

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of)

PACIFIC GAS AND ELECTRIC COMPANY)

(Diablo Canyon Nuclear Power Plant)
Unit Nos. 1 and 2)

Docket Nos. 50-275 O.L.
50-323 O.L.

PROPOSED FINDINGS OF FACT
AND CONCLUSIONS OF LAW



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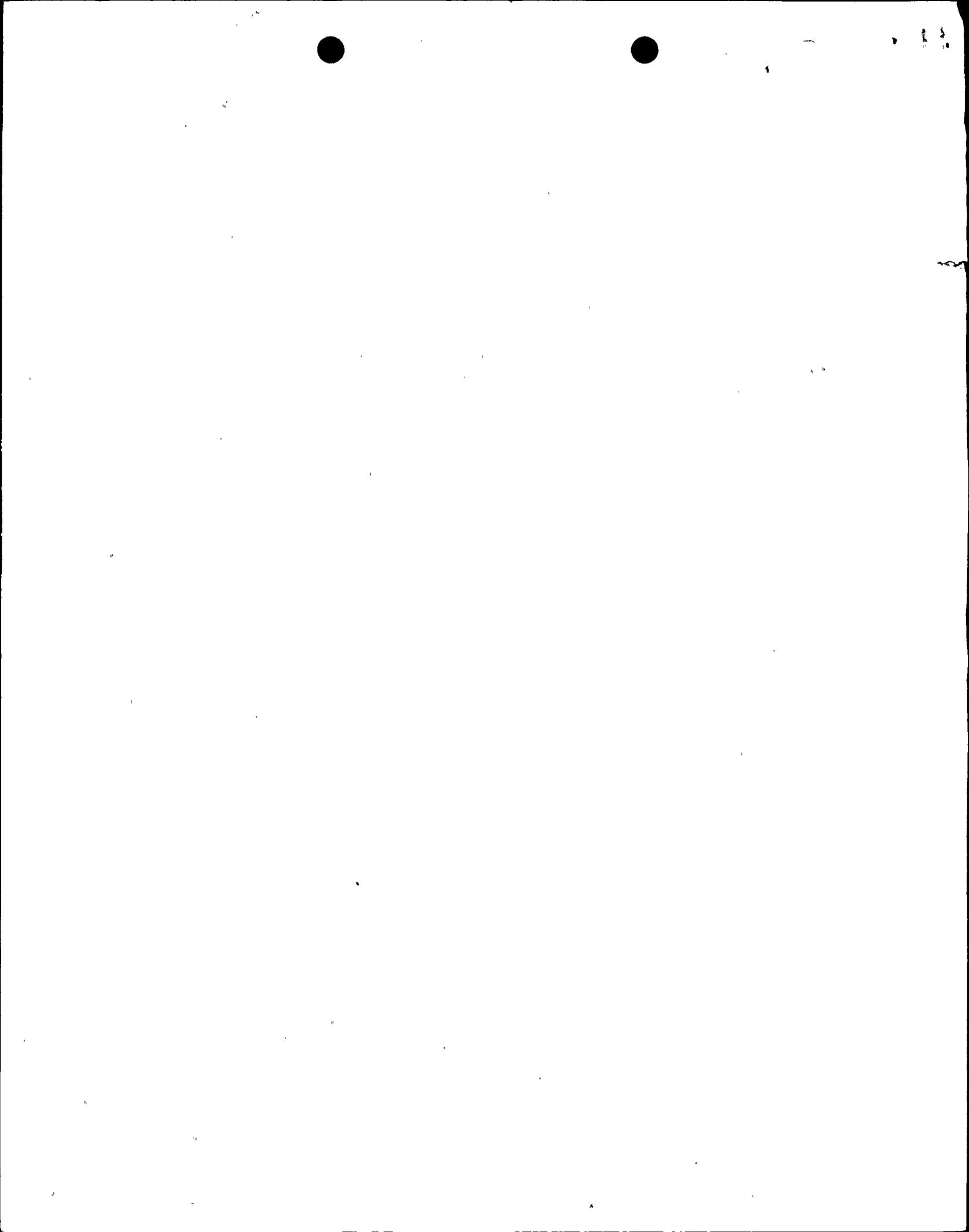
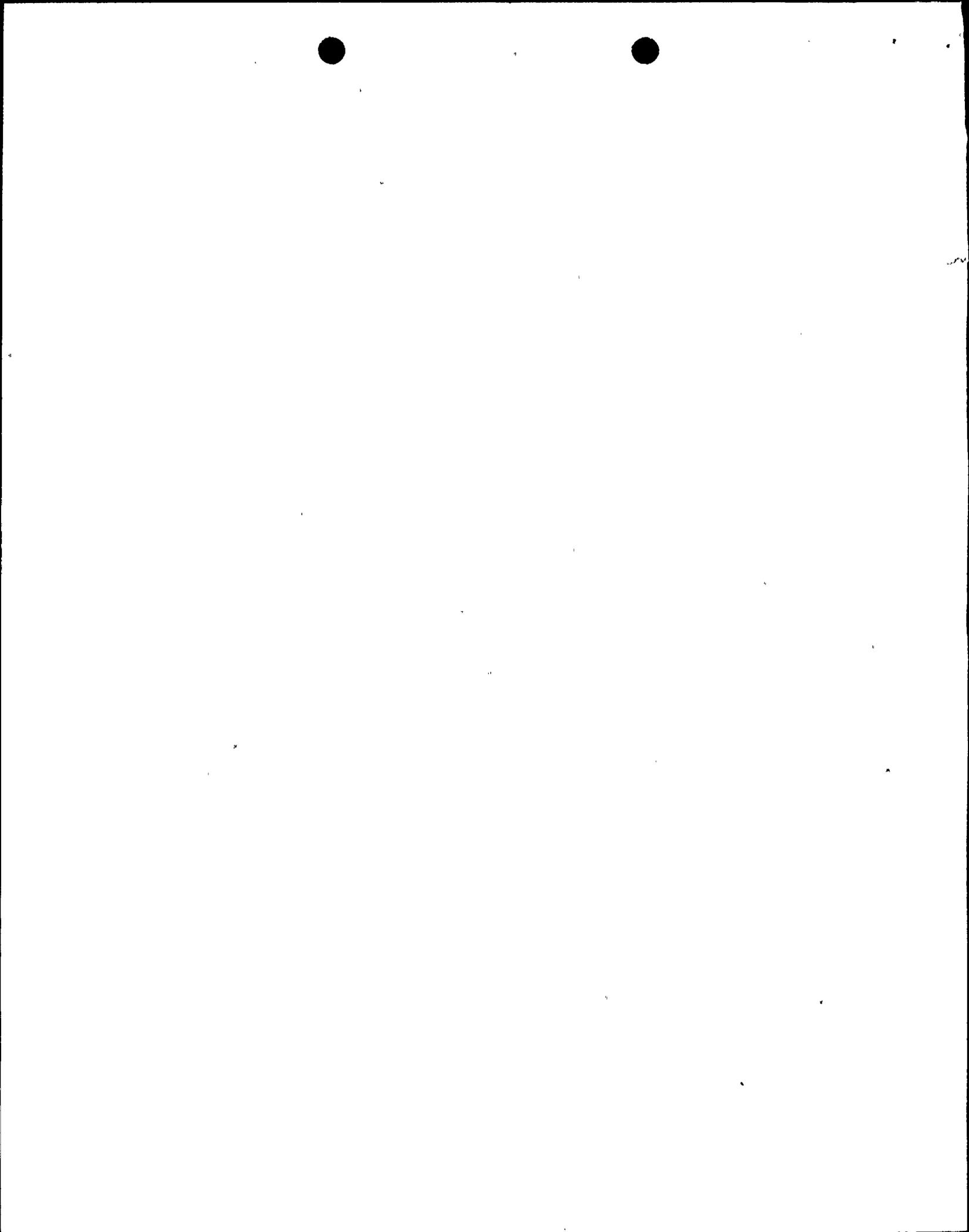


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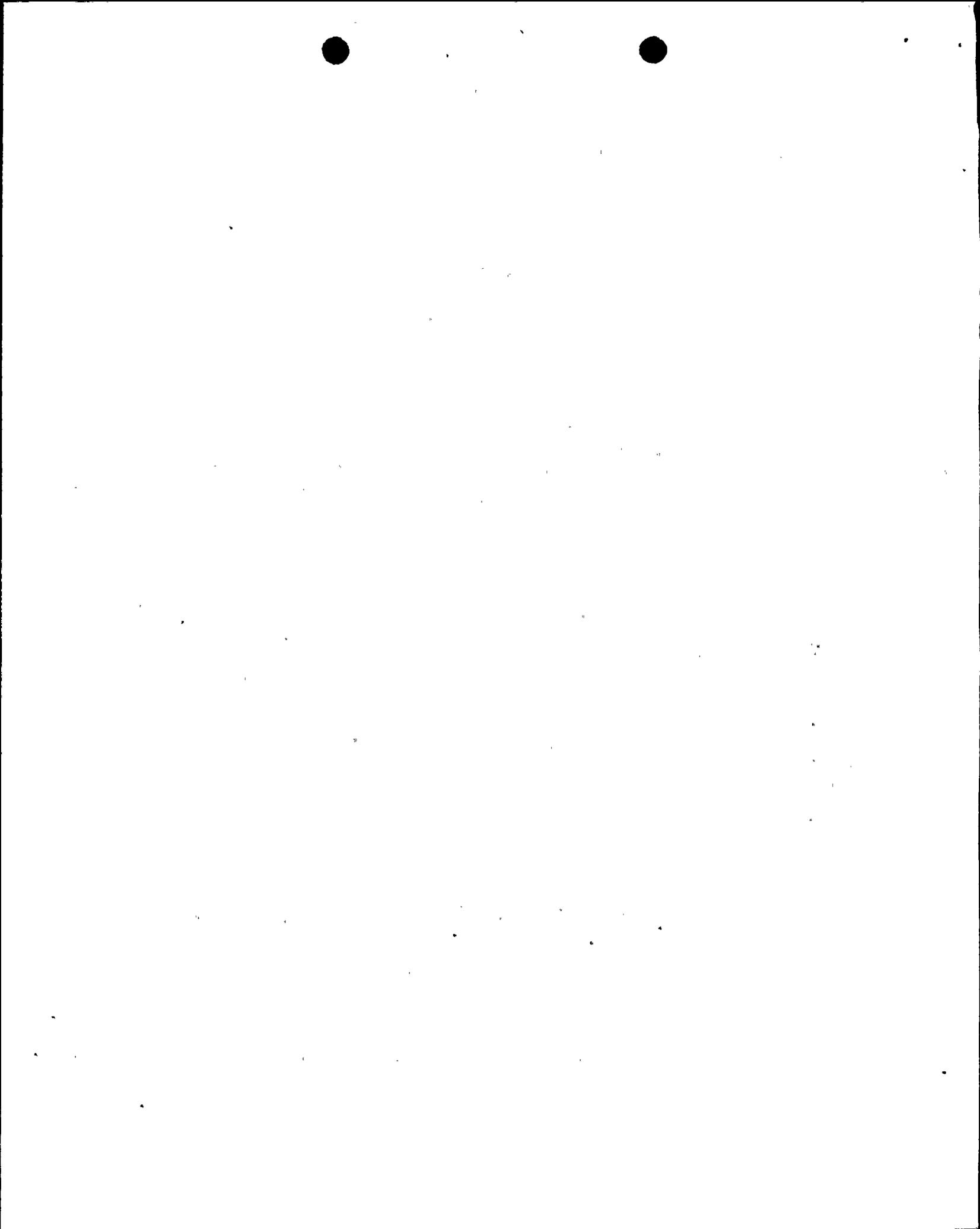
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<u>Exhibit No.</u>	<u>PGandE</u>	<u>In Evidence</u>
66	View Graph - On Site Monitoring Stations	10772
67	View Graph - Off Site Monitoring Stations	10772
68	View Graph - Real Time Instruments on Site	10772
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<u>Exhibit No.</u>	<u>Joint Intervenors</u>	<u>In Evidence</u>
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

