximately 65 residents of the LPZ to be evacuated upon notification by the Sheriff according to a prearranged set of detailed plans on file at the Sheriff's office. [Tr. 10839-10841; Board Exhibit 5.] 6/ This plan calls for the

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6/ Inexplicably, Joint Intervenors and Governor Brown attempted to prevent introduction of this evidence on rebuttal after arguing previously that such information was the most important issue in the case. (Tr. 11245.]

Sheriff to send units to residents located within the LPZ and also to assist the Department of Parks and Recreation in an evacuation of Montana De Oro State Park north of the plant. [Tr. 10839-10841, Board Exhibit 5.]

Additionally, PGandE has committed to give appropriate evacuation information to residents within the LPZ prior to fuel load. The precise information and instructions will be based upon the then existing notification system and will be coordinated with the Sheriff's Department. [Tr. 10842.]

Governor Brown's witnesses, Messrs. Paulus, Mitchell and Jorgensen, gave testimony concerning several elements of the PGandE and County Emergency Response Plans. Mr. Paulus in his prepared testimony outlined several deficiencies regarding the back-up fire-support to be furnished by the California Department of Forestry ("CDF") at Diablo Canyon which caused CDF to cancel its letter of agreement with PGandE in April of this year. [Paulus Testimony following Tr. 10895, pp. 2-4.] However, in his oral testimony, he admitted: (1) that there were no equipment deficiencies for CDF personnel, (2) that adequate radiological protection training for CDF personnel would be completed during the week of May 25, 1981, and (3) that a CDF internal fire pre-plan would be completed by June 5, 1981, and probably be tested within two weeks assuming PGandE's cooperation. [Tr. 10908-10909, 10937-10939,

10990-10993.] Accordingly, he felt that by July 1, 1981, CDF would have resolved the major problems it previously foresaw in furnishing backup fire support for Diablo Canyon and a new fire support agreement would be executed supplanting the February 1979 agreement that had been recently cancelled. [Tr. 10909, 10957.]

Dr. Mitchell stated in his prepared testimony concerns regarding the County's ability to respond to and effectively monitor a radiological emergency at Diablo Canyon as well as the number and overall adequacy of medical care facilities for the treatment of injured persons. Dr. Mitchell also expressed concern regarding notification procedures for the evacuation of residents from the LPZ. [Mitchell Testimony following Tr. 10898, pp. 1-2.]

However, in his oral testimony, Dr. Mitchell admitted that he was pleased with PGandE's expansion of its off-site monitoring capability as well as its training of county health personnel, although he still had some concerns with the response capabilities of his personnel due mainly to communication problems. He indicated that he had recently attended an interesting and effective course at Oak Ridge, Tennessee, concerning treatment of radiation injuries. As for hospital facilities, he merely stated that he would like more facilities in addition to French Hospital to be prepared to treat any injured or contaminated persons. [Tr. 10909-10913, 10960-10963.]

Mr. Jorgensen stated in his prepared testimony that the current county emergency plans were inadequate in the areas of training of personnel, equipment, public information, and medical facilities. [Jorgensen Testimony following Tr. 10901, pp. 2-3; Tr. 10899-10901.]

During his oral testimony, however, he admitted that his prepared testimony did not address issues concerning county emergency response capabilities within the LPZ, which is the area of concern for low power testing. [Tr. 10981.] Moreover, he testified that while the Sheriff has a responsibility under the existing County Emergency Plan to evacuate the LPZ in an emergency he was unaware of any detailed plans of the Sheriff to accomplish this task. [Tr. 10970-10975, 10983-10985.]

This question of the resonsibility for, and ability of, the Sheriff to evacuate the LPZ was resolved when the County Sheriff, George Whiting, testified that he has the responsibility to evacuate the LPZ and that he has detailed plans to accomplish that action if and when called upon. Those plans call for dispatch of units to homes in the LPZ and assisting in the evacuation of Montana De Oro State Park. [Tr. 11321-11324, 11329; Tr. 11329 Board Exhibit 5.]

