

ORIGINAL

RELATED CORRESPONDENCE

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USNRC

UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

'83 SEP 21 12:21

BEFORE THE ATOMIC SAFETY AND LICENSING APPEAL BOARD

In the Matter of	)	
PACIFIC GAS AND ELECTRIC COMPANY	)	Docket Nos. 50-275
(Diablo Canyon Nuclear Power	)	50-323
Plant, Units No. 1 and 2)	)	(Reopened Hearing --
	)	Design Quality
	)	Assurance)

LICENSEE PACIFIC GAS AND ELECTRIC COMPANY'S  
ANSWERS TO  
GOVERNOR DEUKMEJIAN'S THIRD SET OF INTERROGATORIES  
AND SECOND DOCUMENT PRODUCTION REQUEST

INTERROGATORY NO. 1:

With respect to contention 1(a), do you deny that the scope of the IDVP review of both the seismic and non-seismic aspects of the designs of safety-related systems, structures and components was too narrow in that the IDVP did not verify samples from each design activity (seismic and non-seismic)?

DS03

1     RESPONSE TO INTERROGATORY NO. 1:

2             While it is unclear what the Governor or Joint  
3     Intervenors mean by "design activity," it is Licensee's  
4     opinion that the IDVP's review was not too narrow in any  
5     sense.

6     INTERROGATORY NO. 2:

7             If your answer to the preceding interrogatory is a  
8     denial of the contention stated therein:

- 9     (a) Please state each and every fact on which you rely in  
10     support of your denial.
- 11    (b) Please identify each and every document on which you  
12     rely in support of your denial.
- 13    (c) Please identify each and every document known to you or  
14     believed by you to contain facts or allegations that  
15     contradict, are inconsistent with, or tend to cast  
16     doubt upon the validity of your denial or upon those  
17     facts on which you base your denial.
- 18    (d) Please identify each and every person you intend to  
19     call as a witness whom you expect to testify concerning  
20     your denial of this contention or the facts on which  
21     you rely in support of the denial of this contention.

22     RESPONSE TO INTERROGATORY NO. 2

- 23    (a) The scope of the IDVP review was adequate to give  
24     reasonable assurances that the design of the Diablo  
25     Canyon Nuclear Power Plant meets licensing criteria and  
26     licensing commitments.

1 (b) All of our exhibits.

2 (c) Other than the contentions of the Governor and the  
3 Joint Intervenors, none.

4 (d) Potential PGandE witnesses:

5 Richard C. Anderson  
6 Dr. William H. White  
7 Gary H. Moore  
8 Larry E. Shipley  
9 Steve M. Skidmore  
10 Richard D. Etzler  
11 John B. Hoch  
12 Michael R. Tresler  
13 Greg V. Cranston  
14 Charles W. Dick  
15 Mike J. Jacobson  
16 Thomas G. De Uriarte  
17 John M. Amaral  
18 Dr. Harry Seed  
19 Dr. Lincoln E. Malik  
20 Bimal Sarkar  
21 John K. McCall  
22 Pat Chang-Lo  
23 Neil J. Tuholski  
24 Ed R. Kahler  
25 Dr. Stanley Kaplan

16 Other potential witnesses:

17 Westinghouse: Ed Kregg, Bob Wiseman  
18 IDVP witnesses

19 INTERROGATORY NO. 3:

20 With respect to contention 1(b), do you deny that  
21 the scope of the IDVP review of both the seismic and  
22 non-seismic aspects of the designs of safety-related  
23 systems, structures and components was too narrow in that  
24 the IDVP did not verify samples from each of the design  
25 groups in the design chain performing the design activity?

26 ///

1     RESPONSE TO INTERROGATORY NO. 3:

2             While it is unclear what the Governor or Joint  
3     Intervenors mean by "design chain" or "design group," it is  
4     the opinion of Licensee that the scope of the IDVP's review  
5     was not too narrow in any sense.

6     INTERROGATORY NO. 4:

7             If your answer to the preceding interrogatory is a  
8     denial of the contention stated therein:

- 9     (a) Please state each and every fact on which you rely in  
10     support of your denial.
- 11     (b) Please identify each and every document on which you  
12     rely in support of your denial.
- 13     (c) Please identify each and every document known to you or  
14     believed by you to contain facts or allegations that  
15     contradict, are inconsistent with, or tend to cast  
16     doubt upon the validity of your denial or upon those  
17     facts on which you base your denial.
- 18     (d) Please identify each and every person you intend to  
19     call as a witness whom you expect to testify concerning  
20     your denial of this contention or the facts on which  
21     you rely in support of the denial of this contention.

22     RESPONSE TO INTERROGATORY NO. 4:

- 23     (a) See answer to 2(a).
- 24     (b) All of our exhibits.
- 25     (c) See answer to 2(c).
- 26     (d) See answer to 2(d).



1 INTERROGATORY NO. 5:

2 With respect to contention 1(c), do you deny that  
3 the scope of the IDVP review of both the seismic and  
4 non-seismic aspects of the designs of safety-related  
5 systems, structures and components was too narrow in that  
6 the IDVP did not have statistically valid samples from which  
7 to draw conclusions?

8 RESPONSE TO INTERROGATORY NO. 5:

9 Yes.

10 INTERROGATORY NO. 6:

11 If your answer to the preceding interrogatory is a  
12 denial of the contention stated therein:

- 13 (a) Please state each and every fact on which you rely in  
14 support of your denial.
- 15 (b) Please identify each and every document on which you  
16 rely in support of your denial.
- 17 (c) Please identify each and every document known to you or  
18 believed by you to contain facts or allegations that  
19 contradict, are inconsistent with, or tend to cast  
20 doubt upon the validity of your denial or upon those  
21 facts on which you base your denial.
- 22 (d) Please identify each and every person you intend to  
23 call as a witness whom you expect to testify concerning  
24 your denial of this contention or the facts on which  
25 you rely in support of the denial of this contention.

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1     RESPONSE TO INTERROGATORY NO. 6:

2     (a) The selection of samples is discussed in the IDVP  
3         Program Management plans for Phase I and Phase II and  
4         in the IDVP Final Report. The samples for review were  
5         selected using engineering judgment based on detailed  
6         knowledge of the systems, structures, and components  
7         along with an understanding of interfaces between  
8         disciplines and contractors. This approach to sample  
9         selection is more appropriate and more effective than a  
10        purely statistical sample selection. Further dis-  
11        cussion on the applicability of statistics will be  
12        given in the Testimony of Dr. Stanley Kaplan to be  
13        filed on October 8. Dr. Kaplan's testimony will  
14        discuss the inappropriateness of a statistical approach  
15        to the sample selection as well as some discussion on  
16        possible use of statistics in evaluating the present  
17        verification program results. Dr. Kaplan's work in  
18        preparation of testimony has not been completed at this  
19        time.

20     (b) Program Management Plans for Phase I and Phase II; IDVP  
21         Final Report.

22     (c) See answers to 2(c).

23     (d) Stanley Kaplan

24         R. C. Anderson

25         W. H. White

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1 INTERROGATORY NO. 7:

2 With respect to contention 1(d), do you deny that  
3 the scope of the IDVP review of both the seismic and  
4 non-seismic aspects of the designs of safety-related  
5 systems, structures and components was too narrow in that  
6 the IDVP failed to verify independently the analyses but  
7 merely checked data of inputs to models used by PGandE?

8 RESPONSE TO INTERROGATORY NO. 7:

9 Yes.

10 INTERROGATORY NO. 8:

11 If your answer to the preceding interrogatory is a  
12 denial of the contention stated therein:

- 13 (a) Please state each and every fact on which you rely in  
14 support of your denial.
- 15 (b) Please identify each and every document on which you  
16 rely in support of your denial.
- 17 (c) Please identify each and every document known to you or  
18 believed by you to contain facts or allegations that  
19 contradict, are inconsistent with, or tend to cast  
20 doubt upon the validity of your denial or upon those  
21 facts on which you base your denial.
- 22 (d) Please identify each and every person you intend to  
23 call as a witness whom you expect to testify concerning  
24 your denial of this contention or the facts on which  
25 you rely in support of the denial of this contention.

26 ///

1 RESPONSE TO INTERROGATORY NO. 8:

2 (a) The IDVP did independently verify analyses, models and  
3 the like. Therefore, the premise of the contention is  
4 false.

5 (b) See answer to 2(b).

6 (c) See answer to 2(c).

7 (d) See answer to 2(d).

8 INTERROGATORY NO. 9:

9 With respect to contention 1(e), do you deny that  
10 the scope of the IDVP review of both the seismic and  
11 non-seismic aspects of the designs of safety-related  
12 systems, structures and components was too narrow in that  
13 the IDVP failed to verify the design of Unit 2?

14 RESPONSE TO INTERROGATORY NO. 9:

15 Yes.

16 INTERROGATORY NO. 10:

17 If your answer to the preceding interrogatory is a  
18 denial of the contention stated therein:

19 (a) Please state each and every fact on which you rely in  
20 support of your denial.

21 (b) Please identify each and every document on which you  
22 rely in support of your denial.

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25 ///

26

1 (c) Please identify each and every document known to you or  
2 believed by you to contain facts or allegations that  
3 contradict, are inconsistent with, or tend to cast  
4 doubt upon the validity of your denial or upon those  
5 facts on which you base your denial.

6 (d) Please identify each and every person you intend to  
7 call as a witness whom you expect to testify concerning  
8 your denial of this contention or the facts on which  
9 you rely in support of the denial of this contention.

10 RESPONSE TO INTERROGATORY NO. 10:

11 (a) The scope of the IDVP is consistent with the orders of  
12 the Commission.

13 (b) All our exhibits, Commission order (CLI-81-30),  
14 Secy-82-89; Memorandum of Commission Secretary dated  
15 March 8, 1982 (M820304A); Secy 82-414; and Memorandum  
16 of Commission Secretary dated December 9, 1982  
17 (M821208A).

18 (c) See answer to 2(c).

19 (d) See answer to 2(d).

20 INTERROGATORY NO. 11:

21 With respect to contention 2(a), do you deny that  
22 the scope of the ITP review of both the seismic and  
23 non-seismic aspects of the designs of safety-related  
24 systems, structures and components was too narrow in that  
25 the ITP did not verify samples from each design activity  
26 (seismic and non-seismic)?

1     RESPONSE TO INTERROGATORY NO. 11:

2             Yes.

3     INTERROGATORY NO. 12:

4             If your answer to the preceding interrogatory is a  
5     denial of the contention stated therein:

- 6     (a) Please state each and every fact on which you rely in  
7         support of your denial.
- 8     (b) Please identify each and every document on which you  
9         rely in support of your denial.
- 10    (c) Please identify each and every document known to you or  
11         believed by you to contain facts or allegations that  
12         contradict, are inconsistent with, or tend to cast  
13         doubt upon the validity of your denial or upon those  
14         facts on which you base your denial.
- 15    (d) Please identify each and every person you intend to  
16         call as a witness whom you expect to testify concerning  
17         your denial of this contention or the facts on which  
18         you rely in support of the denial of this contention.

19    RESPONSE TO INTERROGATORY NO. 12:

- 20    (a) The scope of the ITP review was adequate to give  
21         reasonable assurances that the design of Diablo Canyon  
22         Nuclear Power Plant meets the licensing criteria and  
23         licensing commitments.
- 24    (b) DCP final report and all documents referenced therein;  
25         reference 6, Attachment A.
- 26    (c) See answer to 2(c).



1 (d) See answer to 2(d).

2 INTERROGATORY NO. 13:

3 With respect to contention 2(b), do you deny that  
4 the scope of the ITP review of both the seismic and  
5 non-seismic aspects of the designs of safety-related  
6 systems, structures and components was too narrow in that  
7 the design activities the ITP did review, it did not verify  
8 samples from each of the design groups in the design chain  
9 performing the design activity?

10 RESPONSE TO INTERROGATORY NO. 13:

11 While the Licensee is unsure what the Governor or  
12 Joint Intervenors mean by "sample from . . . design groups  
13 in the design chain," it is Licensee's opinion that the  
14 review by the ITP was not too narrow in any sense.

15 INTERROGATORY NO. 14:

16 If your answer to the preceding interrogatory is a  
17 denial of the contention stated therein:

- 18 (a) Please state each and every fact on which you rely in  
19 support of your denial.
- 20 (b) Please identify each and every document on which you  
21 rely in support of your denial.
- 22 (c) Please identify each and every document known to you or  
23 believed by you to contain facts or allegations that  
24 contradict, are inconsistent with, or tend to cast  
25 doubt upon the validity of your denial or upon those  
26 facts on which you base your denial.

1 (d) Please identify each and every person you intend to  
2 call as a witness whom you expect to testify concerning  
3 your denial of this contention or the facts on which  
4 you rely in support of the denial of this contention.

5 RESPONSE TO INTERROGATORY NO. 14:

6 (a) The review of the ITP provides reasonable assurances  
7 that the Diablo Canyon Nuclear Power Plant meets  
8 licensing criteria and licensing commitments.

9 (b) See answer to 12(b).

10 (c) See answer to 12(c).

11 (d) See answer to 12(d).

12 INTERROGATORY NO. 15:

13 With respect to contention 2(c), do you deny that  
14 the scope of the ITP review of both the seismic and  
15 non-seismic aspects of the designs of safety-related  
16 systems, structures and components was too narrow in that  
17 the ITP did not have statistically valid samples from which  
18 to draw conclusions?

19 RESPONSE TO INTERROGATORY NO. 15:

20 Yes.

21 INTERROGATORY NO. 16:

22 If your answer to the preceding interrogatory is a  
23 denial of the contention stated therein:

24 (a) Please state each and every fact on which you rely in  
25 support of your denial.

26 ///

- 1 (b) Please identify each and every document on which you  
2 rely in support of your denial.
- 3 (c) Please identify each and every document known to you or  
4 believed by you to contain facts or allegations that  
5 contradict, are inconsistent with, or tend to cast  
6 doubt upon the validity of your denial or upon those  
7 facts on which you base your denial.
- 8 (d) Please identify each and every person you intend to  
9 call as a witness whom you expect to testify concerning  
10 your denial of this contention or the facts on which  
11 you rely in support of the denial of this contention.

12 RESPONSE TO INTERROGATORY NO. 16:

- 13 (a) The scope of the ITP is clearly defined in PGandE's  
14 Phase I Final Report and the Phase II Final Report.  
15 The extensive program described in these reports was  
16 developed based on engineering judgment and detailed  
17 knowledge of the systems, structures, and components  
18 being reviewed. The program was not developed based on  
19 statistical sampling.
- 20 (b) See answer to (a) above; see answer to 12(b).
- 21 (c) Other than contentions of Governor and Joint  
22 Intervenors, none.
- 23 (d) Stanley Kaplan  
24 R. C. Anderson  
25 W. H. White

26 ///

1 INTERROGATORY NO. 17:

2 With respect to contention 2(d), do you deny that  
3 the scope of the ITP review of both the seismic and  
4 non-seismic aspects of the designs of safety-related  
5 systems, structures and components was too narrow in that  
6 the ITP has failed systematically to verify the adequacy of  
7 the design of Unit 2?

8 RESPONSE TO INTERROGATORY NO. 17:

9 While it is unclear what the Governor or Joint  
10 Intervenors mean by "systematically verify," it is  
11 Licensee's opinion that the ITP's review was not too narrow  
12 in any sense.

13 INTERROGATORY NO. 18:

14 If your answer to the preceding interrogatory is a  
15 denial of the contention stated therein:

- 16 (a) Please state each and every fact on which you rely in  
17 support of your denial.
- 18 (b) Please identify each and every document on which you  
19 rely in support of your denial.
- 20 (c) Please identify each and every document known to you or  
21 believed by you to contain facts or allegations that  
22 contradict, are inconsistent with, or tend to cast  
23 doubt upon the validity of your denial or upon those  
24 facts on which you base your denial.

25 ///

26 ///

1 (d) Please identify each and every person you intend to  
2 call as a witness whom you expect to testify concerning  
3 your denial of this contention or the facts on which  
4 you rely in support of the denial of this contention.