<u>Exhibit no.</u>	<u>Governor Brown</u>	<u>In Evidence</u>
1	Memo - J.W. Macy to J.W. McConnell 3/12/80	11078

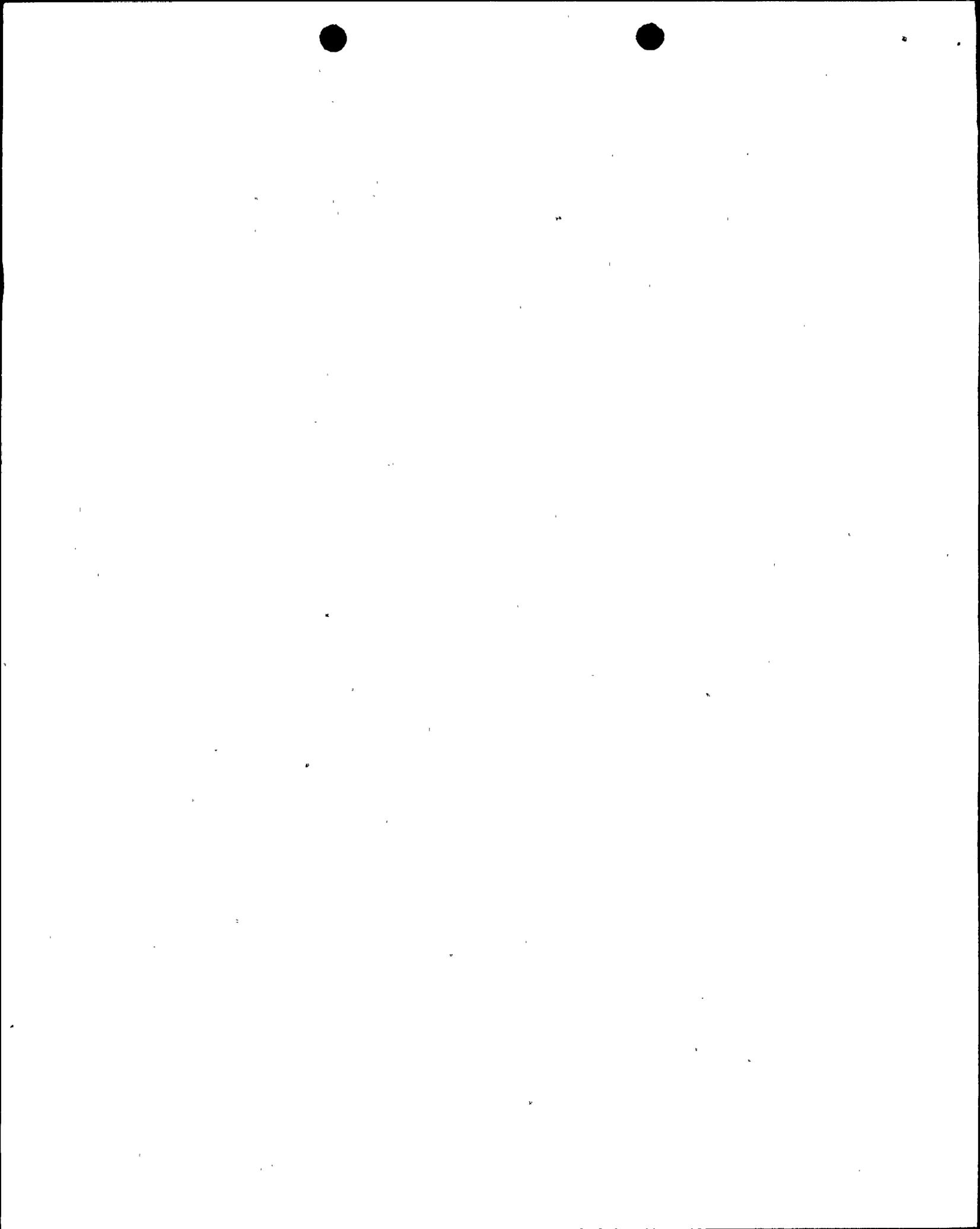


2	Letter and Report entitled "EPRI PWR Safety and Relief Valve Test Program"	
3	FEMA-NRC Memo of Understanding 1/11/80	11276
4	Letter to Harold Denton from John McConnell dated February 14, 1980	11276
5	Letter from Harold Denton to John McConnell dated February 14, 1980	11276
6	Letter to Harold Denton from John McConnell dated March 12, 1980	11276

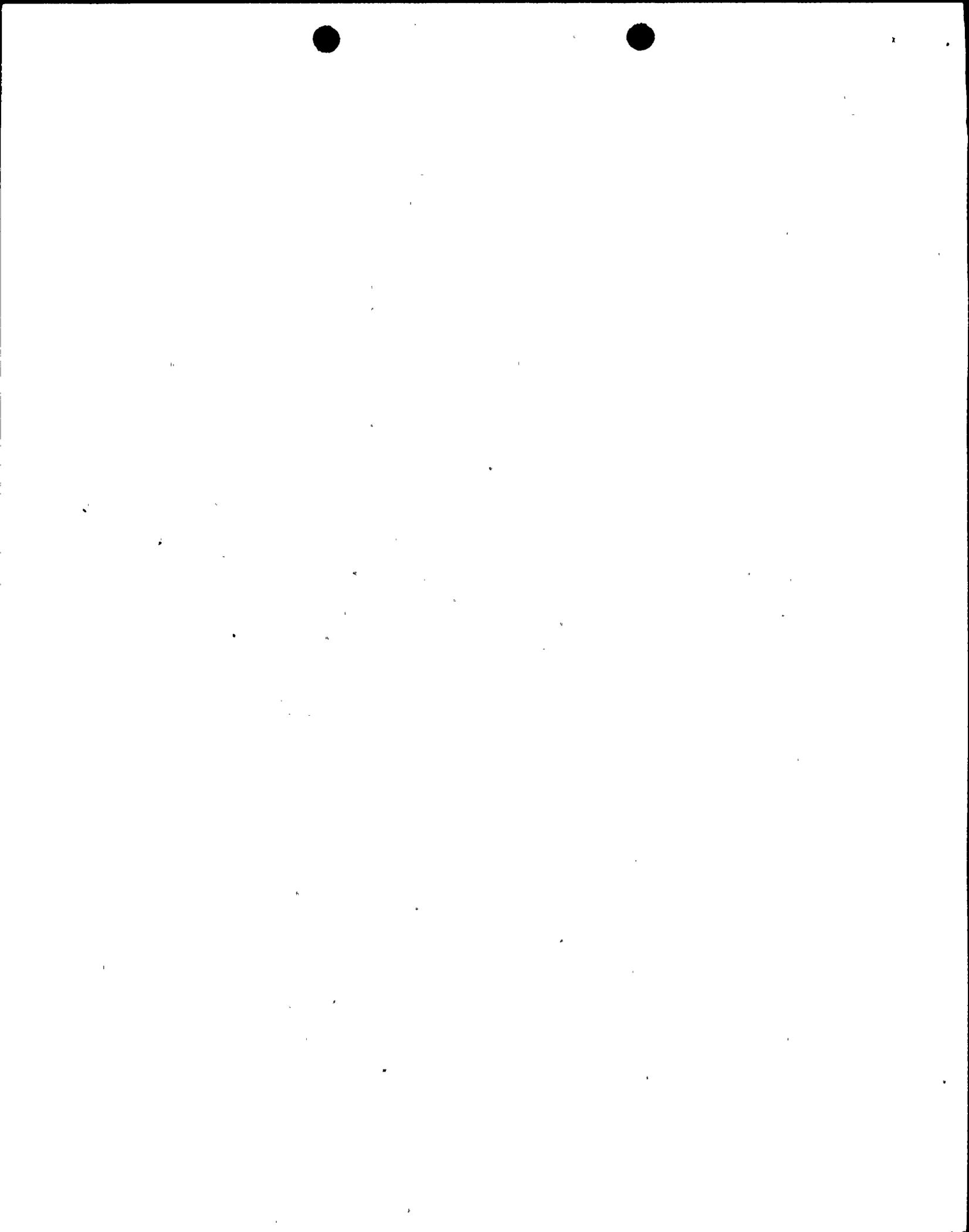
<u>Exhibit No.</u>	<u>NRC Staff</u>	<u>In Evidence</u>
18	SER Supp. 7	11050
19	SER Supp. 8	11050
20	SER Supp. 9	11050
21	SER Supp. 10	11050
22	SER Supp. 11	11050
23	SER Supp. 12	11050
24	SER Supp. 13	11050
25	SER Supp. 14	11050

<u>Exhibit No.</u>	<u>ASLB</u>	<u>In Evidence</u>
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 (Tr. 10649), the report of the
Kemeny Commission (Exhibits 114A and B) (Tr. 10595), and the Rogovin
Report (Exhibit 115) (Tr. 10648).



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FINDINGS OF FACT AND CONCLUSIONS OF LAW
IN FUEL LOAD AND LOW POWER TESTING PROCEEDING

INTRODUCTION AND BACKGROUND

1. The Diablo Canyon proceeding is a contested operating license proceeding which commenced after applications were docketed in 1973. The Licensing Board completed all required hearings in February 1979 and closed the evidentiary record on March 12, 1979. The Licensing Board resolved some of the safety issues in a Partial Initial Decision issued September 27, 1979, (LBP-79-26, 10 NRC 453, aff'd ALAB-644 13 NRC ___ (June 16, 1981). Decision on other issues was deferred pending the receipt of the Staff's report on TMI-related matters. Following appeal of the Licensing Board's September 27, 1979 decision, the Appeal Board reopened the record on two issues: the adequacy of PG&E's security plan and the effect, if any, of the new information concerning near field accelerations arising from the 1979 Imperial Valley Earthquake on the seismic design testimony in the record. Hearings were held on the seismic issue from October 20-25, 1980 and on the security plan issue from November 10-15, 1980. The Appeal Board favorably resolved the seismic issue in ALAB-644 on June 16, 1981. The security issue is currently pending Appeal Board Decision.



2. On July 14, 1980, PG&E filed a motion before the Atomic Safety and Licensing Board (ASLB) requesting authorization for fuel loading and low power testing. In December of 1980 Joint Intervenors filed contentions and Governor Brown (who was allowed in the proceeding on November 16, 1979 as an interested state after the record had closed) filed a list of "subjects" on which he desired to participate. After a Prehearing Conference the ASLB issued a Prehearing Conference Order on February 13, 1981 admitting five of Joint Intervenor's Contentions, and four of Governor Brown's subjects to the extent they raised the same issues as the admitted contentions. Subsequently, on April 30, 1981, the ASLB granted summary disposition on contentions 5 and 13. Two contentions (4 and 24) involving emergency planning and relief, safety, and block valves remained for hearing.