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D. The Valve Issue

Contention 24. Reactor coolant system relief and safety valves form part of the reactor coolant system pressure boundary. Appropriate qualification testing has not been done to verify the capabilities of these valves to function during normal, transient and accident conditions. In the absence of such testing and verification, compliance with GDC 1, 14, 15 and 30 cannot be found and public health and safety are endangered. 7/

NUREG 0737 requires that pressurized water reactor licensees and applicants shall conduct testing to qualify the reactor coolant system relief and safety valves under expected operating conditions for design-basis transients and accidents. (NUREG 0737 at II.D.1-1.) The tests for relief and safety valves are to be completed by July 1, 1981. (NUREG 0737 at II.D.1-3.) NUREG 0737 also requires "verification of block valve functionability" by July 1, 1982. (NUREG 0737 at II.D.1-2.)

The Diablo Canyon reactor coolant systems contain three types of valves: safety valves; power operated relief valves (PORVs); and block valves.

1. Pressurizer Safety Valves

The pressurizer of each unit of the Diablo Canyon plant is equipped with three pressurizer safety valves. Under normal operating conditions, the safety valves remain

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7/ PGandE presented four witnesses whose testimony addressed this contention and the staff produced two. Neither the Joint Intervenors nor Governor Brown produced a witness on this contention.

closed. Under most postulated accident conditions, the pressurizer safety valves are not called upon to operate. In those FSAR accidents analyzed for the Diablo Canyon plant, the safety valves will not open if the PORVs function as designed. If the safety valves were required, the capacity of two safety valves is sufficient to mitigate system overpressure; the capacity of the third safety valve provides redundancy. [Gottshall-Muench Testimony following Tr. 11157, p. 1.]

The valves supplied to Diablo Canyon for this use were designed and manufactured by Crosby Valve and Gage Co. and are identified as Crosby safety valves model HB-BP-86 (6M6). These safety valves are designed to meet the requirements of the ASME Boiler and Pressure Vessel Code, Secton III, 1968 Edition. The valve pressure boundary parts were designed in accordance with USAS-B16.5-1968, Steel Pipe Flanges and Flange Fittings. In addition to meeting the requirements of USAS-B16.5-1968 and the ASME Code, Section III, the safety valves were qualified to continue to operate during and after the postulated Hosgri seismic event accelerations. (Ibid. pp. 1, 2; Tr. 11189.)

Prior to shipment to the plant, each of the valves was inspected and subjected to testing. All surfaces of pressure retaining forgings, castings, finished welds, and machined surfaces were liquid penetrant inspected. The body and nozzles were hydrostatically tested. All of the Diablo

Canyon safety valves successfully completed these tests. [Ibid. p. 2; Tr. 11187.]

As part of the design verification process, valves of the same design, but with a different inlet, were successfully tested at PGandE's Contra Costa plant in a configuration that was representative of the actual Diablo Canyon plant configuration and at the temperatures and pressures for which the valves were designed to function. [Ibid. p. 2; Tr. 11187, 11192.]

Westinghouse has conducted a survey of Westinghouse designed operating plants in the United States to determine the number of times that pressurizer safety valves have actuated during plant operations. No instances of failure of pressurizer safety valves were reported by the owners of Westinghouse designed plants in the United States. This survey covered plants with a total of 181 reactor years of operation through October 1980. In addition, no instances of failure have been reported for Westinghouse plants since the time of the survey. [Ibid. p. 3.]

2. Pressurizer Power-Operated Relief Valves

The pressurizer of each unit of the Diablo Canyon Plant is equipped with three pressurizer PORVs. These valves are designed to relieve steam to limit the maximum pressure in the reactor coolant system during full load rejection transients without reactor trip. Under normal conditions, the PORVs remain closed. In the FSAR accident

analyses for the Diablo Canyon plant, credit has not been taken for the automatic actuation of the PROVs. If automatic PORV actuation had been considered in the analyses, the calculated consequences would have been less severe. Under actual transient conditions the PORVs would actuate prior to the safety valves since the PORV setpoint is lower. [Ibid. p. 3.]