5 RESPONSE TO INTERROGATORY NO. 18:

6 (a) See answer to 14(a).

7 (b) See answer to 12(b).

8 (c) See answer to 12(c).

9 (d) See answer to 12(d).

10 INTERROGATORY NO. 19:

11 With respect to contention 3(a), do you deny that  
12 the ITP used improper engineering standards to determine  
13 whether design activities met license criteria in that it  
14 accepted the mean measured performance of structures and  
15 materials in lieu of code-specified minima and that the  
16 IDVP either used or approved the use of such an improper  
17 standard or did not verify it at all?

18 RESPONSE TO INTERROGATORY NO. 19:

19 Objection. This interrogatory exceeds the scope  
20 of the Board's order of August 26, 1983, in that the ITP  
21 applied licensing criteria previously litigated and approved  
22 in NRC proceedings. Licensee is of the opinion that the ITP  
23 used proper engineering standards which give reasonable  
24 assurance that the Diablo Canyon Nuclear Power Plant meets  
25 licensing criteria.

26 ///



1 INTERROGATORY NO. 20:

2 If your answer to the preceding interrogatory is a  
3 denial of the contention stated therein:

4 (a) Please state each and every fact on which you rely in  
5 support of your denial.

6 (b) Please identify each and every document on which you  
7 rely in support of your denial.

8 (c) Please identify each and every document known to you or  
9 believed by you to contain facts or allegations that  
10 contradict, are inconsistent with, or tend to cast  
11 doubt upon the validity of your denial or upon those  
12 facts on which you base your denial.

13 (d) Please identify each and every person you intend to  
14 call as a witness whom you expect to testify concerning  
15 your denial of this contention or the facts on which  
16 you rely in support of the denial of this contention.

17 RESPONSE TO INTERROGATORY NO. 20:

18 Not applicable.

19 INTERROGATORY NO. 21:

20 With respect to contention 3(b), do you deny that  
21 the ITP used improper engineering standards to determine  
22 whether design activities met license criteria in that it  
23 failed to verify that the stress and load factors for steel  
24 used in the containment building were within code values  
25 and that the IDVP either used or approved the use of such an  
26 improper standard or did not verify it at all?



1       RESPONSE TO INTERROGATORY NO 21:

2               Yes.

3       INTERROGATORY NO. 22:

4               If your answer to the preceding interrogatory is a  
5       denial of the contention stated therein:

- 6       (a) Please state each and every fact on which you rely in  
7               support of your denial.
- 8       (b) Please identify each and every document on which you  
9               rely in support of your denial.
- 10       (c) Please identify each and every document known to you or  
11               believed by you to contain facts or allegations that  
12               contradict, are inconsistent with, or tend to cast  
13               doubt upon the validity of your denial or upon those  
14               facts on which you base your denial.
- 15       (d) Please identify each and every person you intend to  
16               call as a witness whom you expect to testify concerning  
17               your denial of this contention or the facts on which  
18               you rely in support of the denial of this contention.

19       RESPONSE TO INTERROGATORY NO. 22:

- 20       (a) No improper engineering standards are used to determine  
21               that design activities met licensing criteria since the  
22               stress allowables are in accordance with the Code and  
23               the load factors used to calculate stresses are so  
24               stated in the Hosgri Report and the FSAR.
- 25       (b) References 1, 4, and 5 in Attachment A to these  
26               responses.

1 (c) Other than the contentions of the Governor and the  
2 Joint Intervenors, none.

3 (d) Dr. W. H. White.

4 INTERROGATORY NO. 23:

5 With respect to contention 3(c), do you deny that  
6 the ITP used improper engineering standards to determine  
7 whether design activities met license criteria in that it  
8 failed to specify all damping values used in various seismic  
9 modes in the containment and auxiliary buildings and that  
10 the IDVP either used or approved the use of such an improper  
11 standard or did not verify it at all?

12 RESPONSE TO INTERROGATORY NO. 23:

13 Yes.

14 INTERROGATORY NO. 24:

15 If your answer to the preceding interrogatory is a  
16 denial of the contention stated therein:

17 (a) Please state each and every fact on which you rely in  
18 support of your denial.

19 (b) Please identify each and every document on which you  
20 rely in support of your denial.

21 (c) Please identify each and every document known to you or  
22 believed by you to contain facts or allegations that  
23 contradict, are inconsistent with, or tend to cast  
24 doubt upon the validity of your denial or upon those  
25 facts on which you base your denial.

26 ///

1 (d) Please identify each and every person you intend to  
2 call as a witness whom you expect to testify concerning  
3 your denial of this contention or the facts on which  
4 you rely in support of the denial of this contention.

5 RESPONSE TO INTERROGATORY NO. 24:

6 (a) No improper engineering standards are used to determine  
7 that design activities meet licensing criteria. For  
8 containment for the DE and DDE, the resulting values of  
9 damping for each mode in the model analysis are  
10 specified in "Report by John A. Blume and Associates,  
11 Engineers, Diablo Canyon Nuclear Power Plant Unit No.  
12 1, Containment Structure - Finite Element Model,  
13 Dynamic Seismic Analysis, July 1970, JABE-PGE-DC-1."  
14 For the auxiliary building, values of damping for each  
15 mode in the modal analysis are not individually  
16 specified since they are identical. Damping values  
17 associated with soil spring are conservatively ignored.

18 (b) See (a) above; also references 1, 2, 3, 4 and 5 in  
19 Attachment A to these responses.

20 (c) See answer to 2(c).

21 (d) Dr. W. H. White.

22 INTERROGATORY NO. 25:

23 With respect to contention 3(d), do you deny that  
24 the ITP used improper engineering standards to determine  
25 whether design activities met license criteria in that it  
26 failed to verify that PGandE's use of the double algebraic

1 sum method of calculation (rather than the sum of the  
2 squares method) was acceptable as a substitution and that  
3 the IDVP either used or approved the use of such an improper  
4 standard or did not verify it at all?

5 RESPONSE TO INTERROGATORY NO. 25:

6 Yes.

7 INTERROGATORY NO. 26:

8 If your answer to the preceding interrogatory is a  
9 denial of the contention stated therein:

- 10 (a) Please state each and every fact on which you rely in  
11 support of your denial.
- 12 (b) Please identify each and every document on which you  
13 rely in support of your denial.
- 14 (c) Please identify each and every document known to you or  
15 believed by you to contain facts or allegations that  
16 contradict, are inconsistent with, or tend to cast  
17 doubt upon the validity of your denial or upon those  
18 facts on which you base your denial.
- 19 (d) Please identify each and every person you intend to  
20 call as a witness whom you expect to testify concerning  
21 your denial of this contention or the facts on which  
22 you rely in support of the denial of this contention.

23 ///

24 ///

25 ///

26

1     RESPONSE TO INTERROGATORY NO. 26:

2     (a) No improper engineering standards are used to determine  
3         that design activities meet licensing criteria. In  
4         accordance with the Hosgri criteria the individual  
5         modal responses are combined by the square root of the  
6         sum of squares (SRSS) method; however, in case of the  
7         turbine building, for some principal load carrying  
8         members, a more conservative approach of use of the  
9         double algebraic sum (DAS) method was also applied.

10    (b) References 1 and 4 in Attachment A.

11    (c) See answer to 2(c).

12    (d) Dr. W. H. White.

13     INTERROGATORY NO. 27:

14             With respect to contention 3(e), do you deny that  
15     the ITP used improper engineering standards to determine  
16     whether design activities met license criteria in that it  
17     used time-history modeling techniques for some accelera-  
18     tions, displacements and shell forces in the containment  
19     structure and Blume response spectra for other  
20     accelerations, displacements and shell forces in the same  
21     structure and that the IDVP either used or approved the use  
22     of such an improper standard or did not verify it at all?

23     RESPONSE TO INTERROGATORY NO. 27:

24             Yes.

25     ///

26     ///



1 INTERROGATORY NO. 28:

2 If your answer to the preceding interrogatory is a  
3 denial of the contention stated therein:

- 4 (a) Please state each and every fact on which you rely in  
5 support of your denial.
- 6 (b) Please identify each and every document on which you  
7 rely in support of your denial.
- 8 (c) Please identify each and every document known to you or  
9 believed by you to contain facts or allegations that  
10 contradict, are inconsistent with, or tend to cast  
11 doubt upon the validity of your denial or upon those  
12 facts on which you base your denial.
- 13 (d) Please identify each and every person you intend to  
14 call as a witness whom you expect to testify concerning  
15 your denial of this contention or the facts on which  
16 you rely in support of the denial of this contention.

17 RESPONSE TO INTERROGATORY NO. 28:

- 18 (a) No improper engineering standards are used to determine  
19 that design activities meet licensing criteria. The  
20 licensing criteria as stated in the licensing documents  
21 listed under (b) below allow the use of both the time  
22 history and the response spectra methods of dynamic  
23 analyses.
- 24 (b) References 1, 2, 4, and 5, of Attachment A.
- 25 (c) See answer to 2(c).
- 26 (d) See answer to 26(d).



1 INTERROGATORY NO. 29:

2 With respect to contention 3(f), do you deny that  
3 the ITP used improper engineering standards to determine  
4 whether design activities met license criteria with respect  
5 to its modeling of the soil properties for the containment  
6 and auxiliary buildings and that the IDVP either used or  
7 approved the use of such an improper standard or did not  
8 verify it at all?

9 RESPONSE TO INTERROGATORY NO. 29:

10 Yes.

11 INTERROGATORY NO. 30:

12 If your answer to the preceding interrogatory is a  
13 denial of the contention stated therein:

- 14 (a) Please state each and every fact on which you rely in  
15 support of your denial.
- 16 (b) Please identify each and every document on which you  
17 rely in support of your denial.
- 18 (c) Please identify each and every document known to you or  
19 believed by you to contain facts or allegations that  
20 contradict, are inconsistent with, or tend to cast  
21 doubt upon the validity of your denial or upon those  
22 facts on which you base your denial.
- 23 (d) Please identify each and every person you intend to  
24 call as a witness whom you expect to testify concerning  
25 your denial of this contention or the facts on which  
26 you rely in support of the denial of this contention.

1     RESPONSE TO INTERROGATORY NO. 30:

2     (a) No improper engineering standards are used to determine  
3         that design activities meet licensing criteria.

4         (i) (a) In the soil structure interaction analysis of  
5                 containment for the DE and the DDE, use of  
6                 boundary motion to the model were used  
7                 properly and appropriately. The entire  
8                 procedure of developing these boundary  
9                 motions is explained in detail in "Report by  
10                John A. Blume and Associates, Engineers,  
11                Diablo Canyon Nuclear Power Plant Unit No. 1,  
12                Containment Structure - Finite Element Model,  
13                Dynamic Seismic Analysis, July 1970,  
14                JABE-PGE-DC-1," and FSAR.

15               (b) See (i)(a) above.

16               (c) See answer to 2(c).

17               (d) See answer to 24(d).

18         (ii) (a) The soil structure interaction analysis for  
19                 containment for the DE and the DDE uses a 7  
20                 percent damping value for rock in accordance  
21                 with the licensing criteria as specified in  
22                 the FSAR.

23               (b) See (ii)(a) above.

24               (c) See answer to 2(c).

25               (d) See answer to 24(d).

26     ///

- 1 (iii) (a) The dynamic analyses of the containment for  
2 the DE and DDE consider the flexibilities of  
3 both the foundation mat and the underlying  
4 rock. For the Hosgri event, however, the  
5 dynamic analysis is based on fixed base model  
6 in accordance with the licensing criteria.  
7 (b) References 1, 2, 3, 4 and 5 of Attachment A.  
8 (c) See answer to 2(c).  
9 (d) Dr. W. H. White.
- 10 (iv) (a) The soil properties are specified in the  
11 FSAR.  
12 (b) See (iv)(a) above.  
13 (c) See answer to 2(c).  
14 (d) Dr. W. H. White.
- 15 (v) (a) In the seismic analysis of the auxiliary  
16 building the input motion applied to the end  
17 of the soil spring is in accordance with the  
18 accepted licensing provisions.  
19 (b) References 1, 2, 4, and 5 of Attachment A.  
20 (c) See answer to 2(c).  
21 (d) Dr. W. H. White.

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1 INTERROGATORY NO. 31:

2 With respect to contention 3(g), do you deny that  
3 the ITP used improper engineering standards to determine  
4 whether design activities met license criteria with respect  
5 to its modeling of the crane in the turbine building and  
6 that the IDVP either used or approved the use of such an  
7 improper standard or did not verify it at all?

8 ANSWER TO INTERROGATORY NO. 31:

9 Yes.

10 INTERROGATORY NO. 32:

11 If your answer to the preceding interrogatory is a  
12 denial of the contention stated therein:

- 13 (a) Please state each and every fact on which you rely in  
14 support of your denial.
- 15 (b) Please identify each and every document on which you  
16 rely in support of your denial.
- 17 (c) Please identify each and every document known to you or  
18 believed by you to contain facts or allegations that  
19 contradict, are inconsistent with, or tend to cast  
20 doubt upon the validity of your denial or upon those  
21 facts on which you base your denial.
- 22 (d) Please identify each and every person you intend to  
23 call as a witness whom you expect to testify concerning  
24 your denial of this contention or the facts on which  
25 you rely in support of the denial of this contention.

26 ///

1     ANSWER TO INTERROGATORY NO. 32:

2     (a) The initial seismic qualification of the turbine  
3         building considered the crane parked in a single  
4         location. This analysis is proper as long as the crane  
5         remains parked and unloaded. PGandE has committed to  
6         leave the crane parked and unloaded until the turbine  
7         building has been qualified for a loaded crane in all  
8         anticipated locations.

9     (b) Reference 4 in Attachment A.

10    (c) See response to 2(c).

11    (d) Dr. W. H. White

12     INTERROGATORY NO. 33:

13             With respect to contention 3(h), do you deny that  
14     the ITP used improper engineering standards to determine  
15     whether design activities met license criteria by virtue of  
16     its modeling of the torsion factors for different buildings  
17     by differing techniques and that the IDVP either used or  
18     approved the use of such an improper standard or did not  
19     verify it at all?

20     RESPONSE TO INTERROGATORY NO. 33:

21             Yes.

22     INTERROGATORY NO. 34:

23             If your answer to the preceding interrogatory is a  
24     denial of the contention stated therein:

25     (a) Please state each and every fact on which you rely in  
26         support of your denial.

- 1 (b) Please identify each and every document on which you  
2 rely in support of your denial.
- 3 (c) Please identify each and every document known to you or  
4 believed by you to contain facts or allegations that  
5 contradict, are inconsistent with, or tend to cast  
6 doubt upon the validity of your denial or upon those  
7 facts on which you base your denial.
- 8 (d) Please identify each and every person you intend to  
9 call as a witness whom you expect to testify concerning  
10 your denial of this contention or the facts on which  
11 you rely in support of the denial of this contention.

12 RESPONSE TO INTERROGATORY NO. 34:

13 (a) No improper engineering standards are used to determine  
14 that design activities meet licensing criteria in  
15 application of the effect of accidental torsion in the  
16 seismic analyses of the different buildings. The  
17 methods used are in accordance with the provisions of  
18 the Hosgri criteria.

19 (b) References 1, 2, and 5 of Attachment A.

20 (c) See answer to 2(c).

21 (d) Dr. W. H. White.

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1 INTERROGATORY NO. 35:

2 With respect to contention 3(i), do you deny that  
3 the ITP used improper engineering standards to determine  
4 whether design activities met license criteria with respect  
5 to its modeling of hydrodynamic forces for the intake  
6 structure and that the IDVP either used or approved the use  
7 of such an improper standard or did not verify it at all?