3. From May 19, 1981 to May 22, 1981 the ASLB held hearings on the admitted contentions in the low power proceeding in San Luis Obispo, California. The following is the Staff's proposed Findings of Fact and Conclusions of Law on the issues considered in the May 1981 hearing.

DISCUSSION

4. Before addressing the specific findings of fact which the Staff believes were demonstrated by the evidence in the hearing, several procedural assertions made by Governor Brown need be dispensed with. The Governor's findings of fact again requests the Board to strike portions of testimony or give testimony little or no weight, based on the same erroneous bases Counsel for Governor Brown and Joint Intervenors stated



and restated at the hearing. (Governor Brown's Findings, pp. 30-32, 40-46).^{1/} In each case the Board denied the motions after hearing the arguments Governor Brown now attempts to resurrect. Having examined the transcript portions dealing with those motions, the Staff believes the Board's rulings were without error and the testimony of all the challenged witnesses both probative and correct. The Staff will not reiterate each of the Staff's arguments which, after thorough voir dire below, the Board found convincing.^{2/} The Staff would like to note the following, however, which applies generally to the arguments on the admissability of the Staff's testimony which were presented by Governor Brown. The main point argued by Governor Brown is that the witnesses relied on studies or findings which were not compiled or otherwise participated in by the witnesses. The Appeal Board has specifically addressed the issue of an expert witness' reliance on the work of others and has stated: "An expert is, of course, not expected to derive all his background data from experiments which he personally conducts; if that were required, scientific experts would rarely, if ever, be qualified to give any opinion on any subject whatsoever." Wisconsin Electric

^{1/} The voir dire and discussion of admissability of Mr. Lauben's Testimony appears at Tr. pp. 10996-11014 and of Mr. Sears' Testimony at Tr. pp. 11016-11034. The discussion on the admissability of Mr. Sears testimony also addressed whether a FEMA witness was necessary.

^{2/} The voir dire and discussion of admissability of Mr. Lauben's Testimony appears at Tr. pp. 10996-11014 and of Mr. Sears' Testimony at Tr. pp. 11016-11034. The discussion on the admissability of Mr. Sears testimony also addressed whether a FEMA witness was necessary.



Power Company, et. al. (Point Beach Nuclear Plant, Unit 2), ALAB-78, 5 AEC 319, 332 (1972). The crucial element is that the expert is available to explain how he used the data. (Id. p. 333).

5. This principle is consistent with both the Federal Rules of evidence and Federal case law on expert witnesses.^{3/}

6. The Staff thus believes that the Board's original rulings were correct and that those rulings should not be disturbed at this time.

FINDINGS OF FACT - CONTENTION 4

7. Joint Intervenor's contention number 4 reads:

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)).

The Diablo Canyon Emergency Plan

8. Extensive testimony and cross-examination was presented during the hearing dealing with the contents and adequacy of the Diablo Canyon Emergency Plan.

9. Revision 2 to the Diablo Canyon Emergency Plan grew out of a post-TMI review by the NRC of all existing site emergency plans, and, in the case of Diablo Canyon, included a site visit and a public meeting

^{3/} See Federal Rules of Civil Procedure #703 and United States v. Williams, 447 F.2d 1285, 1290; cert. denied 405 U.S. 954 (1974).



during the week of November 27, 1979. (PG&E panel testimony following Tr. 10604, p. 2).

10. Revision 2 was supplemented by additional information in submittals to the NRC dated January 13, 1981 and February 27, 1981. (Sears testimony following Tr. 11035, p. 2).

11. The above documents were reviewed against the specific criteria of the 16 planning standards of 10 C.F.R. § 50.47. The plan was also evaluated against the requirements of Sections III.A.1.1 and III.A.1.2 of NUREG-0694 (now superceded by the same sections of NUREG-0737). (Id. at pp. 2-3).

12. The Staff's evaluation results and conclusions are reported in Appendix B, Emergency Preparedness Evaluation Report to Supplement No. 14 to the Safety Evaluation Report. (NRC Staff exhibit No. 25).

13. Mr. Sears, who appeared as the NRC Staff witness on the Diablo Canyon emergency plan, testified that the NRC Staff's conclusion upon review of the plan was that, when revised in accordance with the commitments made, it would provide an adequate basis for meeting the requirements of 10 C.F.R. Part 50 and Appendix E. (Sears testimony following Tr. 11035, p. 3).

14. The commitments made by PG&E related to deficiencies which the Staff required be corrected prior to full power operation. The principle deficiency being that the fast alerting system has not been installed, although the sirens have been purchased and await only local permits before installation can begin. (Id. at 4).

15. Although PG&E, as documented in Joint Intervenors Exhibit 111, has not as yet complied with all the requirements 10 C.F.R. § 50.47 and the



implementing criteria of NUREG-0654, it has committed to fully comply with these emergency planning provisions prior to full power operation. (Tr. 10660).

16. Mr. Sears specifically addressed the deficiency in the fast alerting system. He noted that this was not significant for low power because, while the system was designed to notify the public within 15 minutes in situations where an offsite release of radiation might occur in less than 30 minutes, at low power the time before the release of radioactive material during a LOCA would be at least 15 hours and a fast alerting system would not be required. (Sears Testimony following Tr. 11035, p. 4).

17. The only other deficiency of any significance identified by Mr. Sears was the public information program. He noted however, that its main purpose would be to inform the public on the fast alerting system, a purpose which is not of significance until the fast alerting system is installed. (Id. at 5).

18. PG&E presented a panel of witnesses on emergency planning who testified that as soon as it was definitely determined whether the fast alert system would be installed prior to fuel load, the brochure on emergency procedures would be issued to inform the public of the emergency procedures which would be in affect during the low power testing program. (Tr. 10800).

19. In their prepared testimony, the PG&E panel noted several recent changes in plant staff which enable better response to emergency situations. The changes were that a shift technical advisor (required to be a graduate engineer) two instrument and controls technicians, one



chemistry and radiation protection technician, and a shift clerk were added to the shift crew. During low power testing this crew will be supplemented by a minimum of three PG&E engineers and 2 Westinghouse engineers. (PG&E panel testing following Tr. 10604, p. 5).

20. The panel also addressed a number of specific areas of emergency planning. PG&E has established a number of emergency response facilities. They are:

1) An onsite Technical Support Center (TSC) to provide plant management and technical support to plant operations personnel during emergency conditions.

2) An onsite Operational Support Center (OSC) to provide an assembly area for operations support personnel and logistic support coordination.

3) An offsite Emergency Operations Facility (EOF) to provide for management of the Company's overall emergency response, coordination of radiological and environmental assessment and coordination of emergency response activities with federal state and local agencies.

4) A Corporate Incident Response Center (CIRC) in San Francisco to provide for additional technical, logistical and liaison support. (Id. at 7).

21. Testimony further established that the OSC would be equipped with radiological monitoring equipment, radios, emergency kits and evacuation kits. Protective clothing and portable lighting will be located at various locations around the plant. (Tr. 10676).



22. It was established during cross of the PG&E panel that up-to-date, as-built drawings, schematics and diagrams will be available in the TSC during low power testing. (Tr. 10674).

23. In the area of communications the PG&E panel testified that Diablo Canyon has a Pacific Telephone and Telegraph (PT&T) phone system and a UHF radio system to reach non-company offsite locations such as the Sheriff's office. When long range communications is required, all radio transmissions are rebroadcast by a mountain top repeater. (PG&E Panel testimony following Tr. 10604, p. 12).

24. A recent addition to the communications system is a computerized Branch exchange (CBX) system which has been installed at the plant. This system provides for improved communications within the Company system and has a number of tie-ins to the PT&T system. (Id. at 13).

25. Other improvements to the communications system were discussed by the panel. Several dedicated phone lines have been installed linking the control room with key offsite locations and the TSC; a second radio system has been installed for health physics use; and a third radio system has been added for plant security. (Id. at 14-15). All communications systems are powered by reliable AC power sources with battery backup. (Id. at 15).

26. Testimony was also received from the PG&E panel on the radiological monitoring program. The panel testified that there are to be 32 environmental sampling stations; two "real time" instruments (TASC-4's) employing NaI scintillation detectors, monitoring teams with portable radiation survey instruments and air sampling equipment, and a mobile lab. (Id. at pp. 16-18).



27. A member of the PG&E panel, Mr. Shiffer, demonstrated that the various radiological monitoring equipment is situated in such a way that it rings the Diablo Canyon plant. (Tr. 10760-10780).

28. The mobile lab is equipped with a variety of special sampling and nuclear measurement systems which allow technicians to collect samples of air, water, milk, foodstuffs, and other media. (PG&E panel testimony following Tr. 10604, p. 18 and Tr. 10788).

29. Although Governor Brown's findings of fact maintain that the county health staff have insufficient training and lack communications equipment (Governor Brown's Findings p. 37-38), Dr. Mitchel, a witness for Governor Brown, acknowledged that the county health staff under his supervision were receiving training on the mobile lab. He also acknowledged that the van has excellent communications equipment. (Tr. 10960-10961).

30. Additionally, PG&E will be adding 9 real time radiation monitors to the 2 TASC-4's already installed. County, as well as PG&E, personnel will have access to these instruments. (Id. at 19).

31. The PG&E panel also noted that the plant has on onsite meteorological tower and computer which determines realtime atmospheric dilution factors to a downwind distance of 50 KM. This information, when coupled with release data or environmental measurement, can be used to predict downwind dose rates. (PG&E panel testimony following Tr. 10604, p. 19).

32. With respect to post-accident sampling capability PG&E is currently completing the installation of an interim post-LOCA sampling system which will enable high activity reactor coolant and containment atmospheric

