

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

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USNRC

ATOMIC SAFETY AND LICENSING APPEAL BOARD SEP 12 11:18

In the Matter of)
)
PACIFIC GAS AND ELECTRIC COMPANY) Docket Nos. 50-275 OL
) 50-323 OL
(Diablo Canyon Nuclear Power)
Plant, Units 1 and 2))
-----)

OFFICE OF SECRETARY
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BRANCH

GOVERNOR DEUKMEJIAN'S AND JOINT INTERVENORS'
CONTENTIONS ON DESIGN QUALITY ASSURANCE

Pursuant to the Atomic Safety and Licensing Appeal Board's August 26, 1983 order, Governor Deukmejian and the Joint Intervenors hereby submit their contentions on design quality assurance. For the convenience of the board and the parties, the contentions are stated in their entirety, with the matters added with this filing underscored.

1. The scope of the IDVP review of both the seismic and non-seismic aspects of the designs of safety-related systems, structures and components (SS&C's) was too narrow in the following respects:

(a) The IDVP did not verify samples from each design activity (seismic and non-seismic).

(b) In the design activities the IDVP did review, it did not verify samples from each of the design groups in the design chain performing the design activity.

(c) The IDVP did not have statistically valid samples from which to draw conclusions.

(d) The IDVP failed to verify independently the analyses but merely checked data of inputs to models used by PG&E.

(e) The IDVP failed to verify the design of Unit 2.

2. The scope of the ITP review of both the seismic and non-seismic aspects of the designs of the safety-related systems, structures and components (SS&C's) was too narrow in the following respects:

(a) The ITP did not verify samples from each design activity (seismic and non-seismic).

(b) In the design activities the ITP did review, it did not verify samples from each of the design groups in the design chain performing the design activity.

(c) The ITP did not have statistically valid samples from which to draw conclusions.

(d) The ITP has failed systematically to verify the adequacy of the design of Unit 2.

3. In various situations listed below the ITP used improper engineering standards to determine whether design activities met license criteria. In some of these situations the IDVP either used or approved the use of such improper standards or did not verify them at all.

(a) The ITP accepted the mean measured performance of structures and materials in lieu of code-specified minima in its seismic analysis for the Hosgri event of the containment, auxiliary building, fuel handling building, turbine building, and intake structure.

(b) The ITP failed to verify that the stress and load factors for steel used in the containment building were within code values in its seismic analysis for the Hosgri event.

(c) The ITP failed to specify all damping values used in various seismic modes in the containment and auxiliary buildings in that, for containment for the DE and the DDE, different damping values are used in different components of the system, but the resulting values of damping for each mode in the modal analysis are not specified. For the auxiliary building, values of damping for each mode in the modal analysis are not

specified, and the ITP has not specified what damping values, if any, were used for the soil springs.

(d) The ITP failed to verify that PG&E's use of the double algebraic sum method of calculation (rather than the sum of the squares method) was an acceptable substitution in the Phase 1 Final Report's calculation of member forces for the Hosgri event, where the double algebraic sum method is used solely for closely spaced modes, and sum of the squares method is used elsewhere.

(e) The ITP's use of time-history modeling techniques for some accelerations, displacements and shell forces in the containment structure and Blume response spectra for other accelerations, displacements and shell forces in the same structure was improper.

(f) The ITP's modeling of the soil properties for the containment and auxiliary buildings was improper in that:

(i) in the soil structure interaction analysis of containment for the DE and the DDE, use of boundary motion inputs to the model were improperly used;

(ii) the soil structure interaction analysis for containment for the DE and the DDE uses a 7 percent damping value for rock, which is unconservative, especially for the DE;

(iii) the dynamic analyses of the containment for all earthquakes omit any analysis of uplifting of the foundation mat;

(iv) the modeling of the soil springs for the auxiliary building does not specify soil properties;

(v) in the modeling of the soil springs for the auxiliary building, the motion inputs to the lower ends of the springs does not account for all soil structure interaction phenomena that could be expected.