8 RESPONSE TO INTERROGATORY NO. 35:

9 Yes.

10 INTERROGATORY NO. 36:

11 If your answer to the preceding interrogatory is a  
12 denial of the contention stated therein:

- 13 (a) Please state each and every fact on which you rely in  
14 support of your denial.
- 15 (b) Please identify each and every document on which you  
16 rely in support of your denial.
- 17 (c) Please identify each and every document known to you or  
18 believed by you to contain facts or allegations that  
19 contradict, are inconsistent with, or tend to cast  
20 doubt upon the validity of your denial or upon those  
21 facts on which you base your denial.
- 22 (d) Please identify each and every person you intend to  
23 call as a witness whom you expect to testify concerning  
24 your denial of this contention or the facts on which  
25 you rely in support of the denial of this contention.

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1     RESPONSE TO INTERROGATORY NO. 36:

2     (a) No improper engineering standards are used to determine  
3         that design activities meet licensing criteria. In the  
4         evaluation of the intake structure no sloshing effect  
5         was considered since sloshing cannot take place in the  
6         open ended compartments between the flow straightners  
7         which are deep and narrow. The hydrodynamic pressures  
8         on the outside of the structure are considered as  
9         described in the Phase I Final Report.

10    (b) See (a) above.

11    (c) See answer to 2(c).

12    (d) Dr. W. H. White.

13     INTERROGATORY NO. 37:

14             With respect to contention 3(j), do you deny that  
15     the ITP used improper engineering standards to determine  
16     whether design activities met license criteria in that for  
17     its modeling of the intake structure it used different  
18     models for horizontal and vertical seismic loadings and  
19     combined the results of these different models for vertical  
20     and horizontal responses and that the IDVP either used or  
21     approved the use of such an improper standard or did not  
22     verify it at all?

23     RESPONSE TO INTERROGATORY NO. 37:

24             Yes.

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1 INTERROGATORY NO. 38:

2 If your answer to the preceding interrogatory is a  
3 denial of the contention stated therein:

4 (a) Please state each and every fact on which you rely in  
5 support of your denial.

6 (b) Please identify each and every document on which you  
7 rely in support of your denial.

8 (c) Please identify each and every document known to you or  
9 believed by you to contain facts or allegations that  
10 contradict, are inconsistent with, or tend to cast  
11 doubt upon the validity of your denial or upon those  
12 facts on which you base your denial.

13 (d) Please identify each and every person you intend to  
14 call as a witness whom you expect to testify concerning  
15 your denial of this contention or the facts on which  
16 you rely in support of the denial of this contention.

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1     RESPONSE TO INTERROGATORY NO. 38:

2     (a) No improper engineering standards are used to determine  
3         that design activities meet licensing criteria. There  
4         is no basic difference in the horizontal and vertical  
5         seismic models, except that in modeling the intake  
6         crane in the vertical direction proper consideration is  
7         given to the fact that during vertical upward motion  
8         the cable holding the lifted weight is slack which  
9         introduces the so-called non-linear effect. It is  
10        perfectly justifiable to combine the responses obtained  
11        from the different seismic analyses which include this  
12        effect.

13    (b) Reference 4 of Attachment A.

14    (c) See answer to 2(c).

15    (d) Dr. W. H. White.

16     INTERROGATORY NO. 39:

17           With respect to contention 3(k), do you deny that  
18    the ITP used improper engineering standards to determine  
19    whether design activities met license criteria in that for  
20    its modeling of the intake structure it used improper  
21    ductility factors for steel and concrete and that the IDVP  
22    either used or approved the use of such an improper standard  
23    or did not verify it at all?

24     RESPONSE TO INTERROGATORY NO. 39:

25           Yes.

26     ///

1 INTERROGATORY NO. 40:

2 If your answer to the preceding interrogatory is a  
3 denial of the contention stated therein:

- 4 (a) Please state each and every fact on which you rely in  
5 support of your denial.
- 6 (b) Please identify each and every document on which you  
7 rely in support of your denial.
- 8 (c) Please identify each and every document known to you or  
9 believed by you to contain facts or allegations that  
10 contradict, are inconsistent with, or tend to cast  
11 doubt upon the validity of your denial or upon those  
12 facts on which you base your denial.
- 13 (d) Please identify each and every person you intend to  
14 call as a witness whom you expect to testify concerning  
15 your denial of this contention or the facts on which  
16 you rely in support of the denial of this contention.

17 RESPONSE TO INTERROGATORY NO. 40:

- 18 (a) No improper engineering standards are used to determine  
19 that design activities meet licensing criteria. The  
20 ductility factors used in evaluation of certain local  
21 structural elements during the Hosgri event are within  
22 the specified allowables of the Hosgri criteria.
- 23 (b) References 1, 2 and 4 of Attachment A.
- 24 (c) See answer to 2(c).
- 25 (d) Dr. W. H. White.

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1 INTERROGATORY NO. 41:

2           With respect to contention 3(1), do you deny that  
3 the ITP used improper engineering standards to determine  
4 whether design activities met license criteria with respect  
5 to its computations of modes in the containment building  
6 having frequencies between 20 and 33 HZ and that the IDVP  
7 either used or approved the use of such an improper standard  
8 or did not verify it at all?

9 RESPONSE TO INTERROGATORY NO. 41:

10           Yes.

11 INTERROGATORY NO. 42:

12           If your answer to the preceding interrogatory is a  
13 denial of the contention stated therein:

14 (a) Please state each and every fact on which you rely in  
15 support of your denial.

16 (b) Please identify each and every document on which you  
17 rely in support of your denial.

18 (c) Please identify each and every document known to you or  
19 believed by you to contain facts or allegations that  
20 contradict, are inconsistent with, or tend to cast  
21 doubt upon the validity of your denial or upon those  
22 facts on which you base your denial.

23 (d) Please identify each and every person you intend to  
24 call as a witness whom you expect to testify concerning  
25 your denial of this contention or the facts on which  
26 you rely in support of the denial of this contention.



1     RESPONSE TO INTERROGATORY NO. 42:

- 2     (a) The Project's response to the NRC question regarding  
3         the 20 Hz criteria was included in the September 9,  
4         1983 submittal to the NRC as Enclosure 2, Attachment 1,  
5         which is attached hereafter as Attachment B.
- 6     (b) In addition to the reference given above, this subject  
7         is addressed in the FSAR and the Hosgri Report.
- 8     (c) Other than the contentions of the Governor and the  
9         Joint Intervenors, none.
- 10    (d) Dr. W. H. White  
11         Larry Shipley

12     INTERROGATORY NO. 43:

13             With respect to contention 3(m), do you deny that  
14     the ITP used improper engineering standards to determine  
15     whether design activities met license criteria in that in  
16     modeling the containment building it failed to use two  
17     horizontal components for the DE and DDE and that the IDVP  
18     either used or approved the use of such an improper standard  
19     or did not verify it at all?

20     RESPONSE TO INTERROGATORY NO. 43:

21             Yes.

22     INTERROGATORY NO. 44:

23             If your answer to the preceding interrogatory is a  
24     denial of the contention stated therein:

- 25     (a) Please state each and every fact on which you rely in  
26         support of your denial.

- 1 (b) Please identify each and every document on which you  
2 rely in support of your denial.
- 3 (c) Please identify each and every document known to you or  
4 believed by you to contain facts or allegations that  
5 contradict, are inconsistent with, or tend to cast  
6 doubt upon the validity of your denial or upon those  
7 facts on which you base your denial.
- 8 (d) Please identify each and every person you intend to  
9 call as a witness whom you expect to testify concerning  
10 your denial of this contention or the facts on which  
11 you rely in support of the denial of this contention.

12 RESPONSE TO INTERROGATORY NO. 44:

13 (a) No improper engineering standards are used to determine  
14 that design activities meet licensing criteria. The  
15 original licensing criterion with regards to the DE and  
16 the DDE was to combine the responses due to one  
17 horizontal excitation to the responses due to the  
18 vertical excitation by the absolute sum method and not  
19 to consider the effects of the three components of  
20 earthquake simultaneously. This criterion was  
21 correctly applied.

22 (b) NRC's SER, Supplement 7, dated May 26, 1978.

23 (c) See answer to 2(c).

24 (d) Dr. W. H. White.

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1 INTERROGATORY NO. 45:

2 With respect to contention 3(n), do you deny that  
3 the ITP used improper engineering standards to determine  
4 whether design activities met license criteria by virtue of  
5 the stress values it used for concrete in shear walls in  
6 modeling the auxiliary building and that the IDVP either  
7 used or approved the use of such an improper standard or did  
8 not verify it at all?

9 RESPONSE TO INTERROGATORY NO. 45:

10 Yes.

11 INTERROGATORY NO. 46:

12 If your answer to the preceding interrogatory is a  
13 denial of the contention stated therein:

- 14 (a) Please state each and every fact on which you rely in  
15 support of your denial.
- 16 (b) Please identify each and every document on which you  
17 rely in support of your denial.
- 18 (c) Please identify each and every document known to you or  
19 believed by you to contain facts or allegations that  
20 contradict, are inconsistent with, or tend to cast  
21 doubt upon the validity of your denial or upon those  
22 facts on which you base your denial.
- 23 (d) Please identify each and every person you intend to  
24 call as a witness whom you expect to testify concerning  
25 your denial of this contention or the facts on which  
26 you rely in support of the denial of this contention.

1     RESPONSE TO INTERROGATORY NO. 46:

2     (a) No improper engineering standards are used to determine  
3         that design activities meet licensing criteria. The  
4         stress value (allowable) used for concrete in shear  
5         walls is not applied in modeling the auxiliary  
6         building. Furthermore, the stress allowables are in  
7         accordance with the criteria of Appendix 2A of Phase I  
8         Final Report. These criteria are based on test results  
9         which are acceptable in accordance with the provisions  
10        of ACI Code.

11    (b) See (a) above.

12    (c) Other than the contentions of the Governor and Joint  
13         Intervenors, none.

14    (d) Dr. W. H. White.

15     INTERROGATORY NO. 47:

16               With respect to contention 4, do you deny that the  
17     IDVP has accepted deviations from the licensing criteria  
18     without providing adequate engineering justification?

19     RESPONSE TO INTERROGATORY NO. 47:

20               While contention No. 4 is not clear as to what is  
21     meant by "accepted," Licensee believes that all actions of  
22     the DCP are consistent with licensing criteria and can be  
23     supported by engineering justification or judgment.

24     INTERROGATORY NO. 48:

25               If your answer to the preceding interrogatory is a  
26     denial of the contention stated therein:

- 1 (a) Please state each and every fact on which you rely in  
2 support of your denial.
- 3 (b) Please identify each and every document on which you  
4 rely in support of your denial.
- 5 (c) Please identify each and every document known to you or  
6 believed by you to contain facts or allegations that  
7 contradict, are inconsistent with, or tend to cast  
8 doubt upon the validity of your denial or upon those  
9 facts on which you base your denial.
- 10 (d) Please identify each and every person you intend to  
11 call as a witness whom you expect to testify concerning  
12 your denial of this contention or the facts on which  
13 you rely in support of the denial of this contention.

14 RESPONSE TO INTERROGATORY NO. 48:

- 15 (a) The IDVP has received full and complete responses to  
16 questions and concerns they have raised concerning  
17 their review of selected DCNPP-1 Unit 1 systems.  
18 Licensing criteria have been met in all cases, and  
19 adequate engineering justification has been provided.  
20 The nature and extent of this engineering justification  
21 with particular reference to contention 4 is provided  
22 below.

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1        Contention 4(a):

2        Contrary to the requirements of FSAR Section 17.1 re-  
3        garding compliance of the as-built installation with  
4        the design documents, the IDVP review of the AFWS dis-  
5        closed that the as-built installation failed to meet  
6        the design drawings in that (i) a steam trap on the  
7        turbine-driven AFW pump steam supply line is not pro-  
8        vided and (ii) there are discrepancies in the arrange-  
9        ment of the long-term cooling water supply line.

10       Response:

11       For this issue, complete engineering justification is  
12       provided in the DCP Resolution and/or Completion  
13       Packages for EOI file 8027 for item (a)(i), and the DCP  
14       Resolution and Completion Packages for EOI file 8048  
15       for item (a)(ii). The IDVP has fully addressed these  
16       matters in ITR No. 22, Rev. 1, on page 4-9.

17       Contention 4(b):

18       Contrary to FSAR Section 8.3.3., the electrical design  
19       does not fully comply with the commitments regarding  
20       separation and color coding.

21       Response:

22       For this issue, complete engineering justification is  
23       provided in the DCP Resolution and/or Completion  
24       Packages for EOI files 8055 and 8059. The IDVP has  
25       fully addressed these matters in ITR No. 27, Rev. 2, on  
26       pages 5-3 and 5-4.



1        Contention 4(c):

2        Contrary to the single failure criterion on Appendix A  
3        to 10 CFR Part 50, a single failure may cause loss of  
4        redundant power divisions because redundant electric  
5        power division trains are electrically interconnected  
6        through two circuit breakers and a single power  
7        transfer switch.

8        Response:

9        For this issue, complete engineering justification is  
10       provided in the DCP Resolution and/or Completion  
11       Packages for EOI file 8041. The IDVP has fully  
12       addressed these matters in ITR No. 26, Rev. 1, on pages  
13       5-1.

14       Contention 4(d):

15       Contrary to GCD 57 of Appendix A, valve operators for  
16       the isolation valves which provide the steam supply to  
17       the turbine-driven auxiliary feed pump from two of the  
18       main steam generators have not been classified and  
19       procured as safety related components.

20       Response:

21       For this issue, complete engineering justification is  
22       provided in the DCP Resolution and/or Completion  
23       Packages for EOI file 8018. The IDVP has fully  
24       addressed these matters in ITR No. 27, Rev. 2, on page  
25       5-1.

26       ///

1       Contention 4(e):

2       The single failure of an auxiliary relay would prevent  
3       automatic closure of the redundant steam generator  
4       blow-down isolation valves on automatic initiation of  
5       the AFWS contrary to a Westinghouse interface  
6       requirement and FSAR Figure 7.2-1.

7       Response:

8       For this issue, complete engineering justification is  
9       provided in the DCP Resolution and/or Completion  
10      Packages for EOI file 8047. The IDVP has fully  
11      addressed these matters in ITR No. 27, Rev. 2, on page  
12      5-1.

13      Contention 4(f):

14      Contrary to NUREG 0588 regarding environmental qualifi-  
15      cations, flow transmitter FT-78 and flow control valve  
16      FCV-05 are located in a harsh environment but were not  
17      listed as such in the PG&E Environmental Qualification  
18      Report dated September 1981, and are not yet  
19      environmentally qualified.

20      Response:

21      For this issue, complete engineering justification is  
22      provided in the DCP Resolution and/or Completion  
23      Packages for EOI file 8052. The IDVP has fully  
24      addressed these matters in ITR No. 27, Rev. 2, on page  
25      5-2.

26      ///

1        Contention 4(g):

2        Contrary to the requirements of NUREG 0588 regarding  
3        environmental qualifications, portions of the CRVPS  
4        were omitted from PG&E's Environmental Qualification  
5        report.

6        Response:

7        For this issue, complete engineering justification is  
8        provided in the DCP Resolution and/or Completion  
9        Packages for EOI file 8056. The IDVP has fully  
10       addressed these matters in ITR No. 28, Rev. 2, on page  
11       5-2.

12       Contention 4(h):

13       Contrary to PG&E's September 14 and December 28, 1978  
14       licensing commitments, CRVPS equipment identified in  
15       the FSAR as necessary to maintain control room  
16       habitability during safe shutdown has not been  
17       evaluated regarding the effects of a moderate energy  
18       pipe break.

19       Response:

20       For this issue, complete engineering justification is  
21       provided in the DCP Resolution and/or Completion  
22       Packages for EOI file 8050. The IDVP has fully  
23       addressed these matters in ITR No. 21, Rev. 1, on page  
24       4-2.

25       ///

26       ///

1        Contention 4(i):

2        The fire protection for the motor driven AFW pump room  
3        is not consistent with the PG&E licensing commitment  
4        for fire zone separation as stated in its November 13,  
5        1978 Supplemental Information for Fire Protection  
6        Review ("SIFPR") in that:

- 7        1)    there is a large grated ventilation opening in the  
8               ceiling of the room;  
9        2)    a fire damper has gaps when it is closed.