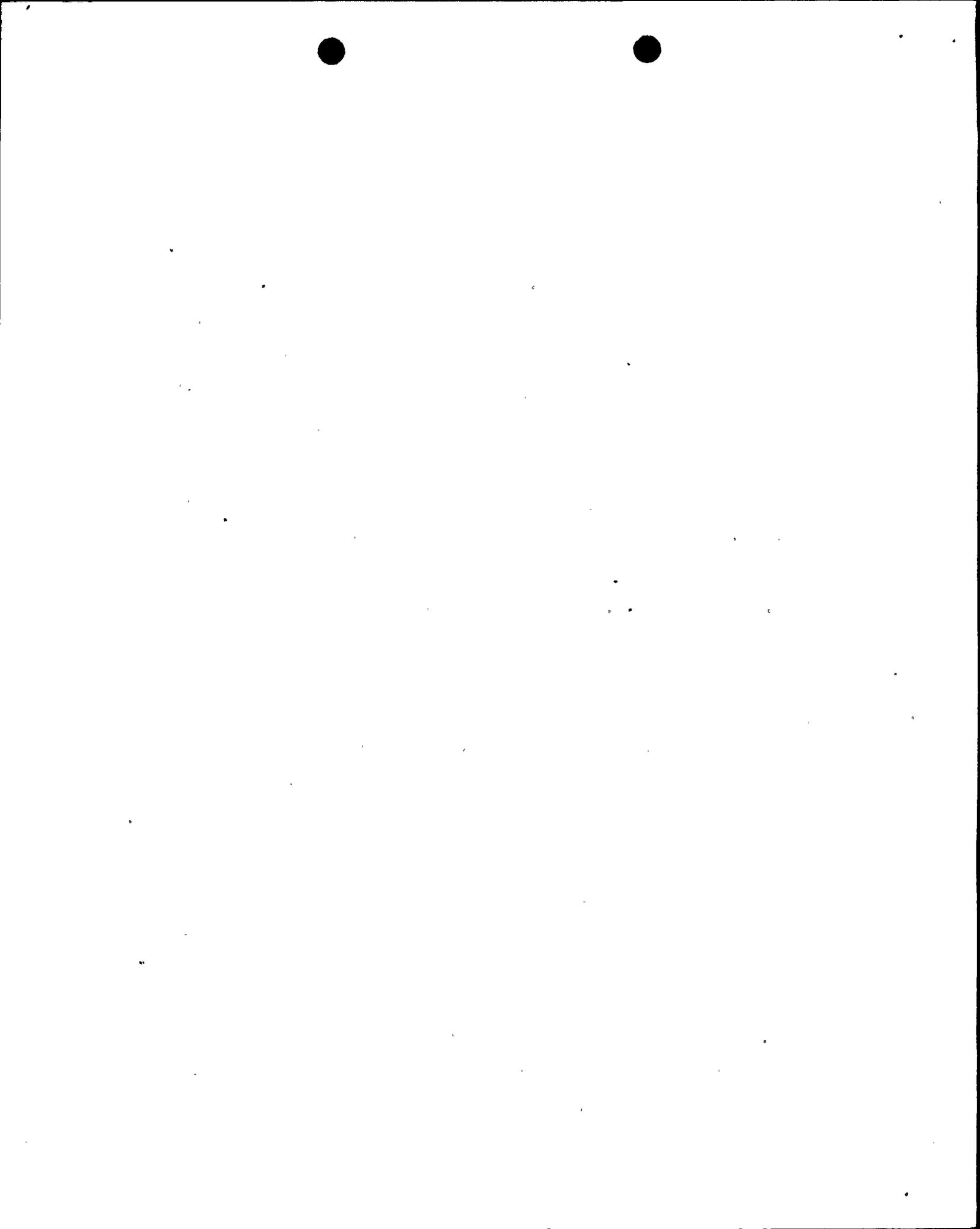


samples to be collected and diluted for laboratory analysis. This system will be in operation prior to fuel load. (Id. at 21).

33. In cases requiring medical treatment Diablo Canyon is equipped with first aid and decontamination areas for handling cases where traumatic injury is minor. In addition, PG&E has several local physicians and medical facilities on its panel for treatment of industrial injuries. For more serious occurrences involving radiation or radioactive contamination, the Company has made arrangements with San Luis Ambulance Service to transport injured personnel who may be contaminated, and with French Hospital for treatment of such persons. (Id. at 24). The panel explained that various training and drills which had involved ambulance and/or medical personnel have been conducted for the Diablo Canyon plant. (Id. at pp. 24-25).

34. The PG&E panel's testimony also addressed the fire protection system at Diablo Canyon. They noted that there is extensive onsite fire protection systems and equipment. In addition, selected plant personnel are organized into fire brigades. The California Department of Forestry (CDF) is expected to provide backup fire protection for the plant. (Id. at pp. 27-29).

35. Mr. Robert E. Paulus, Deputy Director of the California Department of Forestry for Fire Protection and Technical Services, testified as a witness for Governor Brown. Mr. Paulus stated that inadequate training and inadequate equipment existed to enable CDF personnel to fight fires at Diablo Canyon Nuclear Plant. This, he stated, was the basis for the CDF rescinding a February 13, 1979 letter of understanding with PG&E in



an April 20, 1981 letter to PG&E. (Paulus testimony following Tr. 10895, p. 2 and Joint Intervenors exhibit No. 116).

36. During cross-examination Mr. Paulus testified that as a result of recent training which was ongoing during the hearing (and should now be completed) the training concern, which was one basis for rescinding the letter of agreement, was being resolved and all that remained to satisfy the CDF's concern was for the review of the pre-fire plan to be completed. (Id. at 10908). The pre-fire plan was expected to be received and reviewed prior to July 1, 1981. (Id. at 10909). Mr. Paulus also indicated that his concern regarding the CDF having adequate equipment had been resolved. (Tr. 10937). Thus, although not mentioned in Governor Brown's proposed findings of fact, all the CDF's concerns will be resolved prior to fuel load at Diablo Canyon.

37. During the hearing both Mr. Sears and the PG&E panel noted a number of ongoing actions being taken to improve the emergency plan. Mr. Sears noted that PG&E has committed to provide an analysis on the effects of earthquakes on their emergency plan. PG&E is meeting this commitment through a contractor whose report was due in mid-May of 1981. The Applicant has stated it will revise the emergency plan to include the contractors recommendations. (Sears testimony following Tr. 11035, p. 7).

38. Further indicating the reliability of Diablo Canyon, as a whole, during any expected earthquake is the extraordinarily detailed analysis in Pacific Gas & Electric (Diablo Canyon Nuclear Plant, Units 1 and 2) ALAB-644, 13 NRC ____ (1981) which concluded that Diablo Canyon is adequately designed for any expected SSE. Thus, Governor Brown's and



Joint Intervenor's assertions that there has not been adequate consideration of earthquakes, and their statement that the plant's location near the Hosgri fault should result in the facility's not receiving a low power license are groundless.

39. PG&E is also in contact with FEMA, State and local officials and will keep them informed of upcoming programs which will be beneficial to local non-company officials as well as Company personnel. A series of interagency exercises are being planned to start in June, working toward a full scale exercise of the revised PG&E, state and local plans in August, 1981. (PG&E Panel testimony following Tr. 10604, p. 32).

40. Mr. Sears pointed out that FEMA has determined that compliance with NUREG-0694 is unnecessary for low power testing and that the NRC approved emergency plans at Diablo Canyon adequately protect the public health and safety for the purposes of low power testing. (Sears testimony following Tr. 11035, p. 6; and Governor Brown's Exhibit No. 1).

41. Finally, a series of witnesses testified as to the procedures for evacuating the LPZ. The panel testified that there are approximately 65 permanent residents in the LPZ at Diablo Canyon; and between 400-1500 visitors can be expected in Montana de Oro State Park, which is located in the northern portion of the LPZ. (PG&E panel testimony following Tr. 10604, p. 38).

42. Contrary to Governor Brown's assertion in his proposed findings of fact, there was testimony and evidence as to the emergency actions with respect to Montana de Oro State Park. (Governor Brown's Findings, p. 35). Under the present County plans the Sheriff has the lead role in conducting an evacuation of the LPZ. The Sheriff along with State Park



personnel will conduct any evacuation of Montana de Oro Park and can obtain additional assistance under existing mutual aid agreements. (Id.)

43. Mr. Sears testified that for notification of persons in the state park the sheriff's office has an agreement with Hunter Liggett military reservation for the use of a helicopter. The all weather helicopter is equipped with bull horns to notify anybody in the remote areas of Montana de Oro State Park in the event of an evacuation. (Tr. 11068).

44. The panel noted that the Sheriff has the authority to order an evacuation of the LPZ based upon a recommendation of the Plant Emergency Coordinator, and prior to the time that the County Emergency Organization is convened. (PG&E panel Testimony following Tr. 10604, p. 39). Mr. Jorgensen, a witness for Governor Brown and a member of the San Luis Obispo County Board of Supervisors, acknowledged that it is the Sheriff's responsibility to evacuate the LPZ under the County Plan. (Tr. 10971).

45. Sheriff Whiting, the sheriff for San Luis Obispo County, testified that the Sheriff's department does have an evacuation plan for the LPZ and that he believed that the plan was capable of execution. (Tr. 11323, 11337). This is highly probative testimony since the Sheriff is the individual who is to conduct and order the evacuation.

46. The Sheriff's plan was to use a house-to-house notification for residents of the LPZ which could be completed in several hours. (Tr. 10839-10841).

47. Governor Brown states that the County's Director of Emergency Services had never heard of the Sheriff's plan. (Governor Brown's Findings p. 9). However, in examining the Transcript pages cited, no statement that the County Director has never heard of the plan is found.



Rather, the testimony only indicates that, according to Mr. Jorgensen, the emergency services coordinator is not familiar with any implementing plan for the LPZ. Of course, no one at the proceeding argued that the Sheriff's plan amounted to an implementing plan for all the LPZ requirements of the County Emergency Plan. The main point is the Sheriff, who is responsible for implementing the Sheriff's evacuation plan, is aware of the plan (Tr. p. 10973, 11323 and 11337).

48. Existing emergency procedures require that site personnel immediately notify the Sheriff and recommend evacuation of the LPZ in a LOCA situation where proper functioning of the emergency core cooling system is in doubt. Thus, during any accident requiring evacuation during low power operation, it is likely that such action in the LPZ would be well under way, and possibly completed, prior to the onset of inadequate core cooling, which would cause the release of any radioactivity. (PG&E panel testimony following Tr. 10604, p. 33). Neither Governor Brown or Joint Intervenors presented any evidence to dispute the Sheriff's ability and authority to evacuate the LPZ. Finally, as to the approximately 1,000 PG&E and construction personnel who will be on site during testing, testimony revealed that they can exit themselves from the plant site in a half hour. (Tr. p. 10811). Therefore, these personnel clearly will have ample time during low power testing to exit themselves from the site during any credible accident.



Risk Analysis

49. Testimony was received on the relative risk of operation at low power as compared to full power from one NRC Staff witness and one PG&E witness.

50. Mr. Norman Lauben of the NRC Staff testified that there are three major factors which contribute to safe operation during low power as compared to full power operation. They are: 1) additional time for operators to take corrective action; 2) a reduction in the risk associated with significant postulated events at low power; and 3) a reduction in required capacity for mitigating systems at low power. (Lauben testimony following Tr. 11014, p. 2).

51. Mr. Lauben further testified that the dominant events which could potentially affect the public health and safety during low power are: 1) small break LOCA's with loss of the emergency core cooling system (ECCS); 2) transients with total loss of feedwater; and 3) failure of double check valves between the reactor coolant system (high pressure) and the residual heat removal system (low pressure) which results in a LOCA outside containment. (Lauben testimony following Tr. 11014, p. 2).

52. Governor Brown stated that in performing the analysis the Staff relied on the assumption that the dominant events at low power were the same for full power. (Governor Brown's Findings, p. 29). However, Mr. Lauben explained in his testimony that the Staff had analyzed the accident sequences to be sure that additional transients did not become dominant at low power. (Lauben Testimony following Tr. 11014, p. 8).

53. The NRC Staff performed a relative risk analysis which established the reduction in risk at low power, taking into account the reduced fission product material at 5% power and the additional response time



available to plant operators. The reduction in risk under the analysis was stated to be 400-1500 as compared to full power (Id. at 3).

54. In addition, it was stated that the relative risk at low power may be reduced by an additional factor of 2 due to the predicted test program period of 20 days at a maximum of 4% of rated capacity. This would make the reduction in relative risk at low power a factor of 400 to 3000 as compared to full power. (Id. at 4).

55. During cross-examination of Mr. Lauben he testified that, when the number of days at full power (approx 10,000) compared to the number of days at low power (approx. 10) is factored into his relative risk analysis, the total integrated risk at low power is reduced by a factor of over 1,000,000 as compared to full power operation (Tr. 11122).

56. Governor Brown's proposed findings of fact allege that Mr. Lauben's analysis is in error because he did not consider the risk at low and full power for equivalent time periods. (Governor Brown's Findings, p. 28). However, that is not what Mr. Lauben did. Mr. Lauben noted that if he had taken the time difference into consideration the relative risk reduction would be 1,000,000, rather than the 400-1,500 reduction he predicted when the time difference was not factored in. (Tr. 11122). In fact, Mr. Lauben specifically testified that his assessment resulting in a 400-1,500 reduction addressed the risk per unit of time. (Tr. 11053).