(g) The ITP's modeling of the crane in the turbine building was improper in that it models the crane only for a single (parked) position and load (unloaded).

(h) The ITP's modeling of torsion factors for different buildings by differing techniques is improper in that PG&E's modeling of torsion factors is not shown to be conservative, and is unconservative in at least one case.

(i) The ITP's modeling of hydrodynamic forces for the intake structure were improper in that sloshing effects for the inside water and hydrodynamic pressures on the outside of the structure were not considered.

(j) The ITP's modeling of the intake structure by using different models for horizontal and vertical seismic loadings and combining vertical and horizontal responses was improper in that the modeling of the crane combines linear and nonlinear analyses for the different loads without justification.

(k) The ITP's modeling of the intake structure by using ductility factors for steel and concrete was improper in that no explanation or justification for ductility estimates are provided, and in that a post yield analysis was apparently done to determine pier ductility characteristics, also without justification or listing of results.

(l) The ITP's computations of modes in the containment building having frequencies between 20 and 33 HZ was improper in that the analysis does not present data on the amount of mass accounted for by these modes, and in that it is not clear that criteria were correctly applied.

() The ITP's modeling of the containment building by failing to use two horizontal components for the DE and DDE was improper in that it is not clear whether criteria were correctly applied.

(n) The ITP's stress values for concrete in shear walls used in modeling the auxiliary building was improper in that the stress value (allowable) used for

shear in the concrete walls is large, is less conservative than what is provided in ACI 318-77, and may cause wide cracks.

4. The IDVP accepted deviations from the licensing criteria without providing adequate engineering justification in the following respects:

- a. Contrary to the requirements of FSAR Section 17.1 regarding compliance of the as-built installation with the design documents, the IDVP review of the AFWS disclosed that the as-built installation failed to meet the design drawings in that (i) a steam trap on the turbine-driven AFW pump steam supply line is not provided and (ii) there are discrepancies in the arrangement of the long-term cooling water supply line.
- b. Contrary to FSAR Section 8.3.3., the electrical design does not fully comply with the commitments regarding separation and color coding.
- c. Contrary to the single failure criterion of Appendix A to 10 CFR Part 50, a single failure may cause loss of redundant power divisions because redundant electric power division trains are electrically interconnected through two circuit breakers and a single power transfer switch.
- d. Contrary to GDC 57 of Appendix A, valve operators for the isolation valves which provide the steam supply to the turbine-driven auxiliary feed pump from two of the main steam generators have not been classified and procured as safety related components.
- e. The single failure of an auxiliary relay would prevent automatic closure of the redundant

steam generator blowdown isolation valves on automatic initiation of the AFWS contrary to a Westinghouse interface requirement and FSAR Figure 7.2-1.

- f. Contrary to NUREG 0588 regarding environmental qualifications, flow transmitter FT-78 and flow control valve FCV-95 are located in a harsh environment but were not listed as such in the PG&E Environmental Qualification Report dated September 1981, and are not yet environmentally qualified.
- g. Contrary to the requirements of NUREG 0588 regarding environmental qualifications, portions of the CRVPS were omitted from PG&E's Environmental Qualification report.
- h. Contrary to PG&E's September 14 and December 28, 1978 licensing commitments, CRVPS equipment identified in the FSAR as necessary to maintain control room habitability during safe shutdown has not been evaluated regarding the effects of a moderate energy pipe break.
- i. The fire protection for the motor driven AFW pump room is not consistent with the PG&E licensing commitment for fire zone separation as stated in its November 13, 1978 Supplemental Information for Fire Protection Review ("SIFPR") in that:
 - 1) there is a large grated ventilation opening in the ceiling of the room;
 - 2) a fire damper has gaps when it is closed;
- j. The fire protection for the AFW pump room is not consistent with the PG&E licensing

commitment for cable separation as stated in its SIFPR of November 13, 1978 in that:

- 1) the pumps for the motor driven AFW pumps and the control circuitry for a flow control valve necessary for operation of the turbine driven AFW pump are located in a single fire zone;
 - 2) cables for some AFW circuits are not routed in accord with descriptions in the SIFPR and four AFW circuits PG&E committed to identify and review in the SIFPR were not included in that document.
- k. Contrary to the licensing commitment set forth in its SIFPR of November 13, 1978, each of the three 4160 volt cable spreading rooms has a ventilation opening leading up to the 4160 volt switchgear rooms.
- l. Contrary to FSAR Section 3.6, possible jet impingement loads have not been considered in the design and qualification of safety related piping and equipment inside containment.
- m. Contrary to QA program commitments in FSAR Section 17.1, documented evidence is inadequate to demonstrate that rupture restraints outside and inside containment have been properly designed and installed to provide protection against rupture in high pressure piping.
- n. For the containment exterior shell review the ITP review used the AISC Code rather than Section III of the ASME Code contrary to the commitment in Table 3.2-4 of the FSAR.

- o. Contrary to the requirements of NUREG-0588 regarding environmental qualifications, safety-related cables and cable splices which could be subject to a harsh environment during a high-energy line break are not identified in the PG&E Environmental Qualification Report.
- p. The NSC pipe break analysis, which is Appendix A to FSAR Section 3.6, did not include all likely sources of water in the calculation of flooding levels.
- q. Contrary to PG&E's December 28, 1979 licensing commitment letter to the NRC, modifications to protect two Auxiliary Feedwater valves from the effects of moderate energy line breaks were not implemented.
- r. Contrary to the licensing commitment to maintain minimum system redundancy as stated in FSAR Section 3.6A (NSC evaluation of pipe break outside containment), four components were identified for which high energy line cracks could cause temperatures in excess of the specification temperatures of the components.
- s. Contrary to the licensing commitment to maintain minimum system redundancy as stated in FSAR, section 3.6A (NSC evaluation of pipe break outside containment), a conduit was identified whose failure due to a high energy line crack could eliminate redundant Auxiliary Feedwater system flow.
- t. Contrary to the FSAR Section 8.3 commitment to provide switchgear buses with adequate short circuit interrupting capability, the calculated duties for circuit breakers on 4160 V buses F, G, and H were above the nameplate ratings for those buses.

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

5. The verification program has not verified that Diablo Canyon Units 1 and 2 "as built" conform to the design drawings and analyses.

6. The verification program failed to verify that the design of safety related equipment supplied to PG&E by Westinghouse met licensing criteria.

7. The verification program failed to identify the root causes for the failures in the PG&E design quality assurance program and failed to determine if such failures raise generic concerns.

8. The ITP failed to develop and implement in a timely manner a design quality assurance program in accordance with 10 CFR Part 50, Appendix B to assure the quality of the recent design modifications to the Diablo Canyon facility and the IDVP failed to ensure that the corrective and

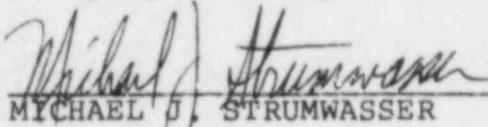
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preventative action programs implemented by the ITP are sufficient to assure that the Diablo Canyon facilities will meet licensing criteria.

DATED: SEPTEMBER 8, 1983.

Respectfully submitted,

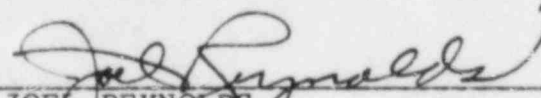
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CERTIFICATE OF SERVICE

I hereby certify that on this date I caused copies of the foregoing GOVERNOR DEUKMEJIAN'S AND JOINT INTERVENORS' CONTENTIONS ON DESIGN QUALITY ASSURANCE served on the following by United States Mail, First Class (except for those persons marked with an asterisk ("*"), to whom the envelope was posted Express Mail), postage prepaid.

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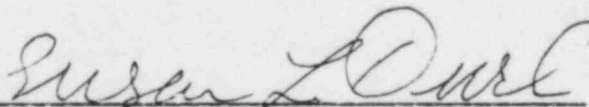
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