10       Response:

11       For these issues, complete engineering justification is  
12       provided in the DCP Resolution and/or Completion .  
13       Packages for EOI files 8038 and 8037. The IDVP has  
14       fully addressed these matters in ITR No. 18, Rev. 1, on  
15       page 5-3.

16       Contention 4(j):

17       The fire protection for the AFW pump room is not  
18       consistent with the PG&E licensing commitment for cable  
19       separation as stated in its SIFPR of November 13, 1978  
20       in that:

- 21       1)    the pumps for the motor driven AFW pumps and the  
22               control circuitry for a flow control valve nec-  
23               essary for operation of the turbine driven AFW  
24               pump are located in a single fire zone.

25       ///

26       ///

1        Response:

2        For this issue, complete engineering justification is  
3        provided in the DCP Resolution and/or Completion  
4        Packages for EOI file 8019. The IDVP has fully  
5        addressed these matters in ITR No. 18, Rev. 1, on page  
6        5-1.

7        Contention 4(j):

8        2) cables for some AFW circuits are not routed in  
9        accord with descriptions in the SIFPR and four AFW  
10       circuits PG&E committed to identify and review in  
11       the SIFPR were not included in that document.

12       Response:

13       For this issue, complete engineering justification is  
14       provided in the DCP Resolution and/or Completion  
15       Packages for EOI file 8021. The IDVP has fully  
16       addressed these matters in ITR No. 18, Rev. 1, on page  
17       5-2.

18       Contention 4(k):

19       Contrary to the licensing commitment set forth in its  
20       SIFPR of November 13, 1978, each of the three 4160 volt  
21       cable spreading rooms has a ventilation opening leading  
22       up to the 4160 volt switchgear rooms.

23       ///

24       ///

25       ///

1        Response:

2        For this issue, complete engineering justification is  
3        provided in the DCP Resolution and/or Completion  
4        Packages for EOI file 8039. The IDVP has fully  
5        addressed these matters in ITR No. 18, Rev. 1, on page  
6        5-3.

7        Contention 4(1):

8        Contrary to FSAR Section 3.6, possible jet impingement  
9        loads have not been considered in the design and  
10       qualification of safety related piping and equipment  
11       inside containment.

12       Response:

13       For this issue, complete engineering justification is  
14       provided in the DCP Resolution and/or Completion  
15       Packages for EOI files 7002 and 8065. The ICVP has  
16       fully addressed these matters in ITR No. 48, Rev. D, on  
17       pages 7-1 and 7-2.

18       Contention 4(m):

19       Contrary to QA program commitments in FSAR Section  
20       17.1, documented evidence is inadequate to demonstrate  
21       that rupture restraints outside and inside containment  
22       have been properly designed and installed to provide  
23       protection against rupture in high pressure piping.

24       ///

25       ///

26       ///



1        Response:

2        Section 17.1 of the FSAR discusses only QA programs and  
3        is silent on the topic of rupture restraints. This  
4        contention is unclear.

5        Contention 4(n):

6        For the containment exterior shell review the ITP  
7        review used the AISC Code rather than Section III of  
8        the ASME Code contrary to the commitment in Table 3.2-4  
9        of the FSAR.

10       Response:

11       This issue is fully addressed in SER, Supplement 18 on  
12       page C.3-17. The ITP used the ASME Code.

13       Contention 4(o):

14       Contrary to the requirements of NUREG-0588 regarding  
15       environmental qualifications, safety-related cables and  
16       cable splices which could be subject to a harsh  
17       environment during a high energy line break are not  
18       identified in the PG&E Environmental Qualification  
19       Report.

20       Response:

21       For this issue, complete engineering justification is  
22       provided in the DCP Resolution and/or Completion  
23       Packages for EOI file 8044. The IDVP has fully  
24       addressed these matters in ITR No. 25, Rev. 1, on page  
25       5-2.

26       ///

1        Contention 4(p):

2        The NSC pipe break analysis, which is Appendix A to  
3        FSAR Section 3.6, did not include all likely sources of  
4        water in the calculation of flooding levels.

5        Response:

6        For this issue, complete engineering justification is  
7        provided in the DCP Resolution and/or Completion  
8        Packages for EOI file 8005. The IDVP has fully  
9        addressed these matters in ITR No. 14, Rev 2., on page  
10       5-4.

11       Contention 4(q):

12       Contrary to PG&E's December 28, 1979 licensing commit-  
13       ment letter to the NRC, modifications to protect two  
14       Auxiliary Feedwater valves from the effects of moderate  
15       energy line breaks were not implemented.

16       Response:

17       For this issue, complete engineering justification is  
18       provided in the DCP Resolution and/or Completion Pack-  
19       ages for EOI file 8014. The IDVP has fully addressed  
20       these matters in ITR No. 21, Rev 1., on page 4-1.

21       ///

22       ///

23       ///

1        Contention 4(r):

2        Contrary to the licensing commitment to maintain  
3        minimum system redundancy as stated in FSAR Section  
4        3.6A (NSC evaluation of pipe break outside  
5        containment), four components were identified for which  
6        high energy line cracks could cause temperatures in  
7        excess of the specification temperatures of the  
8        components.

9        Response:

10       For this issue, complete engineering justification is  
11       provided in the DCP Resolution and/or Completion  
12       Packages for EOI file 8058. The IDVP has fully  
13       addressed these matters in ITR No. 27, Rev 2., on page  
14       5-3.

15       Contention 4(s):

16       Contrary to the licensing commitment to maintain  
17       minimum system redundancy as stated in FSAR, section  
18       3.6A (NSC evaluation of pipe break outside  
19       containment), a conduit was identified whose failure  
20       due to a high energy line crack could eliminate  
21       redundant Auxiliary Feedwater system flow.

22       ///

23       ///

24       ///

1        Response:

2        For this issue, complete engineering justification is  
3        provided in the DCP Resolution and/or Completion  
4        Packages for EOI files 8028, 8029, and 8030. The IDVP  
5        has fully addressed these matters in ITR No. 21, Rev.  
6        1, on page 4-2.

7        Contention 4(t):

8        Contrary to the FSAR Section 8.3 commitment to provide  
9        switchgear buses with adequate short circuit inter-  
10       rupting capability, the calculated duties for circuit  
11       breakers on 4160 V buses F, G, and H were above the  
12       nameplate ratings for those buses.

13       Response:

14       For this issue, complete engineering justification is  
15       provided in the DCP Resolution and/or Completion  
16       Packages for EOI file 8022. The IDVP has fully  
17       addressed these matters in ITR No. 24, Rev. 1, on page  
18       5-1.

19       Contention 4(u):

20       Contrary to single failure criteria stated in FSAR  
21       Section 3.1.1, reviews of the Auxiliary Feedwater and  
22       Control Room Ventilation and Pressurization systems  
23       identified circuit separation and single failure  
24       deficiencies. Similar deficiencies were identified in  
25       additional verification reviews, which included other  
26       safety-related systems.

1        Response:

2        For this issue, complete engineering justification is  
3        provided in the DCP Resolution and/or Completion  
4        Packages for EOI files 8017 and 8057. The IDVP has  
5        fully addressed these matters in ITR No. 28, Rev. 2, on  
6        pages 5-1 and 5-2, and ITR No. 49, Rev. 0, on pages 4-1  
7        and 5-1.

8        (b) The documents pertinent to this matter are identified  
9        in our response to Number 48(a) above.

10       (c) Other than the contentions of the Governor and the  
11       Joint Intervenors, none.

12       (d) See answer to Interrogatory No. 2(d).

13       INTERROGATORY NO. 49:

14                With respect to contention 5, do you deny that the  
15       verification program has not verified that Diablo Canyon  
16       Units 1 and 2 "as built" conform to the design drawings and  
17       analyses?

18       RESPONSE TO INTERROGATORY NO. 49:

19                As of the time of these answers, the "as built"  
20       conformance process is not yet complete, but will be  
21       completed as set forth by the licensee.

22       INTERROGATORY NO. 50:

23                If your answer to the preceding interrogatory is a  
24       denial of the contention stated therein:

25       (a) Please state each and every fact on which you rely in  
26       support of your denial.

- 1 (b) Please identify each and every document on which you  
2 rely in support of your denial.
- 3 (c) Please identify each and every document known to you or  
4 believed by you to contain facts or allegations that  
5 contradict, are inconsistent with, or tend to cast  
6 doubt upon the validity of your denial or upon those  
7 facts on which you base your denial.
- 8 (d) Please identify each and every person you intend to  
9 call as a witness whom you expect to testify concerning  
10 your denial of this contention or the facts on which  
11 you rely in support of the denial of this contention.

12 RESPONSE TO INTERROGATORY NO. 50

13 (a) Unit 1: The engineering review of plant modifications  
14 resulting from IDVP EOI, have been performed in  
15 accordance with Engineering Manual Procedure 3.60N for  
16 Unit 1. These procedures require that engineering  
17 review the results of construction efforts which differ  
18 from the design change notice. This review also  
19 includes a comparison of these results with the design  
20 used in the analyses performed prior to release of the  
21 design.

22 Unit 2: The Unit 2 Internal Review Program, which was  
23 issued March 1983 to address the verification program,  
24 requires that as-built modifications be reviewed to  
25 confirm acceptability.

26 ///



1 (b) PGandE Engineering Manual Procedure No. 3.60N; PGandE  
2 Engineering Manual Procedure No. 3.7, Rev. 5; PGandE  
3 Engineering Manual Procedure No. 3.7, Rev. TR-9; Diablo  
4 Canyon Project Engineer's Instruction No. 13, Rev. 0;  
5 Diablo Canyon Project Engineer's Instruction No. 13,  
6 Rev. 1; previously furnished in discovery.

7 (c) See answer to 48(c).

8 (d) See answer to 48(d).

9 INTERROGATORY NO. 51:

10 With respect to contention 6, do you deny that the  
11 verification program failed to verify that the design of  
12 safety related equipment supplied to PGandE by Westinghouse  
13 met licensing criteria?

14 RESPONSE TO INTERROGATORY NO. 51:

15 No. The seismic design of all safety-related  
16 equipment furnished by Westinghouse was not reanalyzed.  
17 Whenever findings of the verification program altered the  
18 input to specific pieces of safety-related equipment, that  
19 equipment was requalified by Westinghouse and reviewed by  
20 the DCP.

21 INTERROGATORY NO. 52:

22 If your answer to the preceding interrogatory is a  
23 denial of the contention stated therein:

24 (a) Please state each and every fact on which you rely in  
25 support of your denial.

26 ///

- 1 (b) Please identify each and every document on which you  
2 rely in support of your denial.
- 3 (c) Please identify each and every document known to you or  
4 believed by you to contain facts or allegations that  
5 contradict, are inconsistent with, or tend to cast  
6 doubt upon the validity of your denial or upon those  
7 facts on which you base your denial.
- 8 (d) Please identify each and every person you intend to  
9 call as a witness whom you expect to testify concerning  
10 your denial of this contention or the facts on which  
11 you rely in support of the denial of this contention.

12 RESPONSE TO INTERROGATORY NO. 52:

13 Not applicable.

14 INTERROGATORY NO. 53:

15 With respect to contention 7, do you deny that the  
16 verification program failed to identify the root causes for  
17 the failures in the PGandE design quality assurance program  
18 and failed to determine if such failures raise generic  
19 concerns?

20 RESPONSE TO INTERROGATORY NO. 53:

21 Yes.

22 INTERROGATORY NO. 54:

23 If your answer to the preceding interrogatory is a  
24 denial of the contention stated therein:

- 25 (a) Please state each and every fact on which you rely in  
26 support of your denial.

- 1 (b) Please identify each and every document on which you  
2 rely in support of your denial.
- 3 (c) Please identify each and every document known to you or  
4 believed by you to contain facts or allegations that  
5 contradict, are inconsistent with, or tend to cast  
6 doubt upon the validity of your denial or upon those  
7 facts on which you base your denial.
- 8 (d) Please identify each and every person you intend to  
9 call as a witness whom you expect to testify concerning  
10 your denial of this contention or the facts on which  
11 you rely in support of the denial of this contention.

12 RESPONSE TO INTERROGATORY NO. 54:

13 (a) The cause of the deficiencies is clearly addressed in  
14 Section 1.8 of PGandE's Phase I Final Report, in  
15 Section 3.0 of PGandE's Phase II Final Report and in  
16 Section 6.0 of the IDVP Final Report. The development  
17 of the program to address generic concerns is described  
18 in the above referenced Final Reports as well as in the  
19 IDVP Phase I and Phase II management plans. These  
20 documents show that both causes of deficiencies and  
21 possible generic concerns were adequately addressed by  
22 the verification program.

23 (b) See above paragraph.

24 (c) See answer to 42(c).

25 ///

26 ///

1 (d) R. C. Anderson

2 H. B. Friend

3 G. H. Moore

4 C. W. Dick

5 INTERROGATORY NO. 55:

6 With respect to contention 8, do you deny that the  
7 ITP failed to develop and implement in a timely manner a  
8 design quality assurance program in accordance with 10 C.F.R  
9 Part 50, Appendix B to assure the quality of the recent  
10 design modifications to the Diablo Canyon facility and that  
11 the IDVP failed to ensure that the corrective and  
12 preventative action programs implemented by the ITP are  
13 sufficient to assure that the Diablo Canyon facilities will  
14 meet licensing criteria?

15 RESPONSE TO INTERROGATORY NO. 55:

16 Yes.

17 INTERROGATORY NO. 56:

18 If your answer to the preceding interrogatory is a  
19 denial of the contention stated therein:

20 (a) Please state each and every fact on which you rely in  
21 support of your denial.

22 (b) Please identify each and every document on which you  
23 rely in support of your denial.

24 ///

25 ///

26 ///

1 (c) Please identify each and every document known to you or  
2 believed by you to contain facts or allegations that  
3 contradict, are inconsistent with, or tend to cast  
4 doubt upon the validity of your denial or upon those  
5 facts on which you base your denial.

6 (d) Please identify each and every person you intend to  
7 call as a witness whom you expect to testify concerning  
8 your denial of this contention or the facts on which  
9 you rely in support of the denial of this contention.

10 RESPONSE TO INTERROGATORY NO. 56:

11 (a) The PGandE Quality Assurance Program complies with  
12 10CFR50 Appendix B and has been approved by NRC. The  
13 DCP Quality Assurance Program complies with 10CFR50  
14 Appendix B and has been approved by NRC. A QA Program  
15 that complies with 10CFR50 Appendix B has been in force  
16 since the inception of the ITP. Audit programs have  
17 been implemented in a timely manner to assure  
18 continuing effective implementation of the quality  
19 assurance program, and to provide resolution and  
20 corrective action for any deficiencies identified. The  
21 IDVP has performed QA audits and design reviews of DCP  
22 activities, as required by the NRC Commission Order and  
23 Staff Letter. The IDVP Audit included assessment of  
24 DCP corrective action design activities related to  
25 Error or Open item (EOI) Reports and DCP Open Items  
26 (OI).