57. Mr. Lauben also addressed the increased time for operator actions at low power. He noted that the core would have to remain uncovered for approximately 10 hours before fuel element cladding would fail due to overheating. For this overheating to occur the ECCS system, designed to operate to cool the core at up to 102% power, must have failed. In



addition, for any risk to the public to occur the reactor coolant pressure boundary and the containment must be breached. (Lauben testimony following Tr. 11014; p. 4).

58. In addressing accident scenarios that could cause core uncover Mr. Lauben stated that a small LOCA with a completely failed ECCS would not cause uncover for three hours and severe core damage would not commence for about 15 hours. For the actual test program at 3-4% power the time to fuel damage would increase to more than 20 hours. As a result Mr. Lauben concluded that it was extremely unlikely that there would be significant damage (greater than 5% metal-water reaction) due to failure of the ECCS during a LOCA at low power. (Id. at pp. 5-6). As a result of the increased time to react during a small break LOCA the probability of significant fuel damage and significant radiological release is reduced by at least a factor of 400-1600 for low power operation as compared to full power operation. (Id. at 7).

59. Mr. Lauben also addressed the relative risk reduction at low power for transients involving total loss of feedwater. He concluded it would take at least 2½ days for the steam generators to boil dry, and it is possible they would never boil dry. (Lauben Testimony following Tr. 11014, p. 7 and Tr. 11126). These considerations would result in a risk reduction associated with these events of from 1,000 to 20,000 at low power. (Id.).

60. The NRC Staff witness noted that transients, other than those involving feedwater, do not become of concern for low power due to a risk reduction similar to that for feedwater transients. In particular, the



risk from an ATWS event is not significant due to its having a probability of less than 10^{-7} per reactor year. (Id. p. 9).

61. Governor Brown indicates that both Mr. Brunot and Mr. Lauben defined "risk" as the product obtained by multiplying the probability of a release times the probability of the consequences. (Governor Brown's Findings, p. 16) [emphasis added]. This is an incorrect statement of Mr. Lauben's testimony. Mr. Lauben stated that "risk" is generally defined as the product of the probability of the event occurring and the consequences of those events, not the probability of the consequences of those events as in the Governor's statement. (Tr. 11052).

62. Mr. Lauben concluded that, at the low power levels planned for Diablo Canyon's test program, the risk of accidents affecting the public is so small that there is virtually no need for a qualified offsite emergency plan. (Id. at 9).

63. Governor Brown states that the Staff witness argued that virtually no emergency preparedness beyond the Diablo Canyon site boundary is required for low power. (Governor Brown's Findings, p. 28). However, an examination of the statement of Mr. Lauben cited by Governor Brown reveals that Mr. Lauben stated that there was little need for a "qualified emergency plan". (Id. p. 9). This is entirely consistent with the Staff's assertion that the emergency plan need not meet every emergency planning requirement or, in other words, the plan need not be fully qualified under the regulations.

64. Governor Brown also seems to indicate that the NRC has withdrawn its endorsement of the WASH-1400, and that Mr. Lauben relied on that material in his analysis. (Gov. Brown's Findings p. 29). However, that was not



the substance of Mr. Lauben's testimony. Mr. Lauben noted that, although the NRC had withdrawn its endorsement of the WASH-1400 numerical conclusions, they had not withdrawn their endorsement of the methodology of WASH-1400. (Tr. p. 11101). Mr. Lauben specifically testified he did not use the numerical conclusions, but rather he used the methodology of WASH-1400. (Tr. 11007).

65. The witness for PG&E, Dr. William Brunot, also presented prepared testimony addressing the various factors affecting risk at low power as compared to full power. Dr. Brunot explained that an estimate of fission product inventories for low power can be obtained by assuming that such inventories are simply the full power values multiplied by the percentage of full power level to be obtained at low power. A more detailed calculation indicates that for many of the long-lived isotopes, the inventories following a low power test run will be much less than the values obtained by the simple procedure above, because the long-lived isotopes are proportional to the total energy generated, rather than to power level. (Brunot testimony following Tr. 10595, p. 4).

66. During cross-examination, Dr. Brunot noted that the radionuclide with the major prompt health consequences had a reduction factor of 20 for low power as compared to full power. (Tr. 10623).

67. With regard to the fission product inventories following a low power test program for one month as compared to full power, Dr. Brunot noted that: 1) The amounts of fission products produced in the core are directly proportional to the amount of fuel burned, as in any other chemical or physical reaction; 2) For some isotopes, because they decay naturally or are consumed by the core reactions, the amounts available



for release from the core at any time are significantly less than the amounts produced; 3) The methods for calculation of these inventories for any reactor operating condition are well known and well verified by experimental data; and 4) The operation of Diablo Canyon at power levels less than 5% of full power for 1 month will result in core inventories of 5% of those associated with full power for some of the isotopes, and much lower percentages for others, particularly those with long half-lives. This proportionality is a well established basic of nuclear physics. (Brunot testimony following Tr. 10595, pp. 4-5).

68. Dr. Brunot also testified that he was confident that actual testing would be conducted at under 5% power for a period of no more than one month. This was also confirmed by Mr. Shiffer of PG&E's Staff who testified that some of the tests will be run at 0% power. (Tr. pp. 10726-10727, and 10888-10889.).

69. In addition to the reduced fission product inventories, Dr. Brunot identified a number of other factors which reduce the risk of operation at full power. They are:

- 1) Reduced decay heat after shutdown.
- 2) Time available for emergency actions.
- 3) Reduced hydrogen production rate.
- 4) Spent fuel pool accidents are essentially non-existent.
- 5) Lack of activated corrosion products.
- 6) Lack of radioactive inventory in waste systems.
- 7) Lack of radioactive inventory in steam generators and secondary systems.
- 8) Few "wear-out" failures.

(Brunot testimony following Tr. 10595, p. 6-7).

70. Dr. Brunot also identified several items that could lead to increased risk at low power. Those items are:



- 1) Break-in failures.
- 2) Plant modifications (at the hearing Dr. Brunot revealed that subsequent to writing his prepared testimony he had established that this would not, in fact, be an item increasing risk. Tr. 10624).
- 3) Emergency plan arrangements.
- 4) Uncertainties in performance parameters for components and systems. (Id. at 8).

71. Governor Brown alleges that the reduction factors which were used for the analysis of Dr. Brunot and Mr. Lauben were based on extrapolations and assumptions which had not been analyzed for Diablo Canyon. (Governor Brown's Findings, p. 29). However, Mr. Lauben pointed out that this was not a concern due to the great similarity in the reactors from a technical standpoint. (Tr. pp. 11095-11096).

72. On the basis of the factors increasing and decreasing risk, Dr. Brunot concluded that the factors which decrease overall risk are much greater than those which may tend to increase risk during low power at Diablo Canyon. He also concluded that over-all risk of events leading to accidental releases, as well as the quantity of radioactive materials involved in such releases, is greatly reduced at low power. (Id. at 9).

73. Dr. Brunot made some specific observations on the risk to the public associated with low power operation of Diablo Canyon. He noted that:

- 1) Any estimate of risk of exposure to any member of the public, whether characterized by an estimated exposure or by a probability or frequency of receiving exposure, at any distance away from the reactor, is directly proportional to the core inventory of the isotopes which could contribute to that exposure;

- 2) Since the establishment of emergency planning zones, evacuation and sheltering distances, etc. are based upon the selection of dose criteria and estimation of distances at which doses occur, the distances



of concern are greatly reduced regardless of whether other factors may also contribute to reduction of risk; and

3) Because the core inventories of significant isotope are a factor of 20 to 400 less for operation during low power tests, the distances at which any given exposure could occur are correspondingly lower. (Id. at 11). It was noted that Diablo Canyon has one of the most remote sites in the world and population exposure following any events at Diablo Canyon will be much lower than that at a densely populated site. (Id. at 14).

74. Dr. Brunot also testified that for low power any accident doses will fall well below the limits set by the regulations. He noted that no accidents of the severity considered in the FSAR, SER, Environmental Report, or Final Environmental Statements, if they occurred at low power, would be expected to require any protective actions to be taken outside the LPZ, on the basis of exposure predictions. (Id. at pp. 12-13).

75. Governor Brown makes a comparison in his findings which discusses the fission product inventory during low power, potential releases of the fission product material, and the 10 C.F.R. Part 100 limits on thyroid exposure. (Governor Brown's Findings, pp. 21-24). The Staff believes that an examination of that comparison reveals its invalidity for the purpose of determining the significance of emergency planning activities for low power.

76. Governor Brown's comparison assumes either 1% of the total fission product inventory in the core, or .1% of that inventory is released to the atmosphere. This assumption, without Governor Brown postulating any accident which could result in such a release, essentially assumes that the stated percentages of the core are released instantaneously into the



surrounding environment. It fails to explain not only how the given percentages of the core would be released from the core, but also fails to explain how the containment would be breached to cause the instantaneous exposure of the material to the atmosphere. The Staff would certainly not dispute that if you assume that a portion of the fission product inventory is immediately released to the environment without any effective containment, the percentages identified by Governor Brown are likely to exceed the Part 100 limits. However, the above assumptions used by Governor Brown are not those which the regulations indicate should be used in making a Part 100 analysis. 10 C.F.R. 100.11, footnote 1, specifically states that in using Part 100 the Applicant should assume a fission product release no greater than that which would be expected from any accident considered credible. In the hearing Dr. Brunot testified that the release rate for the design basis leak from the containment is .1% per day for the first 24 hours. (Tr. 10703).

Governor Brown and the Joint Intervenors presented no evidence to dispute that this was the correct design basis leak rate. Nevertheless, Governor Brown's analysis assumes a certain percentage of the core is suddenly outside the containment. It is this baseless assumption which makes the Governor's comparison of his figures to the Part 100 limits meaningless.

77. A comparison of the TMI accident to a similar accident at low power at Diablo Canyon was contained in Dr. Brunot's testimony. He concluded that an accident during low power operation at Diablo Canyon would have to be at least 100 times more severe than the TMI accident to cause a single potential cancer among the surrounding population. (Id. at 18.)



78. An accident during low power operation at Diablo Canyon would have to be at least 250 times more severe than the TMI accident to cause an individual exposure exceeding the EPA protective action guideline levels at the site boundry, and at least 10,000 times as severe as the TMI accident to cause an individual exposure exceeding the EPA protective action guidelines at the LPZ. (Id.).

79. An accident during low power operation at Diablo Canyon would have to be at least 6,000 times more severe than the TMI accident to cause an individual exposure large enough to show any detectable clinical effects on an individual at the site boundry; and at least 1,000 times as severe as TMI to cause a statistically detectable increase in the number of cancer deaths occurring in the population surrounding the plant. (Id.).

80. Dr. Brunot noted that for accidents well beyond the severity of TMI, all proposed protective action exposure guidelines will be easily met at the Diablo Canyon site for low power operation without any protective actions outside the LPZ distance. (Id.).

81. Dr. Brunot, based on the factors discussed in his testimony, concluded that emergency planning beyond the site boundry served little purpose for low power. (Id. at 21).

CONCLUSIONS OF LAW - EMERGENCY PLANNING

82. A number of interpretations of the regulations were put forth by the parties to the low power proceeding concerning the adequacy of Emergency Planning for the purposes of low power testing.