The valves supplied to Diablo Canyon for this use were designed and manufactured by Masoneilan International and are identified as Masoneilan Model 20000 series. The valves are designed to be leak tight at the hydrostatic test pressure. The valve bodies, bonnets and flanges were designed and built to USAS-B16.5-1968 and MSS-SP-61. In addition to the requirements of these standards, the PORVs were qualified to continue to operate during and after the postulated Hosgri seismic event accelerations. [Ibid. p. 4; Tr. 11189.]

Prior to shipment to the plant, each of the valves was inspected and subjected to testing. All pressure boundary cast steel parts were radiographed and liquid penetrant inspected. All forged parts were liquid penetrant inspected. Tests on the assembled valves included a hydrostatic test, as well as backseat and seat leakage tests. All of the Diablo Canyon PORVs successfully completed these tests. [Ibid. p. 4.]

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As part of the design verification process, valves of the Model 20000 series were successfully tested in a thermal test loop at 2485 psig and 550°F. [Ibid. p. 4; Tr. 11188.]

After installation in the Diablo Canyon plant, these valves were successfully tested during hot functional testing. In addition, Masoneilan Model 20000 series valves are installed in six Westinghouse designed operating plants in the United States and have also been successfully tested during hot functional testing. [Ibid. p. 5.]

Westinghouse has conducted a survey of Westinghouse designed operating plants in the United States to determine the number of times that pressurizer PORVs have been opened during plant operations. This survey covered plants with a total of 181 reactor years of operation through October 1980. Responses to the survey indicated that there were 163 occurrences of PORV openings with no failures to close. Of these occurrences, 59 of them involved Masoneilan Model 20000 series valves. In addition, there have been no known failures of these valves in these plants since October 1980. [Ibid. p. 5.] There has been one instance of a PORV failure to close in a foreign plant which was associated with the failure of a yoke. The yoke which failed is not the same as those used at Diablo Canyon and has no bearing on Diablo valves. [Tr. 11185, 11189, 11212.]

3. Block Valves

The pressurizer of each unit of the Diablo Canyon plant is equipped with three block valves. These valves are located upstream of the pressurizer PORVs and are provided to isolate the inlets of the PORVs for maintenance and testing. [Ibid. p. 5.]

The block valves supplied to Diablo Canyon for this use were designed and manufactured by Velan Engineering Companies and are identified as Velan Model B10-354B-13MS. The valve pressure boundary parts are designed in accordance with USAS-B16.5-1968. The block valves were qualified to withstand loading due to the Hosgri seismic event accelerations in addition to normal operating and deadweight loads. [Ibid. pp. 5, 6; Tr. 11189.]

Prior to shipment to the plant, each of the valves was inspected and subjected to testing. All surfaces of pressure containing cast parts were radiographed and liquid penetrant inspected. Tests on the assembled valves included a hydrostatic test, as well as backseat and seat leakage tests. All of the Diablo Canyon block valves successfully completed these tests. [Ibid. p. 6.]

Velan-manufactured block valves are installed in twenty-one Westinghouse designed operating plants in the United States. There have been no known failures of these valves in these plants. [Ibid. p. 6; Tr. 11189.]

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4. Evaluations of Postulated Valve Failures

Westinghouse has performed analyses of postulated loss of coolant accidents (LOCAs) in the pressurizer vapor space for a plant substantially identical to the Diablo Canyon plant. These analyses were performed for 100 percent power level. The conclusions which follow are valid and conservative for five percent power level. [Ibid. p. 7; Tr. 11189-11191.]