- 1 (b) 1. Bechtel Power Corporation Topical Report BQ-TOP-1  
2 Revision 3A "Bechtel Quality Assurance Program for  
3 Nuclear Power Plants"; dated October, 1980; signed  
4 by S. D. Bechtel, Jr.
- 5 2. "Quality Assurance Program, Bechtel Power  
6 Corporation, Diablo Canyon Project, Revision 1";  
7 report
- 8 3. Letter dated June 12, 1981, from Karl V. Seyfrit  
9 to Mr. C. D. Statton
- 10 4. Letter dated October 16, 1980, from Walter P.  
11 Haass to Mr. R. M. Collins
- 12 5. Letter dated August 2, 1982, from D. G. Eisenhut  
13 to Philip A. Crane, Jr., Esq.
- 14 6. Letter dated August 13, 1982, from Philip A.  
15 Crane, Jr. to Frank J. Miraglia, Jr.
- 16 7. Letter dated September 22, 1982, from H. R. Denton  
17 to Mr. Joel Reynolds (previously provided to all  
18 parties)
- 19 8. Diablo Canyon FSAR Section 17 (available to all  
20 parties)
- 21 9. "Pacific Gas and Electric Company Quality  
22 Assurance Manual for Nuclear Power Plants"; signed  
23 by Barton W. Shackelford (provided in Governor's  
24 First Document Production Request)

25 ///

26 ///



10. "Diablo Canyon Project Nuclear Quality Assurance Manual" Revision 4; dated August 15, 1983; signed by R. D. Allen, W. T. Kellerman, H. B. Friend (Revisions 0, 1, and 2 provided in Governor's First Document Production Request)
11. "Bechtel Power Corporation, San Francisco Power Division, Quality Assurance Department Manual"; Revision 35 dated December 27, 1982; individual procedures signed by H. F. Lilligh, W. T. Kellerman, and others (provided in Governor's first Document Production Request)
12. "Diablo Canyon Project, Project Engineer's Instruction," Revision 9 dated August 5, 1983; signed by G. H. Moore, G. V. Cranston and M. J. Jacobson (provided in Governor's first Document Production Request)
13. "Pacific Gas and Electric Company, Engineering Manual"; dated August 15, 1983; individual procedures signed by D. A. Brand and others (provided in Governor's First Document Production Request)
14. Letter dated August 20, 1982 from J. O. Schuyler to Howard B. Friend
15. NRC Inspection Report 50-275/81-29, 50-323/81-18 dated November 6, 1981; signed by J. L. Crews and others (available to all parties)

- 1 16. NUREG-0675 Supplement No. 18 dated August 1983  
2 (available to all parties)
- 3 17. Project Audit Reports and Management QA Audits  
4 (provided in Governor's First Document Request and  
5 to be provided in JIs' Second Set of  
6 Interrogatories and Request for Production of  
7 Documents excepts as follows:
- 8 (a) Project Audit 10.1-1; memorandum; May 23,  
9 1983; signed by M. J. Jacobson; to G. H.  
10 Moore/G. V. Cranston
- 11 (b) Project Audit 15.1-1; memorandum; May 13,  
12 1983; signed by M. J. Jacobson; to G. H.  
13 Moore/G. V. Cranston
- 14 (c) Project Audit 2.1-4; memorandum;  
15 September 12, 1983; signed by M. J. Jacobson;  
16 to G. V. Cranston
- 17 (d) Project Audit 3.14.-2; memorandum; August 31,  
18 1983; signed by M. J. Jacobson; to G. V.  
19 Cranston
- 20 (e) Project Audit 13-1; memorandum; August 24,  
21 1983; signed by M. J. Jacobson; to G. V.  
22 Cranston)
- 23 18. NRC Inspection Report 50-275/82-31, dated  
24 November 15, 1982; signed by D. F. Kirsch  
25 (available to all parties)

26 ///

1 19. Letter dated January 26, 1983, from Darrell G.  
2 Eisenhut to Philip A. Crane, Jr., Esq.

3 20. IDVP Final Report (available to all parties)

4 21. All ITR's (available to all parties)

5 22. ITP Final Reports (available to all parties)

6 (c) Other than contentions advanced by the Governor and  
7 Joint Intervenors, none.

8 (d) H. B. Friend

9 C. W. Dick

10 M. J. Jacobson

11 INTERROGATORY NO. 57:

12 Do you contend that the design quality of all the  
13 safety related equipment supplied to PGandE by Westinghouse  
14 was assured by a quality assurance program or programs which  
15 met each and every requirement of each and every criterion  
16 of Appendix B to 10 C.F.R. Part 50?

17 RESPONSE TO INTERROGATORY NO. 57:

18 No. The Westinghouse program fully complied with  
19 applicable Commission quality assurance requirements at the  
20 time of design.

21 INTERROGATORY NO. 58:

22 If your answer to the preceding interrogatory is  
23 in the affirmative:

24 (a) Please state each and every fact on which you rely in  
25 support of your answer.

26 ///

- 1 (b) Please identify each and every document on which you  
2 rely in support of your answer.
- 3 (c) Please identify each and every document known to you or  
4 believed by you to contain facts or allegations that  
5 contradict, are inconsistent with, or tend to cast  
6 doubt upon the validity of your answer or upon those  
7 facts on which you base your answer.

8 RESPONSE TO INTERROGATORY NO. 58:

9 Not applicable.

10 INTERROGATORY NO. 59:

11 Do you contend that the design quality of all the  
12 safety related equipment supplied to PGandE by Westinghouse  
13 was assured by a quality assurance program or programs whose  
14 implementation met each and every requirement of each and  
15 every criterion of Appendix B to 10 C.F.R. Part 50?

16 RESPONSE TO INTERROGATORY NO. 59:

17 No. The Westinghouse program fully complied with  
18 applicable Commission quality assurance requirements at the  
19 time of design.

20 INTERROGATORY NO. 60:

21 If your answer to the preceding interrogatory is  
22 in the affirmative:

- 23 (a) Please state each and every fact on which you rely in  
24 support of your answer.
- 25 (b) Please identify each and every document on which you  
26 rely in support of your answer.

1 (c) Please identify each and every document known to you or  
2 believed by you to contain facts or allegations that  
3 contradict, are inconsistent with, or tend to cast  
4 doubt upon the validity of your answer or upon those  
5 facts on which you base your answer.

6 RESPONSE TO INTERROGATORY NO. 60:

7 Not applicable.

8 INTERROGATORY NO. 61:

9 For each and every person identified in your  
10 answers to the preceding interrogatories as a prospective  
11 witness in these proceedings, please state:

12 (a) Whether he or she will be offered as an expert witness.

13 (b) If the witness will be offered as an expert, the  
14 specific subject matter about which the witness will be  
15 expected to testify.

16 (c) If the witness will be offered as an expert, the  
17 specific qualifications of the witness that you contend  
18 would qualify the witness to give opinion testimony on  
19 each specific subject matter about which the witness  
20 will testify.

21 (d) Each and every professional article, book, or the like,  
22 if any, the witness has authored or co-authored  
23 concerning each specific subject matter set forth in  
24 your answer to subpart (b), above.

25 ///

26 ///



1 (e) The identity of each and every document the witness  
2 will rely on to reach any opinion testimony and  
3 specifically correlate each such document (by page and  
4 paragraph number) to each specific subject matter on  
5 which the witness will render an opinion.

6 (f) As to each specific subject matter identified in your  
7 answer to subpart (b), above, the identity by docket  
8 number and case name of each case (court or administra-  
9 tive agency) where the witness has previously given  
10 expert testimony concerning each specific subject  
11 matter.

12 (g) As to each such case,

13 (i) the date(s) the expert testimony was given;

14 (ii) whether you have a copy of the testimony given;

15 (iii) whether you have a copy of the transcript covering  
16 any or all of the witness's examination or  
17 cross-examination for each such proceeding;

18 (iv) whether you have a copy of any notes which the  
19 witness made in preparation for, or utilized  
20 during, the witness's examination or  
21 cross-examination in each such proceeding.

22 RESPONSE TO INTERROGATORY NO. 61:

23 See Attachment C.

24 ///

25 ///

26 ///



1 INTERROGATORY NO. 62:

2 Please identify each and every document --  
3 excluding the IDVP and DCP Final Reports, the Interim  
4 Technical Reports, and Supplement 18 to the Safety  
5 Evaluation Report -- that:

- 6 (a) Describes how the DCP, the IDVP, or the staff drew  
7 inferences from sample observations of design  
8 activities and products concerning the quality of  
9 design of Diablo Canyon.
- 10 (b) Discusses the validity of the methods used to draw  
11 inferences about the quality of design of Diablo Canyon  
12 from sample observations.
- 13 (c) Discusses the validity of the inferences about the  
14 quality of design of Diablo Canyon drawn from sample  
15 observations.
- 16 (d) Discusses the method by which any one or more sample  
17 was drawn for the purpose of assessing the quality of  
18 design of Diablo Canyon.
- 19 (e) Discusses the validity of the sampling methods used.

20 RESPONSE TO INTERROGATORY NO. 62:

21 There are no documents responding to items a, b,  
22 or c. The list below responds to items d and e:

- 23 1. IDVP Phase I Program Plan, TES; April 2,  
24 1982.
- 25 2. IDVP Phase II Program Plan, TES; June 18,  
26 1982.

- 1 3. SECY-82-89, NRC; March 1, 1982.
- 2 4. SECY-82-414, NRC; October 13, 1982.
- 3 5. Public Meeting, February 3, 1982, NRC Staff,
- 4 IDVP, PGandE; Bethesda, Maryland.
- 5 6. Public Meeting, March 4, 1982; NRC Commis-
- 6 sioners, NRC Staff; Washington, D.C.
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1  
2 Respectfully submitted,

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22  
23  
24  
25  
26

By  

Philip A. Crane, Jr.

DATED: September 19, 1983.

ATTACHMENT A

LICENSEE PACIFIC GAS AND ELECTRIC COMPANY'S  
ANSWERS TO GOVERNOR DEUKMEJIAN'S THIRD SET  
OF INTERROGATORIES

Attachment A

References (Supplement to Response to Interrogatory No. 24(b))

- (1) Seismic Evaluation for Postulated 7.5M Hosgri Earthquake, Units 1 and 2, Diablo Canyon Site, PGandE, U.S. NRC Docket Nos. 50-275 and 50-323.
- (2) Specification for Seismic Review of Major Structures for 7.5M Hosgri Earthquake, February 8, 1977.
- (3) Report by John A. Blume and Associates, Engineers, Diablo Canyon Nuclear Power Plant Unit No. 1, Containment Structure-Finite Element Model, Dynamic Seismic Analysis, July 1970, JABE-PGE-DC-1.
- (4) Pacific Gas and Electric Company, Phase I Final Report, Design Verification Program, Diablo Canyon Power Plant, 1982, Docket No. 50-275, OL-DPR-76.
- (5) Final Safety Analysis Report, Units 1 and 2, Diablo Canyon Site, PGandE, U.S. AEC Docket Nos. 50-275, 50-323.
- (6) ITP working papers, calculation packages, and all pertinent EOIs.

ATTACHMENT B

LICENSEE PACIFIC GAS AND ELECTRIC COMPANY'S  
ANSWERS TO GOVERNOR DEUKMEJIAN'S THIRD SET  
OF INTERROGATORIES



ENCLOSURE 2

This enclosure contains information which addresses potential unresolved items extracted from SSER No. 18. The information provided is considered by PGandE to resolve these items and is provided for review, as appropriate. Information for each item is provided on an individual attachment. Each attachment contains a reference, the identification of the unresolved item, and a response to the identified item. No further action on these issues is contemplated by the Project at this time, with the exception of 1) revising or supplementing the Phase I and II Final Reports at a future date, if appropriate, or 2) completion of evaluations and/or modification work, and documentation of said work.

ENCLOSURE 2

Attachment 1

CONTAINMENT ANNULUS STRUCTURE

20 Hz cutoff frequency

A. REFERENCE

Containment Annulus Structure  
SER Section 3.2.1.6, p. C.3-9

B. POTENTIAL UNRESOLVED ITEM

"It is noted, however, that a frequency of 20 Hz should not be considered as a frequency in the rigid range without verification. The Newmark Hosgri spectra approach ZPA at 33 Hz. It is the staff's position that use of the 20 Hz cutoff frequency for generation of floor response spectra should be verified and/or justified. With the exception noted, the results should lead to the acceptance of the annulus steel structure if the the program was carried out properly. The IDVP review will verify the accuracy of the DCP program."

"The staff considers the 20 Hz cutoff frequency for generation of floor response spectra an open issue and will require that the IDVP review verifications and/or justifications provided by the DCP and include the results of review in future reports."

C. DCP RESPONSE

Horizontal stiffness of the annulus steel being considered rigid by having a frequency beyond 20 Hz is based on the following rationale:

- (1) At the time of the Hosgri evaluation, the NRC Staff and its consultants, and PGandE and their consultants agreed the evaluation would be based on the same mathematical models and analytical procedures as were used for the DDE with certain specific exceptions. Since no exception was given in the Hosgri report, the Hosgri evaluation of the annulus steel was performed to the same criteria and using the same mathematical models and analytical procedures as for the DDE evaluation. For the annulus structure, this DDE analysis, as described in the FSAR, was based on the motions of the interior concrete crane wall without additional amplification. Thus, the horizontal stiffness of the annulus was considered rigid, i.e., transmit motion without amplification. This degree of rigidity, as defined in the FSAR for pipe support structures, systems, and components is 20 Hz. This same set of assumptions and considerations was carried forward for the Hosgri evaluation as permitted by the Hosgri report.

C. DCP RESPONSE (continued)

- (2) The annulus steel is a structure specifically designed to support piping. The stiffness requirements for pipe support structures for the DDE analysis as well as the Hosgri analysis is clearly defined in the FSAR and Hosgri Reports as 20 Hz.

This agreed upon criteria, i.e., being considered rigid by having a fundamental frequency greater than 20 Hz, is entirely reasonable and appropriate for the safety evaluation of the supported systems and components for the following reasons:

- o Dominant modes of piping and raceways generally have frequencies in the 5 to 15 Hz range. These modes are dominant for either or both of the following reasons. First, the highest amplification in the horizontal floor response spectra occurs in this range. Second, the participation factor of the modes in the 5 to 15 Hz range are normally higher than those of the higher modes. In the cases where modes with frequencies greater than 15 Hz have larger participation factors than those of lower modes, the system is quite stiff which results in considerable inherent structural capacity.
- o The strain associated with modes having frequencies higher than 20 Hz is quite small. For example, the natural frequency of a single mass oscillator is  $f = 3.13/\sqrt{D}$ , where D is the static deflection in inches of the mass subjected to a 1.0 g loading and f is in cycles per second. The deflection of a 20 Hz oscillator to a 1.0 g load is 0.0245 inches, which for the span and size of piping and raceways considered results in a small strain. A conservative estimate of the acceleration from a coupled analysis of the annulus steel and the piping or raceway for modes having a frequency greater than 20 Hz is 3.0 g. The deflection associated with a 20 Hz mode experiencing 3.0 g would be approximately 0.064 inches. Such a deflection could not cause serious problems for raceways or piping and these are the items supported by the annulus steel.
- o For conduits or piping where the modes having frequencies greater than 20 Hz are combined with lower modes, the effects are combined by the SRSS. This tends to reduce the significance of a nondominant mode. If, for example, there is one dominant mode below 20 Hz which produces a stress of 20 ksi and a mode above 20 Hz which produces a stress of 5 ksi, the combined stress is 20.6 ksi. Further, if there are four modes below 20 Hz and all are producing 5 ksi individually, the combined stress, excluding the higher mode, would be 10 ksi. The combined stress, including the higher mode, would be 11.2 ksi. This indicates the increase in stress due to inclusion of the higher modes causes only a small increase in the combined seismic stress.

C. DCP RESPONSE (continued)

- o Piping supports for Diablo Canyon have a stiffness of 20 Hz which results in a certain amount of toughness above that of supports designed on the basis of strength only. A number of plants designed in the late 60's and early 70's did not have any specific stiffness requirement for pipe supports. Thus, the design of Diablo Canyon's pipe supports is already more conservative than typical industry practice for this vintage plant.
- o The piping and raceway analysis is based on an uncoupled linear elastic analysis. Tests have demonstrated behavior to be nonlinear and designs based on linear analysis with traditional low damping values to be quite conservative. For piping, if the actual behavior of the supports are taken into consideration, it is apparent that the linear elastic analysis is a conservative idealization of the actual behavior. The actual gaps that exist at some supports are neglected. This results in more of the actual building motion being transmitted to the pipe than actually takes place. In reality, the pipe will tend to have relative movement between the pipe and supports where the gaps exist, which tends to reduce the input motion into the piping system and also tends to prevent a resonant condition from developing. In addition, some supports allow sliding to take place between the support and the pipe. The frictional behavior is also neglected, which, if included, would tend to reduce resonant conditions. The uncoupled analysis using response spectra as input has been recognized as a conservative approach when the weight of the supported items is above a few percent of the supporting structure. In the case of the piping and raceway systems, the percentage is high, relative to the annulus steel. Therefore some unquantified margin exists.