83. One interpretation of the regulations is that 10 C.F.R. § 50.57(c), which authorizes the granting of low power licenses, does not require



that the Board find offsite emergency plans meet all the requirements of 10 C.F.R. § 50.47 for low power operation. 10 C.F.R. § 50.57(c) states that a party has a right to be heard to the extent his contentions are "relevant to the activity to be authorized." The presiding officer is required to make finding only on matters which are both contained in 10 C.F.R. § 50.57(a) and which are properly in controversy. Therefore, under of 10 C.F.R. § 50.57(c), the Board need only rule as to those matters which are relevant to the activity to be authorized. In the present proceeding the Board would only have to rule as to those matters relevant to low power testing.

84. For all matters in § 50.57(a) which are not properly in controversy, the Director of Nuclear Reactor Regulation is the designee who is to make findings under § 50.57(c). As documented in SER Supplement No. 12, Staff Exhibit No. 23, pp. III-2 through III-3; the Office of Nuclear Reactor Regulation has granted the applicant an exemption from meeting the emergency planning provisions of NUREG-0737 which now appear in Appendix E of 10 C.F.R. Part 50. Thus, if the Board agrees that offsite emergency planning is not a relevant consideration for low power operation, the applicant, as far as emergency planning is concerned, will have met the requirements of 10 C.F.R. § 50.57(c).

85. Although it may not have been clear prior to the hearing, the evidence presented showed that offsite emergency planning is not relevant for low power testing. The testimony of Mr. Lauben and Dr. Brunot established that the risk of any offsite exposure requiring the operation of an offsite emergency plan is extremely remote. Due to this low risk,



offsite planning is irrelevant for fuel load and low power testing (the activity for which authorization is sought.) However, even though offsite planning is irrelevant for low power, Diablo Canyon does have offsite planning that can be effectively implemented during low power operation. As discussed above, procedures for notification and evacuation of the LPZ by the Sheriff are available in the extremely unlikely event of an accident during low power requiring such action. Agreements exist with medical facilities and ambulance services, with training continuing for personnel at these facilities. Under 10 C.F.R. § 50.57(c), therefore, this Board may rule that no determination of the adequacy of emergency planning need be made by the Licensing Board, but rather the low power license may be issued based on the finding of the Division of Nuclear Reactor Regulation that the emergency plan is adequate for low power testing. This finding is reinforced by the FEMA/NRC Steering Committee position that preexisting NRC approved plans are an adequate basis for authorizing low power testing. It is noteworthy that NUREG-0737 does not require a formal FEMA finding for low power operation. In fact, the Licensing Board took official notice of "SECY-81-188 - Emergency Preparedness" which clarified Enclosure 2 to NUREG-0737 by indicating that the upgrading of emergency plans to meet Appendix E, 10 C.F.R. § 50 need not be completed for fuel load, but rather must be completed for full power operation.

36. In Governor Brown's and Joint Intervenor's proposed findings they seem to raise as being important in their eyes the lack of any FEMA "finding". (Governor Brown's Findings, pp. 42-44, Joint Intervenor's Findings pp. 34-36). If Governor Brown and Joint Intervenor's are simply



arguing that there is no FEMA finding satisfying the 10 C.F.R. § 50.47(a) requirement, the Staff would agree. However, this misinterprets the importance of the FEMA/NRC Steering Committee Memorandum. The crucial importance of this document is that it shows both FEMA and NRC agree that a complete implementation of all emergency plans required for full power is not necessary for low power testing.

87. That a nuclear power plant should receive a license for low power testing while certain emergency planning deficiencies exist is neither a unique nor new occurrence. In fact, the majority of the facilities which have received low power authorization since TMI have had identified emergency planning deficiencies.^{4/} Those deficiencies included a lack of a fast alerting system and lack of an adequate public information program.^{5/} Thus, plants which had the same deficiencies emphasized as existing at Diablo Canyon were granted low power testing authorization. In fact, two of the 5 plants which have received low power authorization cited the NRC/FEMA Interim Agreement on Criteria for Low Power Testing

4/ Virginia Electric & Power Co., (North Anna, Unit 2), Low Power Authorization issued April 11, 1980; Public Service Electric and Gas Company, (Salem, Unit 2) Low Power Authorization issued April 11, 1980; TVA, (Sequoyah, Unit 1) Low Power Authorization issued February 29, 1980 and Alabama Power Company (Joseph M. Farley Nuclear Plant, Unit 2) Low Power Authorization issued October 23, 1980.

5/ Those deficiencies were identified in the Safety Evaluation Report Supplements as follows:

Sequoyah - SER Supp. No. 1, Part II, Section III B.

Salem - SER Supp. No. 4, Part II, Section III B.

North Anna - SER Supp. No. 10, Part II, Section III B.

Farley - SER Supp. No. 4, p. 110.



at New Commercial Nuclear Facilities (Governor Brown Exhibit 1) in the SER Supplement on which low power testing was based, as a supporting the Staff's position.^{6/} That same exhibit addresses Diablo Canyon and indicates that Diablo Canyon meets (the old) Appendix E to Part 50 and NRC Regulatory Guide 1.101. The document notes that compliance with (the old) Appendix E to part 50 and Reg. Guide 101 assures adequate protection of the public health and safety prior to low power testing. (Governor Brown Exhibit No. 1.)

88. It would, therefore, be perfectly consistent with the NRC licensing practice since TMI to grant Diablo Canyon a low power testing license even though some actions remain to be taken to meet NRC emergency planning regulations for full power.^{7/}

89. Governor Brown cites NUREG-0654 as establishing "under the NRC regulations" that the Staff must assume a core melt and containment failure for the purposes of emergency planning. (Gov. Brown's Findings pp. 18, 22). This statement misstates the effect of the cited language in two ways. First, the NUREG document does not have the effect of an NRC regulation. Governor Brown himself acknowledges the process by which

^{6/} See Salem SER Supp. No. 4, Part II, page III-8--4 and North Anna SER Supp. No. 10, Part II, page III-8-4.

^{7/} In at least one adjudicated proceeding a low power authorization was issued, even though there was an admitted emergency planning contention being litigated for full power. Philadelphia Electric Company (Peach Bottom Atomic Power Station, Units 2 and 3), 6 AEC 724 (1973).



regulations can be implemented or changed. (Id. p. 14). NUREG-0654 has not gone through that process to become a regulation. Secondly, the cited portion of the NUREG only indicates what is to be an initiating condition for emergency action. It does not indicate that the plans must be designed for this specific improbable occurrence. In fact, in the planning basis section of NUREG-0654 it is specifically noted that the time between the initial recognition at the nuclear facility that a serious accident is in progress and the beginning of the radioactive release to the surrounding environment is critical in determining the type of protective actions which are feasible"; and the NUREG notes that it did not attempt to define a single accident sequence or even a limited number of sequences as a planning basis. (NUREG-0654, p. 7).

90. Thus it is evident that NUREG-0654 does not contemplate the rigid design basis proposed by Governor Brown, but rather, it specifically recognizes the importance of the time to release of radioactivity (which has been emphasized by the Staff), as well as flexibility in determining which accidents to consider in emergency planning. Governor Brown also places great emphasis on the fact that PG&E's plan provides that emergency action will be initiated for an earthquake greater than the SSE. He argues that this should be a basis for an analysis for the emergency plan. (Governor Brown's Findings p. 70). However, no regulation requires the emergency plan to be measured against any earthquake greater than the SSE. And, in fact, this provision only appears to be a sensible statement of what would trigger the emergency plan in a very specific, extremely unlikely situation.



91. Even if the Board were to find the emergency planning question is relevant for low power testing, the applicant would still be entitled to a low power license. Under 10 C.F.R. § 50.12 the Commission may grant exemptions from the regulations where such exemptions will not endanger the life, property or the common defense and security of the public. Licensing Boards and the Commission itself have noted that this power may be exercised by the Director of Nuclear Reactor Regulation.^{8/} The exemption is to be granted upon a consideration of the following factors:

- 1) Adverse environmental impact, if any,
- 2) Whether redress of environmental impact can be reasonably achieved,
- 3) Whether conduct of exempt activities would foreclose adoption of alternatives, and
- 4) The effects of delay if exemption denied (10 C.F.R. § 50.12(b)).

92. In addition, the Director of the Division of Licensing, Office of Nuclear Reactor Regulation, noted in a letter attached to NUREG-0737 as p. vii-viii that relief from NUREG-0737 requirements could be granted upon request. The Applicant requested such relief from the emergency planning portions of Appendix E of 10 C.F.R. Part 50 which appear in NUREG-0737 as Items III.A.1.1 and III.A.2 of Enclosure 2. (Staff Exhibit No. 23, p.

^{8/} The Carolina Power and Light Co. (Shearon Harris Nuclear Power Plant, Units 1, 2, 3 and 4), CLI-74-9, 7 AEC 197 (1974); Southern California Edison Co., et. al. (San Onofre Nuclear Generating Station, Units 2 and 3), LBP-77-35, 5 NRC 1290 (1977); and the Carolina Power and Light Co. (Shearon Harris Nuclear Power Plant, Units 1, 2, 3 and 4) LBP-74-18, 7 AEC 538, 553 (1979).



III-2). The Office of Nuclear Reactor Regulation has granted that request. (Id. p. III-3). The facts presented at the hearing demonstrate the remote risk to the environment and public safety from low power operation without complete implementation of emergency plans, and, balanced against the benefits to be gained by avoiding delay, demonstrated the correctness of the granting of the exemption from the NUREG-0737 requirements. In view of that exemption, the Board clearly can make the finding for 10 C.F.R. § 50.57(a) that Diablo Canyon Nuclear Facility has been constructed and will operate in accordance with the Commission's rules and regulations. Thus, for emergency planning, the Board has competent evidence before it to make all the required findings for 10 C.F.R. § 50.57(a) and may authorize the issuance of the low power license.

93. Finally, even if the above exemption had not been granted, a fuel load and low power license could be granted under the provisions of 10 C.F.R. § 50.47(c). The Joint Intervenors and Governor Brown argue that a low power license can not be granted unless the applicant meets each of the requirements of 10 C.F.R. § 50.47(b). However, 10 C.F.R. § 50.47(c)(1) specifically states that:

Failure to meet the standards set forth in paragraph (b) of this subsection may result in the Commission declining to issue an Operating License; however, the applicant will have an opportunity to demonstrate to the satisfaction of the Commission that deficiencies in the 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. [emphasis added].

94. The evidence presented during the hearing demonstrates that the standard for an exception under 10 C.F.R. § 50.47(c) is met. In view of



the testimony on the extremely low risk during low power, it is evident that the deficiencies in emergency planning are not significant for low power testing at Diablo Canyon. This is particularly true considering the many features of the offsite plan which will be available for low power, such as the Sheriff's evacuation plan, the radiation monitoring systems, and various medical and emergency facilities.

95. Contrary to Governor Brown's assertion that the measure of whether a 50.47(c) exemption should be granted is the consequences of the accident, 50.47(c) makes no mention of "consequences". (Governor Brown's Findings, pp. 18-19). In fact, contrary to Governor Brown's numerous statements that the low risk of occurrence of an accident is not a proper concern when considering emergency plans, the Commission has in an analogous situation, specifically noted in an Interim Policy Statement which became effective on June 13, 1980, 45 Fed. Reg. 40101, 40103 (June 13, 1980) that both the probability of occurrence and consequence of accidents were appropriate considerations. (Governor Brown's Findings pp. 16,17,19,22,23,24,26,27, and 33).