Analyses performed included the extremely unlikely case that all three pressurizer PORVs of the size installed at Diablo Canyon were postulated to have stuck completely open. These analyses were performed with the NRC approved evaluation model, which includes the assumption of minimum safeguards. No core uncovery was predicted to occur. Therefore, if all three of the pressurizer PORVs failed completely open at Diablo Canyon, no core uncovery would be expected. [Ibid. p. 7.]

It should be noted that these PORV LOCA analyses also assume that the pressurizer block valves failed to close. Therefore, if all of the pressurizer PORVs failed completely open and if all three block valves failed to close at Diablo Canyon, no core uncovery would be expected. [Ibid. pp. 7, 8.]

Similarly, analyses performed enveloped the extremely unlikely case that all three pressurizer safety valves of the size installed at Diablo Canyon were

postulated to have stuck completely open. These analyses were performed with the NRC approved evaluation model, which includes the assumption of minimum safeguards. No core uncovery was predicted to occur. Therefore, if all three of the pressurizer safety valves failed completely open at Diablo Canyon, no core uncovery would be expected. [Ibid. p. 8.]

5. Compliance with GDC's

Based on the information presented above, the PGandE and NRC witnesses concluded that the pressurizer safety valves, PORVs, and block valves, which are part of the reactor coolant pressure boundary, comply with the applicable regulatory requirements, including GDC's 1, 14, 15, and 30. [Ibid. p. 8; Cherny Testimony following Tr. 11216, pp. 6, 7.]

6. Electric Power Research Institute (EPRI) Test Program

In August 1979, the TMI Ad Hoc Nuclear Oversight Committee requested EPRI to develop a generic valve testing program responsive to the recommendation contained in NUREG-0578, Section 2.1.2 "Performance Testing for BWR and PWR Relief and Safety Valves," which is now Item II.D in NUREG-0737. Such a program was developed by EPRI and submitted to the NRC July 8, 1980. The total program cost is approximately $18,000,000 and is supported by contributions from 41 electric utilities with pressurized water reactors, including PGandE. Under the program, safety

and relief valve testing is scheduled to be completed by July 1, 1981 which is prior to fuel loading. As stated previously (supra, p. 21) under NUREG-0737 block valve testing must be completed by July 1, 1982 (Carey-Auble Testimony following Tr. 11159, pp. 1, 2; Cherny Testimony following Tr. 11216, pp. 5, 6; Tr. 11165.)

The current EPRI program covers the testing of safety and relief valves. The qualification of associated control circuitry, piping and supports as required in NUREG-0737 will be covered in a report to be filed shortly by PGandE. [Tr. 11173, 11225.]

The overall objective of the EPRI PWR Safety and Relief Valve Test Program is to obtain full scale data on the operational performance of pressurized water reactor primary system relief and safety valves under expected operating conditions for design basis transients and accidents by July 1, 1981. It is expected that PWR utilities will utilize this data to support plant specific submittals in response to safety and relief valve test requirements, first identified in NUREG 0578 and subsequently clarified in NUREG 0737, Item II.D.1A. [Carey-Auble Testimony following Tr. 11159, pp. 2, 3.]

Ten PORVs and nine safety valves have been selected for testing. The valves selected for testing are identified in Table 1 of the Carey-Auble testimony. The PWR Valve Test Program was developed so that the valves selected

for testing are representative of relief and safety valve designs in use or planned for use in PWR's. [Ibid. p. 3; Tr. 11170.]

The Masoneilan Model No. 20000 series valve being tested by EPRI is believed to be fully representative of the valves utilized as PORVs in the Diablo Canyon Nuclear Power Plant. [Ibid. p. 3; Cherny Testimony following Tr. 11216, p. 11; Tr. 11171, 11172.] The Masoneilan valve passed all of the performance screening criteria and performed successfully under steam conditions at the Marshall facility. [Carey-Auble Testimony following Tr. 11159, pp. 5-6.] The remaining tests on the Masoneilan valve will be completed in June 1981. [Ibid.]