When the Hosgri criteria were developed from many and lengthy discussions between the NRC Staff, PGandE and its respective consultants, the above considerations, and perhaps others not explicitly mentioned, influenced the collective engineering judgment. Engineering judgment is, in fact, necessary in such a process due to the nature of seismic design. Based on all of the considerations outlined above, it is concluded that the 20 Hz criteria for definitions of rigid range for the horizontal response of the annulus structure is a reasonable and appropriate basis for evaluation of the piping, systems, and components supported by the annulus steel.

ATTACHMENT C

LICENSEE PACIFIC GAS AND ELECTRIC COMPANY'S  
ANSWERS TO GOVERNOR DEUKMEJIAN'S THIRD SET  
OF INTERROGATORIES



NAME: LINCOLN E. MALIK

RESPONSE TO INT. 61:

(a) Yes

(b) Seismic

(c) See attached resume.

(d) Publications:

1. "Evaluation of Contribution of Floor System to Dynamic Characteristics of Moment-Resisting Space Frames," with V. V. Bertero, Proceedings, Sixth World Conference on Earthquake Engineering, New Delhi, India (January, 1977)
2. "Contribution of a Floor System to the Dynamic Characteristics of R/C Buildings," with V. V. Bertero, Earthquake Engineering Research Center, Report No. EERC 76-30, University of California, Berkeley (1976)
3. "Preliminary Dynamic Analysis of the Main Building of the Olive View Hospital," with A. K. Chopra, V. V. Bertero, and S. A. Mahin, Proceedings, National Conference on Earthquake Engineering, Investigation of the San Fernando Earthquake, Los Angeles, California (February, 1972)



4. "Propagation of Entropy Through Systems of Mathematical Equations,"  
Engineer Thesis, Stanford University (1970)

(e) To be provided at the time of the testimony.

(f) i) Docket #

ii) Case #

Diablo Canyon License Unit 1 Testimony Before ASLB

(g) i) Date: 1979

ii) No

iii) No

iv) No

# Lincoln E. Malik

structural engineering  
earthquake engineering  
probability analysis  
soils engineering

## EDUCATION

University of California, Berkeley: Ph.D. Structural Engineering, 1976  
Stanford University: Degree of Engineer, 1970  
Stanford University: M.S. Civil Engineering, 1969  
University of California, Berkeley: B.S. Civil Engineering, 1964

## PROFESSIONAL HISTORY

URS/John A. Blume & Associates, Engineers, San Francisco, California, Manager of Structures Department, 1979-present; Project Engineer, 1976-1979  
University of California, Berkeley, Department of Civil Engineering, Research Assistant, 1971-1976  
Sargent and Lundy Consulting Engineers, Chicago, Illinois, Design Engineer, 1965-1968  
Westenhoff and Novak Consulting Engineers, Chicago, Illinois, Design Engineer, 1964

## PROFESSIONAL EXPERIENCE

Dr. Malik has had extensive experience in structural engineering, risk analysis, and soils engineering. His experience includes the seismic analysis of nuclear power plants, high-rise buildings, and buried structures; design of reinforced concrete and steel structures; assessment of earthquake damage; risk analysis of nuclear-related equipment and structures; foundation design; and slope-stability analysis. He is also a member of selected professional committees engaged in establishing state-of-the-art procedures for the seismic analysis of nuclear facilities.

Among other major projects, Dr. Malik supervised the seismic reanalysis and design of modifications for the Connecticut Yankee nuclear power plant in response to the Systematic Evaluation Program (SEP) initiated by the Nuclear Regulatory Commission (NRC). He directed the effort to develop the structural criteria and the technical approach to model, analyze, and design the modifications for the entire plant. He also supervised the development of project-specific computer programs and preliminary parametric studies and the preparation of responses to NRC staff questions.

Dr. Malik was also responsible for supervising the analysis, evaluation, and design of modifications of safety-related masonry walls in response to IE Bulletin 80-11. For this project, criteria documents were developed for three nuclear plants, and a full evaluation and design of modifications was completed for the masonry walls at the Connecticut Yankee plant. He also participated in the owners group that developed generic criteria for use in all plants.

*PROFESSIONAL EXPERIENCE (Continued)*

His supervision of the seismic evaluation and risk analysis of the Purex facility structures at the Hanford reservation in Washington included overseeing the nonlinear analyses of several structures. Also involved, in association with a subcontractor, was a risk analysis to develop fragility curves for the structures at the facility.

In connection with the seismic review of the Diablo Canyon Nuclear Power Plant for a postulated earthquake on the Hosgri fault, Dr. Malik supervised the reevaluation of the containment and auxiliary structures, providing such work as development of seismic criteria, mathematical modeling, soil-structure interaction analysis, dynamic analysis, and assistance in the development of the seismic sections of the PSAR and FSAR documents. In this work, he often met with NRC staff and clients to resolve problems and offered expert testimony at hearings before the Advisory Committee on Reactor Safeguards and the Atomic Safety and Licensing Board. He also coordinated a seismic research program for Pacific Gas and Electric Company involving several engineering and scientific firms.

His nuclear experience has also included structural analyses and design of structures at the Quad Cities Nuclear Power Plant, seismic analysis of buried nuclear waste storage tanks at the Hanford facility, and SEP work for the Dresden 2 and Oyster Creek nuclear power plants.

Dr. Malik's probability analysis experience includes supervision of a project to assess both the reliability of industrial cranes and added reliability resulting from redundancies along the crane's loading path.

Soils engineering, which was one of Dr. Malik's minors in his doctoral studies, is another area of his professional expertise. He was responsible for the analysis and design of the crusher building at the River Rouge Plant in Michigan, which was sunk as a caisson in very soft clay. He also directed projects requiring the design of foundations at several power plants and slope-stability analyses under gravity and seismic loads.

In addition, Dr. Malik has performed static and dynamic analyses to investigate the response of the Olive View Medical Center in Los Angeles to the 1971 San Fernando earthquake. He also investigated the contribution of floor systems to the dynamic characteristics of buildings.

*AFFILIATIONS*

ASCE Seismic Analysis of Safety Class Structures Standards Committee,  
Nuclear Standards Committee

1. NAME: JOHN M. AMARAL

RESPONSE TO INT. 61:

- (a) Yes
- (b) Quality Assurance
- (c) See attached professional qualifications for J. M. Amaral.
- (d) Author of numerous papers and reports that have contributed to the overall effectiveness of quality programs:

Papers

- 1. "Approach to the Acceptance of Concrete Requirements," presented at AIF Forum on Reactor Construction and Operation, Boston (1977)
- 2. "Interfacing With Project Management," given during the Ninth Annual National Energy Division Conference, Orlando (1982)
- 3. "Control of Quality for the 260-In-Dia Solid Rocket Motors," presented at ICRPG/AIAA Solid Propulsion Conference, Washington, D.C. (1966)
- 4. "Quality Assurance & Reliability of the Aerojet 260-Inch Motor," presented to the Panel on Reliability of Large Solid-Propellant Motors, JPL (1965)

5. "Observations on the Practical Approach to the Acceptance of Concrete Requirements," presented at Atomic International Forum on Reactor Construction and Operation, Boston (1977)

#### Reports

1. "260-Inch Motor Reliability Study, Final Report." (1968)
2. "Development of Non-Destructive Test Techniques for Large Solid Propellant Grains, Final Report," J. M. Amaral and B. L. Lamb (1971)

#### Contractural Reports, Plans, Proposals and Procedures

1. "Cost Effectiveness of Radiographic Examination of 156-In-Dia Rocket Motors."
2. "Microwave Inspection Technique Development for the 260-In-Dia Motor Grain."
3. "NDT Plan for TPA Titanium Forgings, ANSC QA-261-13-121."
4. "Nozzle Extension NDT Plan for Fibrous Graphite - Composite Nozzle Components, ANSC QA-261-13-143."

5. "Reliability and Quality Control Plan for Design, Fabrication, and Test of Omnidirectional Flexible Seals for Thrust Vector Control of Large Solid Rocket Motors."

(e) To be provided during the testimony.

(f) 1.i) Docket #'s 50-498 Operating License, 50-499 Operating License

Houston Lighting & Power, et al

ii) Case #

South Texas Project Units 1 and 2

ASLB Hearing

2.i) Docket #'s 50-275, 50-323

ii) Case #

PGandE CQA ASLB Hearing

(g) 1. Refer to the Docket.

2. Refer to the Docket.

ii)1 No

)2 No



iii)1 No

)2 No

iv)1 No

)2 No

PROFESSIONAL QUALIFICATIONS OF

JOHN M. AMARAL

My name is John M. Amaral. I am the Manager of Quality Assurance for the Bechtel Power Corporation. In this capacity I have responsibility for advancing the effectiveness of the corporate program and directing its implementation in all four divisions of Bechtel Power Corporation. This covers quality control and related activities for engineering, construction, and procurement. As part of this, I have provided special assistance to several projects, including non-Bechtel projects, where quality problems have developed, in which I directed investigations, furnished consulting services, and developed recommendations for corrective action.

I have 30 years of industry experience, including 11 years with Bechtel. Previously, my responsibilities included Manager of Quality Assurance for the Gaithersburg Power Division, Deputy Manager of Division Quality Assurance in Bechtel's San Francisco Power Division, and Quality Assurance Manager for the LMBR Fast Flux Test Facility.

Prior to joining Bechtel, I was Manager of Quality Systems for Aerojet Nuclear Systems Company, and served as a consultant on reliability, quality systems, and non-destructive testing and developed the quality system for Aerojet's portion of a major nuclear program. Earlier, I was program manager

of advanced technology, responsible for conducting research and development programs in nondestructive testing and reliability. Before that, I held successive positions as Quality Engineer, Manager of Quality Engineering, and Associate Manager, and later, Manager of Reliability and Quality Assurance. I have also been Chief Engineer at Burndy Corporation, responsible for supervising production engineering and control and quality control.

I hold a Bachelor of Science degree from the University of Southern California, where I majored in Industrial Management/Engineering. I am a Registered Professional Engineer in California and a Certified Reliability Engineer by the American Society for Quality Control (ASQC). I am a Senior Member of the ASQC; Junior Past Chairman of the ASQC Energy Division; Member of the Atomic Industrial Forum Subcommittee on Quality Assurance; and Member of the General Requirements Subcommittee of the ASME Committee on Nuclear Quality Assurance. I was selected as ASQC Energy Division QA Person of the Year for 1982, and received the 1983 American Nuclear Society (ANS) Special Award for distinctive quality assurance achievement in the nuclear energy field.

NAME:

R. D. ETZLER

RESPONSE TO INT. 61:

(a) Yes

(b) General

(c) See attached professional qualifications of R. D. Etzler.

(d) None

(e) To be provided during testimony.

(f) i) Docket #  
Diablo Canyon Unit #1

ii) Case #  
CQA Hearing before ASLB

(g) i) Date: July 19-22, 1983

ii) Yes

iii) Yes

iv) No

PROFESSIONAL QUALIFICATIONS OF

RICHARD D. ETZLER

My name is Richard D. Etzler. I am Project Superintendent at Diablo Canyon. I have held this position since September, 1978. I am responsible for managing the on-site construction and startup activities at Diablo Canyon.

Prior to my duties as Project Superintendent, I was Resident Mechanical Engineer. I held that position from March, 1977 to September, 1978. As Resident Mechanical Engineer, I was responsible for managing the mechanical type of construction activities such as installation of piping, ventilation systems, turbine/generator components, and nuclear steam supply system components.

Prior to my duties as Resident Mechanical Engineer, I was a Field Engineer and Group Leader, reporting to the Mechanical Resident Engineer. I held this type of position and level of responsibilities from 1971 to 1977. My responsibilities included supervising installation of the nuclear steam supply and turbine generator systems.

Prior to my duties as a Group Leader for the Mechanical Resident Engineer, I was a Startup Field Engineer, beginning in December, 1969. My duties as a Startup Engineer included preparing preoperational startup testing procedures and scheduling tests.

Prior to my assignment to Diablo Canyon, I was in training to be a Startup Engineer since October, 1968. This training included approximately nine months' startup experience at the Robert E. Ginna nuclear power plant near Rochester, New York, and six weeks' reactor operator training at Westinghouse's Waltz Mill facility near Pittsburgh, Pennsylvania.

Prior to October, 1968, I was a Field Engineer at PGandE's Round Mountain 500 kv Substation for three months. Duties included planning construction activities, "as-built" drawings, and assisting in testing components.

My first assignment with PGandE was as a Field Engineer on the construction of the Moss Landing Power Plant Units 6 and 7. This assignment started in June, 1967 and continued to July, 1968. My duties included assuring installation of piping systems was in accordance with engineering specifications and drawings.

I graduated from California Polytechnic College, San Luis Obispo, in June, 1967 with a BS degree in Mechanical Engineering.



NAME:

H. B. FRIEND

RESPONSE TO INT. 61:

(a) Yes

(b) General

(c) See attached resume.

(d) None

(e) To be provided during testimony

(f) None

(g) i) Not Applicable

ii) Not Applicable

iii) Not Applicable

iv) Not Applicable

PROFESSIONAL QUALIFICATIONS OF

HOWARD B. FRIEND

EDUCATION:

BS, Mechanical Engineering, Heald Engineering College

PROFESSIONAL DATA:

Member, American Society of Mechanical Engineers (Nuclear Power Group) -  
Special task force for the design of prestressed concrete containment vessels.

SUMMARY OF EXPERIENCE:

1 year: Manager of Projects  
2 years: Manager of Division Engineering  
5 years: Engineering Manager  
2 years: Project Manager  
7 years: Project Engineer  
4 years: Senior Engineer

#### EXPERIENCE:

Currently, Mr. Friend is the Completion Manager on Diablo Canyon for PGandE. Mr. Friend was previously Manager of Projects for the San Francisco Power Division. As Project Manager for the South Texas project (two 1250 MW pressurized water reactor (PWR) units), Mr. Friend was responsible for the takeover of engineering, procurement, and construction management, and related services. Takeover activities included reviewing and establishing the status of design, procurement, quality assurance, construction, and related activities; preparation of total cost estimate and schedule; preparation and implementation of a transition program to transfer the responsibilities from the existing engineer and construction manager to Bechtel; preparation of licensing information for the Nuclear Regulatory Commission (NRC); and explanation of the transition program to the NRC, Public Utilities Commission, partners, and other interested parties.

Prior to the above assignment, Mr. Friend was the Manager of Division Engineering, responsible for directing all engineering of the San Francisco Power Division, including the design of both fossil-fuel and nuclear power plants. His department was responsible for more than 22 major design projects, including development of the Bechtel generic coal-fired power plant.

Previously, as Engineering Manager, Mr. Friend had been responsible for Bowline Point Units 1 and 2 (two 600 MW oil-fired units); Skagit Unit 1 (a 1336 MW boiling water reactor (BWR) unit); Syncrude utility plant (an approximately 300 MW plant that furnishes steam, electricity, and other utilities for the Syncrude Tar Sands project in northern Alberta); and for a power plant that furnishes steam, electricity, and other utilities for the Badak liquid natural gas facility.

Mr. Friend was also Engineering Manager for the Susquehanna Steam Electric Station Units 1 and 2 (two 1086 MW BRW units) and for the studies and a task force responsible for analyzing the response of several Mark I and Mark II BWR containment structures to newly identified loading criteria.

Mr. Friend also acted as Project Engineer on other major projects, including Peach Bottom Units 1, 2, and 3 (one 40 MW high-temperature gas reactor, and two 1108 MW BWR units) and Limerick Units 1 and 2 (two 1090 MW BWR units). Earlier assignments covered a variety of fossil-fired and nuclear power plants in supervisory and technical capabilities and in field assignments.