96. The language of 10 C.F.R. § 50.47(c) makes it clear that the regulations contemplate authorizing plant operations without absolute compliance with 10 C.F.R. § 50.47(b) requirements. During the hearing deficiencies in the emergency plan were identified pursuant to § 50.47(b), but this is not significant since no party contended that Diablo Canyon did meet all of the 15 requirements. In fact, no one disputed the accuracy of Joint Intervenor's Exhibit 111 and the deficiencies it identifies. It is significant that the Joint Intervenors and Governor Brown presented no witnesses to rebut the testimony of Dr.



Brunot and Mr. Lauben that the risk is so low as to make all offsite emergency planning deficiencies insignificant for low power operation.

97. The lack of a formal finding by FEMA on the Diablo Canyon Emergency plan does not prevent a finding of compliance with 10 C.F.R. § 50.47 for low power testing. Under 10 C.F.R. § 50.47(a) the FEMA findings on the state and local emergency plans constitute a rebuttal presumption. Since the plans would be reviewed to the standards in 10 C.F.R. § 50.47(b), any inadequacy identified by FEMA would be in terms of deficiencies in meeting those standards. In the hearing the deficiencies in Diablo Canyon's Emergency plans were identified. This is no more than a FEMA finding would have accomplished. If, under 10 C.F.R. § 50.47(c), this Board finds the deficiencies in meeting 10 C.F.R. § 50.47(b) requirements are insignificant for low power, the Applicants will have, in effect, met the rebuttable presumption any FEMA finding would create.

98. Governor Brown's counsel has totally misconstrued the effect of SECY-81-188 on the argument under 10 C.F.R. § 50.47(c). The Staff in no way alleges that a SECY paper may change or amend 10 C.F.R. § 50.47. What that paper does, by indicating that all emergency planning requirements of NUREG-0737 need not be met until full power, is provide conclusive evidence to refute Joint Intervenors and Governor Brown's apparent assertion that any deficiency is significant. SECY-81-188 does provide evidence that deficiencies in emergency plans may be insignificant for low power.

99. Similarly, Governor Brown has misconstrued the effect of the risk testimony on 10 C.F.R. § 50.47(c). That testimony does not go to showing that 10 C.F.R. § 50.47 need not be complied with, but rather provides the



very evidence that 10 C.F.R. § 50.47 is complied with. It is this testimony, among other evidence discussed above, which demonstrates the insignificance of any remaining deficiencies at Diablo Canyon, thus fulfilling the requirements of 10 C.F.R. § 50.47(c) for an exemption from literal compliance with 10 C.F.R. § 50.47(b).

100. Therefore under 10 C.F.R. § 50.47(c)(1), the low power test authorization is appropriate for Diablo Canyon despite some deficiencies in meeting the requirements of 10 C.F.R. § 50.47(b).

101. Governor Brown and Joint Intervenors cite numerous portions of the Kemeny Commission Report, the Rogovin Report and the Senate Report accompanying the 1980 NRC Appropriations Act, as supporting their theories on emergency planning at Diablo Canyon. (Gov. Brown's Findings pp. 17,18,64-65; Joint Intervenors findings pp. 6-7,17-20,24,32,34,40, 45,47,48,49,52). However, all of these documents dealt with the TMI accident which occurred at full power. Failing to specifically discuss the effects of TMI on low power operation and emergency planning for low power operation, these reports are not probative for the contentions in this proceeding, which address low power.

102. PG&E further argues the insignificance of emergency planning by focusing on 10 C.F.R. § 50.57(c)(2). That subsection provides that the EPZ may be determined on a case by case basis for plants which operate at less than 250 MW. At 5% power Diablo Canyon will be operating at less than 250 MW. PG&E, therefore, maintains that the emergency plan need only cover a much smaller area for low power testing. The importance of this provision is not that it established an additional set of requirements which the plan must meet because it will be operating at



less than 250 MW. In fact, the regulation refers to plants which are designed to operate at the lower power levels. It's significance lies in it's implicit recognition that the risk that is present from operation of the nuclear plant does have an effect on the emergency planning that is necessary. As testified to by Mr. Lauben, the Diablo Canyon plant was designed to operate at power levels far above 250 MW and thus it contains far greater safeguards than would be present in a plant which was originally designed to operate at 250 MW or below. The conclusion which can be reached from this is, if the regulations require a smaller LPZ for plants designed solely for low power operation, a plant operating at low power which was designed for full power is of even less concern for the purposes of emergency planning. Thus, this is further evidence that the deficiencies in the Diablo Canyon emergency plan as regards full power, are insignificant for low power testing and an exemption under 10 C.F.R. § 50.47(c) is appropriate.

FINDINGS OF FACT - CONTENTION 24

103. Contention 24 reads:

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.

104. The Board accepted this contention in its prehearing conference order of February 13, 1981 only to the extent it addressed the issue of when the testing of the block valves must be completed. In the April 30, 1981 Memorandum and Order (Granting PG&E's and NRC Staff Motions for



Summary Disposition of Joint Intervenors' Contentions 5 and 13; Denying their motions as to Contentions 4 and 24), the Board put the parties on notice that it was not appropriate in this proceeding to go beyond the Contention to attack the EPRI testing program itself. Joint Intervenors nevertheless appear to have made such an argument. (Joint Intervenor's Findings, p. 61, items 4 and 5). The Staff believes such assertions go beyond the admitted contention and should not be considered by the Board. The Board did indicate that the significance of some block valve failures during EPRI testing might be addressed by the parties.

105. Candee L. Gottshall, Richard A. Muench, John L. Carey and Thomas E. Auble presented testimony on this contention on behalf of PGandE. Frank C. Cherny presented testimony on behalf of the NRC Staff. Joint Intervenors and Governor Brown did not present any direct testimony on this contention.

106. In Diablo Canyon's reactor coolant systems the pressurizer of each unit is equipped with three Masoneilan 20,000 Series (2NPS) power operated relief valves (PORVs), three Crosby HB-BP-86 (6M6) safety valves and three Velan #B10-3054B013M block valves (Cherny Testimony following Tr. 11216, p. 10 and Muench-Gottshall Testimony following Tr. 11157, pp.1, 3 and 5).

107. The PORVs are designed to be the first valves to respond to relieve steam to limit the maximum pressure in the reactor coolant system during full load rejection transients without reactor trip. The PORVs are the first valves to respond because the set point for the PORVs is lower than the set point for the safety valves. Under normal conditions, the PORVs remain closed. (Muench-Gottshall Testimony following Tr. 11157, p.



3 and Tr. 11174). The safety valves also remain closed under normal operating conditions. If the PORVs function as designed, the safety valves will not open. However, if the safety valves were required the capacity of two safety valves is sufficient to mitigate system over-pressure; the capacity of the third safety valve provides redundancy. (Id., p. 1). Upstream of the PORVs are the block valves which are provided to isolate the inlets of the PORVs for maintenance and testing. (Id., p.5).

108. Candee L. Gottshall and Richard A. Muench from Westinghouse testified on the reliability of the original design and testing of safety valves, relief valves and block valves at Diablo Canyon. The three types of valves were designed in accordance with USAS-816.5-1968, Steel Pipe Flanges and Flange Fittings. (Id., p. 2, 4 and 6). In the case of the safety valves, they were also designed to meet the requirements of the ASME Boiler and Pressure Vessel Code, Section III. (Id., p. 1-2). Additionally, the safety valves, relief valves and block valves were qualified to withstand seismic loadings equivalent to 3.0g in the horizontal direction and 2.0g in the vertical direction and to withstand loading due to the Hosgri seismic event accelerations in addition to normal operating and deadweight loads. Prior to shipment to the Diablo Canyon plant, the three types of valves successfully completed liquid penetrant inspection and a hydrostatic test. (Id., p. 2, 4 and 6). Safety valves of the same design as Diablo Canyon were successfully pressure tested at Pacific Gas and Electric's Contra Costa plant in a configuration that was representative of the actual Diablo Canyon plant configuration. (Id., p. 2). After the relief valves were installed at



Diablo Canyon, the relief valves were successfully tested during hot functional testing. (Id., p. 5).

109. Westinghouse conducted a survey on the failure rate of the Diablo Canyon type of safety, relief and block valves and found there have been no known failures for the three types of valves during actual operation in U.S. Westinghouse designed nuclear power plants. (Id., p. 3, 5 and 6). With regard to evaluating a postulated valve failure, Westinghouse performed an analysis which assumed all three PORVs failed to open and another analysis which assumed all three safety valves stuck open. In both cases, it was found no core uncover would be expected. (Id., p. 7 and 8). Therefore, if either the safety, or relief and block valves failed to close the public health and safety would not be endangered. (Id., p. 8).

110. NRC Staff witness Frank Cherny presented testimony on the safety standards for the PORVs, safety valves and block valves. PORVs and safety valves must comply with General Design Criteria 1, 14, 15 and 30. In reviewing for compliance with the criteria, the NRC Staff used the following standards: (a) Standard Review Plan (SRP) 3.9.2 "Dynamic Testing and Analyses of Systems, Components, and Equipment;" (b) SRP 3.9.3 "ASME Code Class 1, 2 and 3 Components, Component Supports, and Core Support Structures;" (c) Regulatory Guide 1.48 "Design Limits and Loading Combinations for Seismic Category 1 Fluid Systems Components;" and (d) Regulatory Guide 1.68 "Pre-operational and Initial Startup Test Programs for Water Cooled Power Reactors." (Cherny Testimony following T.R. 11216, p. 3). The NRC Staff has found that the Applicant has demonstrated compliance with GDC 1, 14, 15 and 30 except for qualifying



the PORV and safety valves with respect to loadings which result from transition flow from steam to water or solid fluid flow. (Id., p. 6 and 7).

111. In response to the requirements in Item II.D.1 of NUREG-0737, a test program to cover loadings which result from transition flow from steam to water and solid fluid flow for PORV and safety valves has been developed by the Electric Power Research Institute (EPRI) and was submitted to the NRC on December 17, 1979. A revised version with modifications was submitted on July 8, 1980. (Id., p. 6 and Carey-Auble Testimony following Tr. 11159, p. 1 and 2).

112. John J. Carey and Thomas E. Auble were PG&E's witnesses who participated in developing the EPRI test program. They explained the status of the on-going testing. A Masoneilan Model No. 20,000 PORV and a Crosby HB-BP-86 (6M6) safety valve which are representative of the PORVs and safety valves at Diablo Canyon were selected for testing. (Carey-Auble Testimony following T.R. 11159, p. 3 and 4). The test conditions for these valves include steam, subcooled water, water seal, and steam to water transition discharge conditions. (Id., p. 4). EPRI testing has not been fully completed on the PORVs and safety valves. However, the PORVs have successfully passed the steam tests that have been performed. (Id. p. 6). The remainder of the test program for the PORV and the safety valves at Diablo Canyon is presently scheduled to be completed by July 1, 1981. (Id. p. 2 and 3).