The Crosby model HB-BP-86 safety valve being tested by EPRI is believed to be fully representative of the safety valves utilized in the Diablo Canyon Nuclear Power Plant. [Carey-Auble Testimony following Tr. 11159 p. 4.] The Crosby valve is scheduled for testing at the Combustion Engineering facility in June 1981. [Ibid., p. 7.]

The conditions under which the relief and safety valves are being tested envelope the expected operating and accident conditions as prescribed in the final safety analysis reports (FSARs) for pressurized water reactors. In addition, the conditions resulting from cold pressurization transients and transients resulting from the extended

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operation of the high pressure liquid injection system will be enveloped. [Ibid. p. 4; Tr. 11167, 11174, 11126.]

The test conditions for safety and relief valves include steam, subcooled water, water seal, and steam to water transition discharge conditions. [Ibid. p. 4; Tr. 11168, 11169, 11201.]

A formal program for testing block valves responsive to NUREG 0737, Item II.D.1B, is not part of the EPRI test program scope. Discussions concerning a block valve test program have been held by EPRI and a PWR owners group. PGandE has committed to qualifying its block valves by July 1982 whether there is an EPRI program or not. [Ibid. p. 7; Tr. 11220, 11221.]

Furthermore, in addition to the ten (10) relief valves tested at Marshall, seven (7) block valves were also tested. The block valves tested are identified in Table 2 to the Carey-Auble testimony. Two block valves manufactured by Velan were tested at Marshall and performed satisfactorily. Of these two, the Velan valve which is believed to be fully representative of the block valve model utilized in the Diablo Canyon Plant was cycled in excess of 21 times, and satisfactorily fully opened and fully closed each cycle. [Ibid. p. 7; Tr. 11181-11183.] There were no failures of any valves which might have some bearing on the operation of valves at Diablo Canyon. [Tr. 11185 and 11231.] In addition, the block valve which was representative of those

used at Diablo Canyon was successfully closed against somewhat higher flow than it could ever see at Diablo Canyon. [Ibid. p. 7; Tr. 11181-11183.]

7. Conclusion

Based on the design and analysis of, as well as testing applicable to, the pressurizer safety, relief, and block valves at Diablo Canyon, these valves are expected to function as required during any condition of normal operation, including anticipated operational occurrences. As discussed above, even in the hypothetical case of the pressurizer safety, relief, and block valves failing to close, the public health and safety would not be endangered. Accordingly, completion of additional testing of safety valves, PORVs, and block valves is not required prior to fuel load, low power testing, or full power operation at Diablo Canyon. [Gottshall-Muench Testimony following Tr. 11157, p. 8; Cherny testimony following Tr. 11216, pp. 13, 14.]

E. Legal Argument

During the hearing, the Board questioned PGandE regarding which of the 16 planning standards of 10 C.F.R. 50.47(b) it was seeking an exemption for purposes of obtaining a low power testing license. During the proceedings, staff counsel furnished to the Board a copy of SECY-81-188-Emergency Preparedness which was approved by the Commission on April 27, 1981. The Commission's action

negated Joint Intervenors' and Governor Brown's legal argument that PGandE had to comply with every facet of emergency planning contained in 10 C.F.R. 50.47. Instead the Commission chose to retain the flexibility of 10 C.F.R. 50.47(c) to allow case-by-case analysis of emergency preparedness. In the context of low power testing, the Commission reaffirmed its previous position in NUREG-0694 that it is unnecessary to require extensive offsite emergency capability because of the low potential for significant offsite releases. Accordingly, it is unnecessary for PGandE to seek exemptions from the planning standards. Rather all that is required is for PGandE to demonstrate reasonable compliance with those standards which are reasonably related to low power testing. PGandE has so presented this testimony as set forth in C (3) above. (Supra pp. 15-20.]

F. Summary

From the foregoing testimony and evidence, the Board finds that the risks from fuel load and low power testing are considerably reduced from that of full-power operation of Diablo Canyon. Further, that this risk reduction is based upon a variety of factors including a lower fission product inventory and a greater amount of time for operator response to mitigate and/or terminate an accident condition.