NAME:

R. C. ANDERSON

RESPONSE TO INT. 61:

(a.) Yes

(b) General, Statistics and Seismic

(c) See attached professional qualifications of R. C. Anderson.

(d) None

(e) To be provided during the testimony.

(f) i) Docket # 1. 50-323, 50-275

2. 50-344

3. 50-263

ii) Case # 1. Diablo Canyon CQA Hearing before the ASLB

2. Trojan

3. Monticello

(g) i) Date: 1. July 19-22, 1983

2.

ii)

iii)

iv)



PROFESSIONAL QUALIFICATIONS OF

RICHARD C. ANDERSON

My name is Richard C. Anderson. I am the Engineering Manager in the Diablo Canyon integrated project organization consisting of Pacific Gas and Electric Company and Bechtel Power Corporation employees. I am a Registered Mechanical and Nuclear Engineer in the State of California. I hold a BS degree in Mechanical Engineering from the University of California at Berkeley.

I have been with Bechtel for more than 24 years and for the past five years have been assigned as an Engineering Manager in Bechtel's San Francisco Division, responsible for all engineering work in the Pacific Northwest and Japan. I have been assigned since March, 1982, specifically to the Diablo Canyon Project to act as Project Engineering Manager. Prior to these Engineering Manager assignments, I was the Chief Nuclear/Environmental Engineer for Bechtel's San Francisco Power Division, involved in nuclear power plant design, safety, and operation.

Prior to that, I was assigned as an Assistant Project Engineer on a proposed nuclear power plant project for PGandE and as Mechanical Supervisor and later Project Engineer on another large nuclear power plant project in the United States. These assignments included supervision and coordination of design, specification, procurement, and quality control activities.

I also served as Senior Mechanical Engineer for various other nuclear power facility projects in the United States and abroad, which included work in systems, safety and equipment engineering.

I have been an instructor in Bechtel's power plant courses for over 10 years and have given numerous talks and lectures in California on nuclear power and energy issues.

NAME:

W. H. WHITE

RESPONSE TO INT. 61:

(a) Yes

(b) General, Statistics and Seismic

(c) See attached professional qualifications of W. H. White.

(d) Inplane Shear Capacity of Reinforced Composite Masonry Block Walls,  
by W. H. White, W. S. Tseng, Transactions of 6th SMIRT Conference,  
1981.

Free Vibration and Buckling of Edge Stiffened Square Plates, Ph. D.  
Thesis.

(e) To be provided during the testimony.

(f) i) Docket # 1. 50-323, 50-275

2. 50-344

ii) Case # 1. Diablo Canyon CQA Hearing

2. Trojan

(g) i) Date: 1. July 19-22, 1983

2.

ii)

iii)

iv

PROFESSIONAL QUALIFICATIONS OF

DR. WILLIAM H. WHITE

My name is William H. White. I am an Assistant Project Engineer in the Diablo Canyon integrated organization consisting of Pacific Gas and Electric Company and Bechtel Power Corporation employees. My responsibilities include supervision and direction of seismic-related engineering analyses for the Diablo Canyon Unit 1 Project Engineering Organization. I am a Registered Professional Engineer and member of the American Society of Civil Engineers.

My educational background includes: BS, Civil Engineering, University of Idaho; MS, Civil Engineering, University of Colorado; PhD, Civil Engineering, University of Colorado.

For the past five years, I have been an engineering specialist with Bechtel's San Francisco Power Division working with the Chief Civil Engineer's staff in the area of seismic analysis for several Bechtel projects.

Earlier, I was a Structural Engineer with the Tennessee Valley Authority where I was responsible for seismic analysis of all Category I structures for a twin-unit nuclear power plant, including seismic input for the design of the nuclear steam supply system.

I was an Assistant Professor at Oregon State University where I taught undergraduate and graduate courses in structural mechanics and analysis and computer applications. I performed a special study for Bechtel on soil-structure interaction for the proposed Mendocino nuclear power plant while teaching at Oregon State University.

While employed at the Bettis Atomic Power Laboratory, I was a Senior Engineer working on shock analysis of nuclear reactors aboard submarines and was involved in programs to assess the shock resistance of reactor internals subjected to long-term irradiation damage.



NAME:

S. M. SKIDMORE

RESPONSE TO INT. 61:

(a) Yes

(b) General and Quality Assurance

(c) See attached professional qualifications of S. M. Skidmore.

(d) None

(e) To be provided during testimony.

(f) i) Docket # 50-323, 50-275

ii) Case # Diablo Canyon CQA Hearing

(g) i) Date: July 19-22, 1983

ii)

iii)

iv)

PROFESSIONAL QUALIFICATIONS OF

STEVEN M. SKIDMORE

My name is Steven M. Skidmore. I have been the Manager of Quality Assurance in the Nuclear Power Generation Department in the Pacific Gas and Electric Company since May, 1983. I am responsible for the quality assurance of Diablo Canyon Power Plant construction and engineering. Prior to that, I was the Assistant Project Manager to the Diablo Canyon Project, between February, 1982 and May, 1983, where I was responsible for management of the Diablo Canyon Construction Quality Assurance Evaluation, as well as other functions.

Between 1972 and 1982, I was employed by Pacific Gas and Electric Company as an engineer in various capacities, including engineer in the Mechanical and Nuclear Engineering Department, Assistant to the Nuclear Projects Engineer, Technical Assistant to the Vice President of Nuclear Power Generation, and Supervising Personnel and Environmental Safety Engineer. In these positions, my responsibilities included analyses of reactor physics and fuel cycle evaluations for Diablo Canyon, and the management and coordination of development of the emergency plans for Diablo Canyon.

Between 1967 and 1971, I was employed as a Research Assistant in the Department of Mechanical Engineering at Stanford University, where I was enrolled as a graduate student of nuclear engineering.

Between 1962 and 1967, I was employed by the General Electric Company, both at the Hanford Atomic Products Operations Office and at the Nuclear Energy Division. My responsibilities included engineering work in pile physics, and the analyses of reactor physics for reactor fuel manufacturers and a plutonium production laboratory.

I am a Registered Professional Nuclear Engineer in the State of California. I have a MS degree in Nuclear Engineering from Stanford University in 1969, and a BS degree in Physics from Oregon State University in 1962.

NAME:

M. J. JACOBSON

RESPONSE TO INT. 61:

(a) Yes

(b) Quality Assurance

(c) See Attached professional qualifications of M. J. Jacobson

(d) None

(e) To be provided during testimony.

(f) i) Docket # 1. 50-323, 50-275

2. 50-471

ii) Case # 1. Diablo Canyon CQA Mini-Hearing

2. Pilgrim Station Unit 2 Construction Permit  
Hearing

(g) i) Date: 1. July 20-21, 1983

2.

ii) 1. Yes (Affidavit of Warren A. Raymond, et al, July 2, 1982)

2. No

iii) 1. Yes

2. No

iv) No

PROFESSIONAL QUALIFICATIONS OF

MICHAEL J. JACOBSON

My name is Michael J. Jacobson. I am the Project Quality Assurance (QA) Engineer for the Diablo Canyon Project consisting of the integrated organization of Bechtel Power Corporation and Pacific Gas and Electric Company. I am a Registered Professional Quality Engineer in the State of California.

My educational background is as follows: BS in Civil Engineering, Sacramento State College, 1970; Business Management Certificate in Management, Golden Gate University, 1979.

I joined Bechtel Power Corporation in 1970 as a Quality Assurance Engineer responsible for various aspects of design phase quality assurance on a nuclear power plant project. I was subsequently responsible for performing structural design and seismic analysis activities on the project. Later, I was assigned as Project Quality Assurance Engineer responsible for supervising project QA activities, including direction of quality audits of construction activities.

Subsequently, I was assigned Project QA Engineer on various other nuclear power plants, where I was responsible for directing project QA programs. I was responsible for ensuring that project construction and site activities, as well as quality control aspects, met applicable QA and regulatory requirements.

I was assigned to the Diablo Canyon project in 1982 to direct and control the QA program for this project.



NAME:

C. W. DICK

RESPONSE TO INT. 61:

(a) Yes

(b) Quality Assurance

(c) See attached professional qualifications of C. W. Dick.

(d) Paper on Design Control Requirements (ANSI N45.2.11) presented at the Nuclear Quality Assurance Seminar, Knoxville, Tenn. on March 9, 1978.

(e) To be provided during testimony.

(f) i) Docket # 50-323, 50-275

ii) Case # Diablo Canyon CQA Hearing

(g) i) Date: July 19-22, 1983

ii)

iii)

iv)

PROFESSIONAL QUALIFICATIONS OF

CHARLES W. DICK

My name is Charles W. Dick. I am a Project Manager and a member of the project management team of the Diablo Canyon Project consisting of the integrated organization of Bechtel Power Corporation and Pacific Gas and Electric Company, and with responsibilities which include quality assurance. I am a Licensed Professional Engineer in the states of California, New York, and Pennsylvania.

My educational background is as follows: BS in Electrical Engineering, California Institute of Technology, 1946; MS in Electrical Engineering, Stanford University, 1948.

I have also had additional training through Advanced Engineering Programs in Business Administration and from various technical and business courses.

Prior to my recent assignment to the Diablo Canyon Project, I was Manager of Division Quality Assurance Division at the Bechtel Power Corporation from 1980 to 1982. My responsibilities included formulating the QA programs for implementing such programs, and training QA personnel for some 14 nuclear projects.

I joined Bechtel Power Corporation in 1965 and worked as a Project Engineer on various nuclear and fossil-fuel projects. I was responsible for project engineering work for a number of different types of power projects and studies, for nuclear standards development and for licensing. Beginning in 1973, I became an Engineering Manager and subsequently Manager of Engineering, with overall management responsibility for the project engineering work on more than 20 power plant projects.

Prior to my employment at Bechtel, I was engaged as an engineer with the General Electric Company beginning in 1948. During that time, I was involved in marketing and application engineering related to nuclear power facilities. Prior to that I was assigned as an electric utility applications engineer and provided consultation services involving heavy electrical apparatus.

I am a senior member of IEEE and a member of the American Society for Quality Control. I was also a member of the industry working group for development of ANSI Standard N45.2.11 (Quality Assurance Standards for Design of Nuclear Power Plants).

NAME:

G. H. MOORE

RESPONSE TO INT 61:

(a) Yes

(b) General, Statistics and Seismic

(c) See attached professional qualifications of G. H. Moore.

(d)

(e) To be provided during the testimony.

(f) i) Docket # 50-323, 50-275

ii) Case # Diablo Canyon CQA Hearing

(g) i) Date: July 19-22, 1983

ii)

iii)

iv)

PROFESSIONAL QUALIFICATIONS OF

GARY H. MOORE

My name is Gary H. Moore. I am the Unit 1 Project Engineer of the Diablo Canyon Project consisting of the integrated organization of Pacific Gas and Electric Company and Bechtel Power Corporation. I have held this position since January, 1982. I am responsible for the project engineering work related to the design and analysis of Diablo Canyon Power Plant Unit 1. I am a Registered Professional Engineer in Mechanical and Control Systems in the State of California.

My educational background is as follows: BS in Mechanical Engineering, San Jose State University, 1968; MS in Mechanical Engineering, San Jose State University, 1969.

I joined PGand E in 1969 as a Mechanical Engineer in the Mechanical and Nuclear Engineering Department, designing instrumentation and control (I&C) systems for conventional fossil plants.

In 1977, I was named a Senior Mechanical Engineer supervising the I&C Group assigned to the Potrero Unit 7 Project.

In 1979, I was named Supervising Mechanical Engineer, supervising the Mechanical and Nuclear Engineering Department's entire I&C Group, including responsibility for the I&C design of the Diablo Canyon Power Plant.

I have completed the following formal training courses: Simulator Training, Westinghouse Nuclear Training Center, Zion, Illinois; Westinghouse PWR Information Course.



NAME:

DR. S. KAPLAN

RESPONSE TO INT. 61:

(a) Yes

(b) Statistics

(c) See attached professional qualifications of Dr. S. Kaplan.

(d) See attached list of publications.

(e) To be provided during the testimony.

(f) i) Docket #

ii) Case #

(g) i) Date:

ii)

iii)

iv

PROFESSIONAL QUALIFICATIONS OF

DR. STANLEY KAPLAN

EDUCATION:

Senior Post-Doctoral Fellowship, University of Southern California, 1967-1969.

Ph.D., Mechanical Engineering and Applied Mathematics, University of

Pittsburgh, 1960. Post-doctoral courses in mathematics at the University of Pittsburgh and Carnegie Institute of Technology, 1960-1965.

M.S., Mechanical Engineering, University of Pittsburgh, 1958.

Graduate of the Oak Ridge School of Reactor Technology, 1955.

B.S., Civil Engineering, City College of New York, 1954.

PROFESSIONAL EXPERIENCE:

General Summary

Mathematician and engineer well known for contributions to risk analysis and reliability theory, reactor physics, kinetics, and computational technique. Specializes in probabilistic methodology; decision theory; risk analysis; and, particularly, applications of Bayes' theorem. In this connection, has worked specifically and recently on developing probabilistic and decision theoretic treatments of various phases of the energy business. Included here are PRA analyses of several existing nuclear plants, hazardous material transportation and storage, spent fuel pools, aircraft impact, offshore oil drill (environmental risk), underground oil storage, pipelines, and tarsands

projects (business and construction risk). Developer of the DPD method for probabilistic calculations, the two-stage Bayesian technique for data analysis, the "set of triplets," "probability of frequency," "cause table," and "environmental table" concepts in risk analysis. Originator of the Matrix Theory of Event Trees and DPD approach to seismic risk analysis.

#### Chronological Summary

1977 - Present      President, Kaplan & Associates, Inc., a consulting firm specializing in risk analysis and applied decision theory.

Concurrently Adjunct Professor, Department of Chemical, Nuclear and Thermal Engineering, University of California, Los Angeles, and Associate Consultant, Pickard, Lowe and Garrick, Inc.

1975-1977      Private consultant specializing in risk analysis and decision theory.

1972-1975      Holmes & Narver, Inc., Anaheim, California  
Director, Advanced Technology Division;  
Director, Systems Sciences Division  
Technical Director, Nuclear & Systems Science Group

1971-1972      Director of Software Development, COMARC Design Systems, Inc., San Francisco, California.

1969-1971	Product Manager and Senior Staff Member, Computer Sciences Corporation, Los Angeles, California.
1967-1969	Special Research Fellow, U.S. Public Health Service at University of Southern California, Los Angeles.
1955-1967	Westinghouse Bettis Atomic Power Laboratory, West Mifflin, Pennsylvania.  Experimentalist, Experimentalist in Charge, Scientist, Senior Scientist, Fellow Scientist, Advisory Scientist.
1954	Lecturer, Department of Civil Engineering, City College of New York.
1962-1967	Concurrently Adjunct Professor of Mechanical Engineering, University of Pittsburgh; Lecturer, Department of Mathematics, Carnegie Institute of Technology.

MEMBERSHIPS, PAST OR PRESENT:

American Society of Civil Engineers  
 American Nuclear Society  
 Society of Industrial and Applied Mathematics  
 New York Academy of Sciences

LIST OF PUBLICATIONS OF

DR. STANLEY KAPLAN

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Yasinsky, J. B., and S. Kaplan, "On the Use of Dual Variational Principles for the Estimation of Error in Approximate Solutions of Diffusion of Problems," Nuclear Science and Engineering, 31, 80-90 (1968).

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Garrick, B. J., S. Kaplan, D. C. Iden, E. B. Cleveland, H. F. Perla, D. C. Bley, D. W. Stillwell, H. V. Schneider, and G. Apostolakis, "Power Plant Availability Engineering: Methods of Analysis, Program Planning, and Applications," EPRI NP-2168, PLG-0165, May 1982.

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NAME: THOMAS G. DeURIARTE

RESPONSE TO INT. 61:

(a) Yes

(b) Quality Assurance

(c) See attached Professional Qualifications of T. G. DeUriarte

(d) None

(e) To be provided at the time of the testimony.