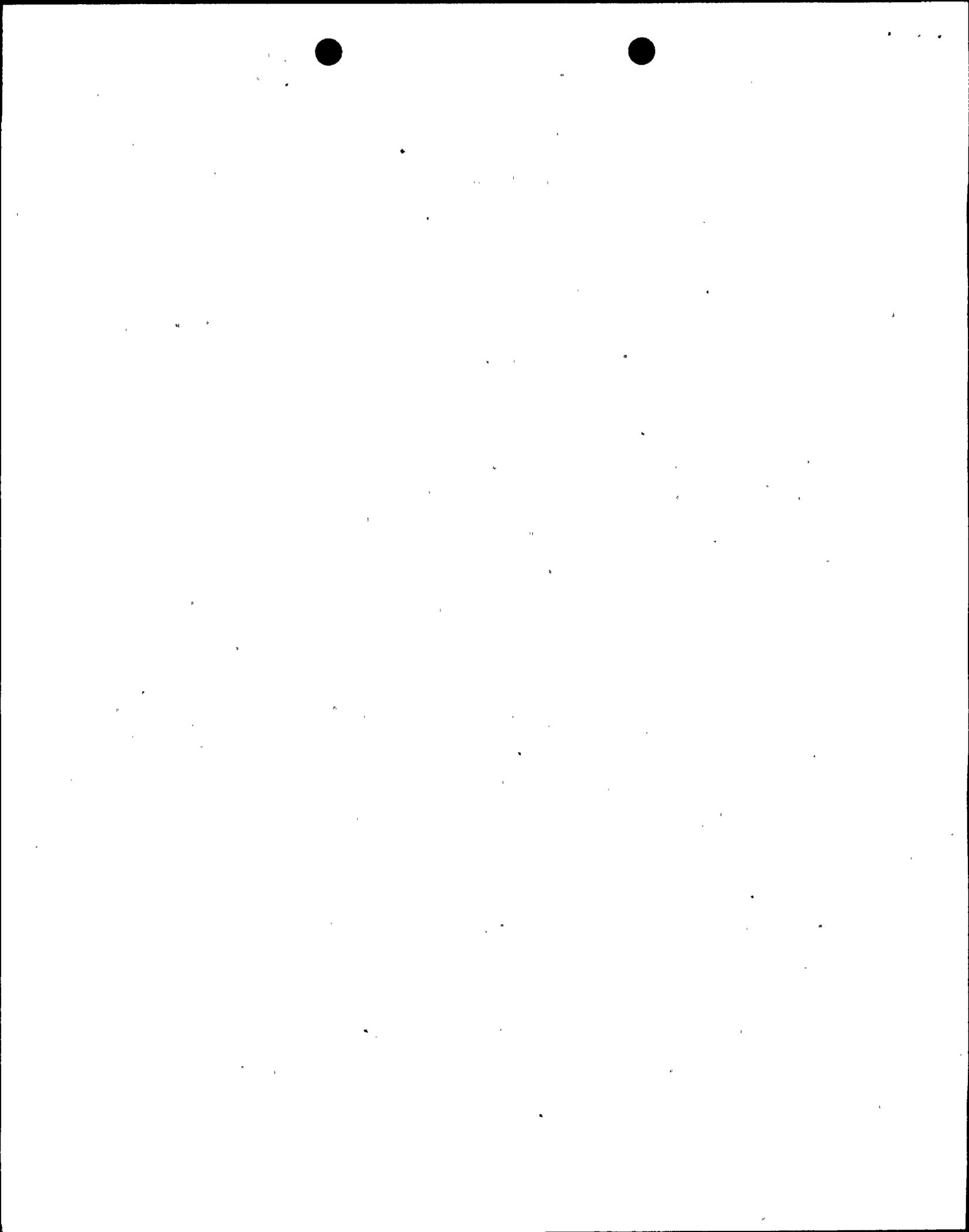
113. The EPRI panel noted that, although not part of the EPRI test program scope, seven PORV block valves were preliminarily steam tested. Among those seven valves was the block valve type and model used in the



Diablo Canyon Plant. (Id., p. 7). Although three of the block valves tested failed to fully close, those block valve models are not utilized as block valves in the Diablo Canyon Nuclear Power Plant. Therefore, the Diablo Canyon block valve models successfully completed the preliminary test. (Id. p. 7 and 8). In his findings of fact the Governor states that the block valves which were tested during the EPRI program were tested at relatively low pressure. (Governor Brown's Findings, p. 76). However, the testimony at the hearing was that the block valves were tested at the Marshall facility and that the pressure used for steam conditions at that facility was 2400 psi. (Tr. 11228 and 11232). The Staff finds nothing in the evidence presented at the hearing, nor in the pages cited by Governor Brown, to justify calling this "relatively low pressure conditions."

114. The testimony in this proceeding indicated the Staff's belief that the EPRI program, upon proper documentation, will meet the requirements of NUREG-0737 as it addressed relief and safety valve testing. (Cherny Testimony following Tr. 11216 p. 6).

115. In the event there is a failure of either the relief or safety valves during the remainder of the EPRI program, the necessary corrective actions will be ordered by the NRC. (Id. p. 6). At the present time it is not clear what, if any, additional block valve testing will be required to meet Item II.D.1 of NUREG-0737. Although Governor Brown asserted that the block valve testing to date did not envelope water and transition flow (Governor Brown's Findings, p. 77), Mr. Cherny noted that it is possible that the testing completed to date on block valves may envelope the conditions of concern. (Id., p. 12-13, T.R. 11237).



116. Governor Brown asserts in his findings of fact that the valves involved in this proceeding are the valves which were associated with the LOCA at TMI. (Governor Brown's Findings p. 77). However, the TMI accident in no way was associated with the failure of block valves. (Rogovin Report, Joint Intervenors Exhibit 115, p. 14-15, Kemeny Report, Joint Intervenors Exhibit 114, p. 27).

117. NRC Staff witness Norman Lauben who testified on the low risk associated with low power operation also pointed out that the safety significance of block valve failure during low power is negligible. This is due to the fact that if the relief valves are not challenged the block valve position has no significance. The only condition causing such a challenge are transients involving loss of feedwater which are not of particular concern for low power as detailed in the discussion of risk during low power testing presented above. Even if both the relief valve and block valve stuck open, this would only amount to a small LOCA which is not a significant concern at low power. (See pp. 17-19 above). In fact, it would be a smaller LOCA than the one used in the analysis of risk reduction for small break LOCAs discussed previously in these findings. (Lauben Testimony following Tr. 11014, p. 10).

118. Accordingly, after considering all of the evidence above in evaluating the reliability of the Diablo Canyon reactor coolant system valves for low power operation, and in particular the following factors: the design of the valves, factor testing, seismic qualification, postulated valve failure, compliance with GDC 1,14,15 and 30, the safety and relief valves qualification by the EPRI test program prior to fuel load, and the safety significance of the block valve during low-power operation, it can



be concluded that fuel loading and low power testing can commence at Diablo Canyon with no adverse affect on the health and safety of the public, prior to any additional testing of the relief, safety and block valves.

CONCLUSIONS OF LAW - BLOCK VALVES

119. The Licensing Board, in their prehearing conference order of February 13, 1981, admitted the contention on valves only to the extent that the Joint Intervenors and Governor Brown wished to argue that the testing program must be completed prior to fuel load. This interpretation of the contention was reinforced by the Licensing Board in their Memorandum and Order of April 30, 1981 which denied Summary disposition of the valve contention. In that order, however, the Board did express some concern over the significance of the failure of 3 block valves during the EPRI testing program.

120. Under NUREG-0737, Subsection II.D.1, the testing of relief and safety valves must be completed by July 1, 1981 and testing of block valves must be completed by July 1, 1982. Joint Intervenors essentially argue that all the testing programs must be completed prior to fuel load and low power testing of the Diablo Canyon Nuclear Power Plant.

121. As discussed above, the testing of relief and safety valves will be completed by July 1, 1981, which will predate the fuel load at Diablo Canyon. Thus, the only remaining issue under Contention 24 is whether the block valve testing should also predate fuel loading. The evidence discussed above presents no basis for requiring a testing program be conducted for block valves other than on the schedule provided in NUREG-0737.



122. The reliability of the relief and safety valves, demonstrated through design and testing, and which will be supplemented by further testing prior to July 1, 1981, demonstrates there is little risk of their failure, resulting in a challenge to the block valves, during low power testing.

123. The test in which 3 block valves failed only serves to reinforce the unnecessary of altering NUREG-0737 compliance dates. Not only were the 3 valves which failed not of the type used at Diablo Canyon, but the block valve which will be used at Diablo Canyon passed those tests. As noted in the findings of fact, it is possible the testing of the block valves which has already taken place envelopes the conditions of concern and no further testing will be required.

124. Finally, the consequence of failure of the block valve during low power testing was shown to be a manageable event in terms of both reaction time and consequences.

125. In sum, the total of evidence presented failed to show any urgency requiring the Licensing Board to change the requirements of NUREG-0737.

CONCLUSION

126. Based on the discussion above, the Staff maintains that Joint Intervenors Contention 4 and 24 do not present issues which would justify denying the application of PG&E for fuel load and low power testing at Diablo Canyon Nuclear Power Facility.

The NRC Staff, therefore, urges the Board to find as follows:

A. The application for a license filed by Pacific Gas and Electric (PG&E) complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's regulations set



forth in 10 C.F.R. Chapter I, and all required notifications to other agencies or bodies have been duly made;

B. Construction of Diablo Canyon, Unit 1 (the facility), has been substantially completed in conformity with the construction permit and the application, as amended, the provisions of the Act and the regulations of the Commission;

C. The facility will operate in conformity with the application, as amended, the provisions of the Act, and the regulations of the Commission;

D. There is reasonable assurance: (i) that the activities authorized by this 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 set forth in 10 C.F.R. Chapter I;

E. The Pacific Gas and Electric Company is technically and financially qualified to engage in the activities authorized by this license in accordance with the Commission's regulations set forth in 10 C.F.R. Chapter I;

F. The Pacific Gas and Electric Company has satisfied the applicable provisions of 10 C.F.R. Part 140 "Financial Protection Requirements and Indemnity Agreements", of the Commission's regulations;

G. The issuance of this license will not be inimical to the common defense and security or to the health and safety of the public;

H. After weighing the environmental, economic, technical, and other benefits of the facility against environmental and other costs and considering available alternatives, the issuance of the License, subject



to the conditions for protection of the environment set forth in the Environmental Protection Plan, is in accordance with 10 C.F.R. Part 50, Appendix D, of the Commission's regulations and all applicable requirements have been satisfied; and

I. The receipt, possession, and use of source, byproduct and special nuclear material as authorized by this license will be in accordance with the Commission's regulations in 10 C.F.R. Parts 30, 40, and 70.

128. The Board should, therefore order 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. [Joint Intervenors Exhibit 113.]

129. In addition, 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 the Board's 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 the Initial Decision should be filed by any party within 10 days after the service of this Initial Decision. A



brief in support of the exceptions should be filed within 30 days thereafter (40 days in the case of the Staff).

Respectfully submitted,

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Dated at Bethesda, Maryland
this 22nd day of June, 1981.



UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of

PACIFIC GAS AND ELECTRIC COMPANY
(Diablo Canyon Nuclear Power Plant
Unit Nos. 1 and 2

Docket Nos. 50-275 O.L.
50-323 O.L.

CERTIFICATE OF SERVICE

I hereby certify that copies of PROPOSED FINDINGS OF FACT AND CONCLUSIONS OF LAW in the above-captioned proceeding have been served on the following by deposit in the United States mail, first class or as indicated by an asterisk, through deposit in the Nuclear Regulatory Commission's internal mail system, this 22nd day of June, 1981.

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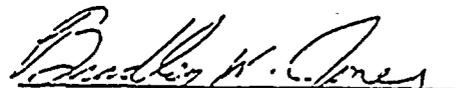
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