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The Board further finds that these factors reduce dramatically the size of the area which might be affected by a radiological emergency and for which emergency planning measures must be taken and the level of emergency response preparedness which would have to be in place.

The Board finds that the Federal Emergency Management Agency has found that the state and local emergency response preparedness for low power operation of the Diablo Canyon facility is adequate.

The Board finds that the current PGandE, county and state emergency plans demonstrate a sufficient level of emergency preparedness to respond effectively to any radiological emergency which might reasonably be expected to occur during low power testing.

The Board further finds that the current level of emergency preparedness meets NRC requirements as set forth in 10 C.F.R. 50.47 and NUREG-0737 as recently amended by the Commission on April 22, 1981 in SECY-81-188 in that any deficiencies in the PGandE, local and state plans are not significant for operation of Diablo Canyon at power levels not to exceed 5% power.

The Board also finds that NUREG-0737 requires only that testing of relief and safety valves need be completed by July 1, 1981 and of block valves by July 1, 1982. The Board further finds that failure to successfully complete this testing by fuel load does not result in a failure to

comply with GDC 1, 14, 15 and 30 or otherwise endanger the public health and safety.

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CONCLUSIONS OF LAW

The Board has given careful consideration to all the documentary and oral evidence produced by the parties. Based upon our review of the entire record in this proceeding and upon the foregoing findings of fact, the Board concludes as follows:

(a) Construction of the facility has been substantially completed in conformity with the construction permit and the application as amended, the provisions of the Atomic Energy Act of 1954, as amended, and the rules and regulations of the Commission; and

(b) The facility will operate in conformity with the application as amended, the provisions of the Act, and the rules and regulations of the Commission; and

(c) There is reasonable assurance (i) that the activities authorized by the fuel load and low-power testing (up to 5%) license can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations; and

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(d) PGandE is technically and financially qualified to engage in the activities authorized by the fuel load and low-power testing license in accordance with the Commission's regulations; and

(e) The applicable provisions of 10 C.F.R. Part 140 will be satisfied prior to fuel load; and

(f) The issuance of a fuel load and low power testing license will not be inimical to the common defense and security or to the health and safety of the public.

WHEREFORE, IT IS ORDERED in accordance with the Atomic Energy Act of 1954, as amended, and the Commission's regulations, and based on the findings and conclusions set forth herein, that the Director of Nuclear Reactor Regulation is authorized to issue a license, consistent with the terms of the Initial Decision, to authorize fuel load and low power testing up to 5% of rated power generally in the form submitted by PGandE in support of the motion. [J.I. Ex. 113.]

IT IS FURTHER ORDERED, in accordance with Sections 2.760, 2.762, 2.764, 2.785 and 2.786 of the Commission's Rules of Practice, that this Initial Decision shall not become effective until 10 days from the date this decision is transmitted to the Commission and shall constitute the final action of the Commission subject to review thereof under the above-cited rules. Exceptions to this Initial Decision may be filed by any party within 10 days after the

service of this Initial Decision. A brief in support of the exceptions shall be filed within 30 days thereafter (40 days in the case of the staff). Within 30 days after the service of this brief of the appellant (40 days in the case of the staff), any other party may file a brief in support of, or in opposition to, the exceptions.

Respectfully submitted,

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By 
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DATED: June 1, 1981.

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the Matter of	)	
	)	
PACIFIC GAS AND ELECTRIC COMPANY	)	Docket No. 50-275
	)	Docket No. 50-323
Units 1 and 2	)	(Low Power Test Proceeding)
	)	
Diablo Canyon Power Plant	)	
	)	

CERTIFICATE OF SERVICE

The foregoing document of Pacific Gas and Electric Company has been served today on the following by deposit in the United States mail* properly stamped and addressed:

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Chairman
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