(f) None

(g) i) Not applicable

ii) Not applicable

iii) Not applicable

iv) Not applicable

## Resume

T. G. de Uriarte, Senior Engineer  
Quality Assurance Department  
Pacific Gas and Electric Company  
77 Beale St., San Francisco, California 94106

### EDUCATION

B.S. Civil Engineering, University of California, Berkeley, 1967

### PROFESSIONAL REGISTRATION

Certificate No. 25196, Civil Engineering, California  
Certificate No. 874, Quality Engineering, California

### EXPERIENCE

7/67 TO PRESENT: Pacific Gas and Electric Company, 77 Beale St.,  
San Francisco, CA 94106

7/77 TO PRESENT: Senior Engineer, Quality Assurance Department  
Primary responsibilities include:

- (a) administration of audit program, schedule audits and assign personnel to perform audits of Company and Supplier activities to verify compliance with applicable Nuclear Regulatory Commission regulations and other requirements such as nuclear industry guides and standards, and corporate procedures and specifications.
- (b) supervision of department personnel for the timely completion of special projects.
- (c) supervision of departmental participation in review of discrepancies.
- (d) supervision of development of departmental training program.
- (e) participation in licensing hearings as QA department representative.

2/72 to 7/77: Engineer, Quality Assurance Department.

Primary responsibilities were to (a) perform audits of Company and Supplier activities; (b) develop procedures for the corporate quality program; (c) review and approve, if appropriate, suppliers quality assurance/control programs; (d) develop the corporate specifications for suppliers quality assurance programs; (e) provide interface with regional NRC inspectors.

4/70 to 2/72: Scheduling Engineer, Station Construction Department at Pittsburg Power Plant. Primary responsibilities were to (a) develop, layout, and maintain overall project schedule and schedules for the various contractors and the various systems; (b) analyze layouts and budgeting for future plant sites; (c) investigate equipment delivery dates and forecast the consequences of delays to the project schedule; (d) prepare weekly and bi-monthly progress reports; (e) initiate and process claims against contractors, carriers, and suppliers.

10/68 to 4/70: Field Engineer, Civil Department at Pittsburg Power Plant. Primary responsibilities were to (a) perform field inspection of specific contracts; (b) provide office supervision of specific contracts; (c) estimate quantities for contract administration; (d) verify contractors' billings for unit price and cost plus change orders; (e) analyze job progress and provide suggestions for improvements; (f) participate in Company program for safety, first aid, and jobsite surveillance of safety infractions.

The above duties were performed for pile driving, subfoundations and foundations, underground piping systems, structural steel erection, and superstructure erection.

7/67 to 10/68: Field Engineer, Substation Construction. General Construction Department. Primary responsibilities were to (a) supervise contractors in excavating, grading, fencing, and surfacing Company substations; (b) provide job progress reports; (c) perform surveying for verification of property lines and acceptance of final grades; (d) perform drafting, job layouts, and quantity takeoffs for job estimates.

#### SOCIETIES

American Society for Quality Control; American Society for Nondestructive Testing; California Association of Professional Engineers.

Name: L.E. SHIPLEY

Position: Assistant Chief Engineer (Plant Design)  
Technical Consultant to Diablo Canyon

Education: BS, Mechanical Engineering, US Merchant Marine Academy,  
Kings Point, NY

Professional Data:

- o Registered Professional Mechanical Engineer in California
- o Member of ASME
- o Member of ASME/ANSI Task Force to Define Vibration Monitoring Requirements for Piping (Past)
- o Member ANS Committee for Protection Against Postulated Effects of Pipe Rupture.
- o Member of Industry Advisory Committee to a DOE program for Structural Energy Absorbing Restrainers.
- o Chairman on several ASME Technical Sessions at the ASME Piping and Pressure Vessel Conferences.

Summary:

- o Present - Assistant Chief Engineer
- o 1 year Technical Consultant to Diablo Canyon
- o 1½ years Assistant Project Engineer (Nuclear Plant)
- o 4 years Supervisor of Piping Stress Analysis for San Francisco Power Division.
- o 9 years various positions of increasing responsibility in Engineering
- o 2 years Engineering Officer, US Merchant Marines.

Experience:

Mr. Shipley has recently assumed the position of Assistant Chief Engineer for Plant Design in the San Francisco Power Division. The scope of responsibility of the Chief's office requires technical direction of over 900 professional engineers and draftsmen working on 15 projects worldwide. Scope of services includes equipment location, piping layout, piping stress analysis, pipe support design, material specification, welding and NDE. Projects include nuclear, fossil and co-generation power plants. He is the chairman of an interdivisional technical steering committee for computer program applications. In addition, he is the corporate sponsor for over 10 computer programs including the most widely used piping program.

Experience  
(continued):

For over a year, Mr. Shipley has been assigned to the Diablo Canyon Nuclear Power Plant in San Luis Obispo, Ca. as a Technical Consultant to the piping program. He was instrumental in the development and review of the Corrective Action Program whose intent was to review all piping systems to licensing commitments and newly developed seismic criteria. During the course of the assignment, constant communication was required with the independent verification team and the construction forces at the jobsite.

Previously, he was Assistant Project Engineer on the Susquehanna Steam Electric Station in Berwick, Pennsylvania for  $1\frac{1}{2}$  yrs. He was responsible for engineering in the civil-structural, architectural and piping/plant design areas. He directed the efforts of 350 engineers and draftsmen in a variety of engineering tasks including:

- o structural analysis review of all seismic category 1 buildings.
- o Preparation of as-built response spectra curves.
- o Piping/Stress analysis and pipe support design.
- o Valve Qualification
- o Material Specification
- o Welding and NDE

The final 2 months before fuel-load were spent at the jobsite coordinating the final as-built reconciliation for pipe hangers. This phase of the work required extensive construction/engineering interface for which he was the focal point. The job responsibilities also included budget, schedule and manpower planning aspects.

Technical direction was given in the areas of stress analysis, pipe support design, materials selection and qualification, valve qualification, welding and NDE.

Previously, Mr. Shipley worked in the field of piping stress analysis for  $13\frac{1}{2}$  years and was responsible for technical direction and personnel administration of 150 engineers and technicians. Projects under his supervision include nuclear and fossil power plants, as well as liquid-metal fast breeder plants.

Experience  
(continued):

He has been directly involved in the design of the following nuclear plants: Monticello, Pilgrim 1, Peach Bottom, and Duane Arnold. He has had supervisory responsibilities for Arkansas Units 1 and 2, and Trojan, Limerick, 1 & 2, Susquehanna, 1 & 2, Pilgrim 2, Skagit. Fossil plants include: Jim Bridger and Colstrip. FFTF was the breeder plant.

Mr. Shipley was responsible for the dynamic analysis of piping as it relates to abnormal events, such as pipe rupture and building response to dynamic loads. Analysis includes both linear and non-linear, as well as elasto-plastic evaluations using time history and direct integration computer codes. Mr. Shipley was also responsible for ASME - required stress reports including life cycle evaluation of thermal transients as well as other cyclic phenomenon. He was responsible for the analysis of piping on fossil projects, including cold springing of the major piping systems. Corporate Standards and Guides were written under his supervision.

Mr. Shipley has visited all of the jobsites mentioned above, primarily in a trouble-shooting capacity, and has conducted the pipe support field review on Monticello.

He was responsible for the Bechtel Topical report, "Seismic Analysis of Piping Systems." He has served on ASME Annual Meetings for Pressure Vessels and Piping as a session chairman for seismic analysis of piping and equipment.

He has testified at several hearings on various piping issues.



INFORMATION REQUEST SHEET

1. Technical Publication - Article, Books, etc.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

2. Previous Testimony

Docket No.

Case No.

Date of Testimony

? TROJAN SEIS. REEVALUATION

78-79

~~LIMERICK CONST LLC. HEADING~~

72

ACES - BECHTEL PRESENTATION ON INDUST. PROB

75-76

3. Do you have a copy of the testimony?

NO

4. Do you have a copy of the transcript of the witness's examination or cross-examination?

NO

5. Do you have any notes for the preparation of the testimony?

NO

6. Provide the document references you will rely on to reach any opinion testimony and specifically correlate each document (by page and paragraph number) to each specific subject matter.

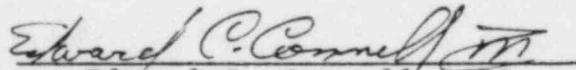
ASME SECTION II, ANSI B31.1

THIRD SET OF INTERROGATORIES  
PROPOUNDED TO PACIFIC GAS AND ELECTRIC COMPANY  
BY GOVERNOR DEUKMEJIAN

---

I have assisted in preparing the answers to  
Interrogatories 51 and 52\_\_\_\_\_.

Said answers are true and correct to the best of my knowledge  
and belief.

  
Edward C. Connell, III

Subscribed and sworn to  
before me this 19th day  
of September, 1983.

C. T. Neal-Madison

C. T. Neal Madison, Notary Public  
in and for the City and County  
of San Francisco, State of  
California

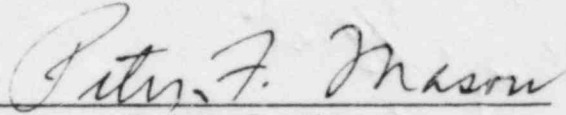


My Commission expires December 27, 1985

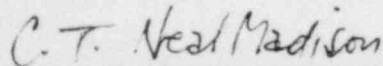
THIRD SET OF INTERROGATORIES  
PROPOUNDED TO PACIFIC GAS AND ELECTRIC COMPANY  
BY GOVERNOR DEUKMEJIAN

---

I have assisted in preparing the answers to  
Interrogatories 47, 48, 49, and 50.  
Said answers are true and correct to the best of my knowledge  
and belief.

  
Peter F. Mason

Subscribed and sworn to  
before me this 19th day  
of September, 1983.



C. T. Neal Madison, Notary Public  
in and for the City and County  
of San Francisco, State of  
California



My Commission expires December 27, 1985

THIRD SET OF INTERROGATORIES  
PROPOUNDED TO PACIFIC GAS AND ELECTRIC COMPANY  
BY GOVERNOR DEUKMEJIAN

---

I have assisted in preparing the answers to  
Interrogatories 5, 6, 15, 16, 41, 42, 53, 54, 61, and 62.  
Said answers are true and correct to the best of my knowledge  
and belief.

*Richard C. Anderson*

Richard C. Anderson

Subscribed and sworn to  
before me this 19th day  
of September, 1983.

*C.T. Neal Madison*

C. T. Neal Madison, Notary Public  
in and for the City and County  
of San Francisco, State of  
California

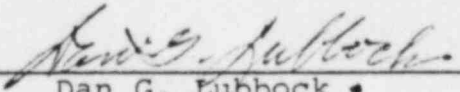


My Commission expires December 27, 1985

THIRD SET OF INTERROGATORIES  
PROPOUNDED TO PACIFIC GAS AND ELECTRIC COMPANY  
BY GOVERNOR DEUKMEJIAN

---

I have assisted in preparing the answers to  
Interrogatories 1, 2, 3, 4, 7, 8, 9, 10, 11, 12, 13, 14, 17, 18, 19,  
20, 57, 58, 59, and 60.  
Said answers are true and correct to the best of my knowledge  
and belief.

  
\_\_\_\_\_  
Dan G. Lubbock •

Subscribed and sworn to  
before me this 19th day  
of September, 1983.

*C. T. Neal Madison*

C. T. Neal Madison, Notary Public  
in and for the City and County  
of San Francisco, State of  
California

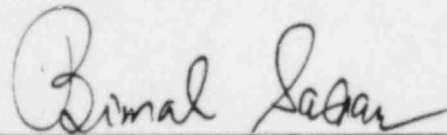


My Commission expires December 27, 1985

THIRD SET OF INTERROGATORIES  
PROPOUNDED TO PACIFIC GAS AND ELECTRIC COMPANY  
BY GOVERNOR DEUKMEJIAN

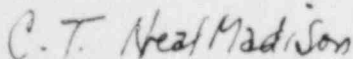
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I have assisted in preparing the answers to  
Interrogatories 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 33, 34,  
35, 36, 37, 38, 39, 40, 43, 44, 45, and 46.  
Said answers are true and correct to the best of my knowledge  
and belief.



Bimal Sarkar

Subscribed and sworn to  
before me this 19th day  
of September, 1983.



C. T. Neal Madison, Notary Public  
in and for the City and County  
of San Francisco, State of  
California



My Commission expires December 27, 1985



THIRD SET OF INTERROGATORIES  
PROPOUNDED TO PACIFIC GAS AND ELECTRIC COMPANY  
BY GOVERNOR DEUKMEJIAN

---

I have assisted in preparing the answers to  
Interrogatories 55, 56, and 61.  
Said answers are true and correct to the best of my knowledge  
and belief.

*Michael J. Jacobson*  
Michael J. Jacobson

Subscribed and sworn to  
before me this 19th day  
of September, 1983.

*C.T. Neal Madison*

C. T. Neal Madison, Notary Public  
in and for the City and County  
of San Francisco, State of  
California




My Commission expires December 27, 1985

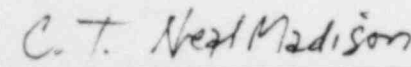
THIRD SET OF INTERROGATORIES  
PROPOUNDED TO PACIFIC GAS AND ELECTRIC COMPANY  
BY GOVERNOR DEUKMEJIAN

---

I have assisted in preparing the answers to  
Interrogatories 31, 32, and 61.  
Said answers are true and correct to the best of my knowledge  
and belief.

  
\_\_\_\_\_  
Gary H. Moore

Subscribed and sworn to  
before me this 19th day  
of September, 1983.

  
\_\_\_\_\_  
C. T. Neal Madison, Notary Public  
in and for the City and County  
of San Francisco, State of  
California



My Commission expires December 27, 1985

THIRD SET OF INTERROGATORIES  
PROPOUNDED TO PACIFIC GAS AND ELECTRIC COMPANY  
BY GOVERNOR DEUKMEJIAN

---

I have assisted in preparing the answers to  
Interrogatories 49 and 50.

Said answers are true and correct to the best of my knowledge  
and belief.

*Hans G. Sommer*

Hans G. Sommer

Subscribed and sworn to  
before me this 19th day  
of September, 1983.

*C. T. Neal-Madison*

C. T. Neal Madison, Notary Public  
in and for the City and County  
of San Francisco, State of  
California



My Commission expires December 27, 1985

UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

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

CERTIFICATE OF SERVICE

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

Judge John F. Wolf  
Chairman  
Atomic Safety and Licensing Board  
US Nuclear Regulatory Commission  
Washington DC 20555

Judge Glenn O. Bright  
Atomic Safety and Licensing Board  
US Nuclear Regulatory Commission  
Washington DC 20555

Judge Jerry R. Kline  
Atomic Safety and Licensing Board  
US Nuclear Regulatory Commission  
Washington DC 20555

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San Francisco CA 94102

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Chairman  
Atomic Safety and Licensing  
Board Panel  
US Nuclear Regulatory Commission  
Washington DC 20555

\*Sent by Sky Courier Network

Chairman  
Atomic Safety and Licensing  
Appeal Panel  
US Nuclear Regulatory Commission  
Washington DC 20555

Secretary  
US Nuclear Regulatory Commission  
Washington DC 20555

Attn: Docketing and Service  
Section

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Washington DC 20555

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San Luis Obispo CA 93402

Judge Thomas S. Moore  
Chairman  
Atomic Safety and Licensing  
Appeal Board  
US Nuclear Regulatory Commission  
Washington DC 20555

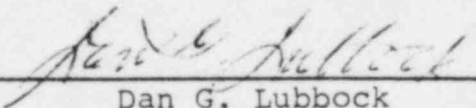
Judge W. Reed Johnson  
Atomic Safety and Licensing  
Appeal Board  
US Nuclear Regulatory Commission  
Washington DC 20555

Judge John H. Buck  
Atomic Safety and Licensing  
Appeal Board  
US Nuclear Regulatory Commission  
Washington DC 20555

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Date: September 19, 1983

  
Dan G. Lubbock

\*Sent by Sky Courier Network