



State of California

GOVERNOR'S OFFICE
SACRAMENTO 95814

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EDMUND G. BROWN JR.
GOVERNOR

November 7, 1981

Nunzio J. Palladino
Chairman
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

RE: Pacific Gas and Electric Co.
(Diablo Canyon Nuclear Power Plant,
Units 1 and 2)
Docket Nos. 50-275, 50-323

Dear Chairman Palladino:

This letter is in furtherance of Governor Brown's letter to you dated October 30, 1981, in which the Governor asked the Commission to order a truly independent audit of the safety features of the Diablo Canyon Plant before the Commission permits any operation of the plant.

Attached is a list of thirteen separate seismic design and construction errors at Diablo Canyon that have been discovered since September 21, 1981. These errors, which involve a large number of systems, components, and equipment critical to safe operation of the plant, demonstrate a serious and widespread breakdown of the quality assurance program at Diablo Canyon. The errors are particularly significant because they were overlooked by PG&E and NRC inspectors for four years, during which time both PG&E and the NRC repeatedly gave assurances that the seismic design and safety features of the plant were being analyzed with the most careful and detailed attention.

The NRC's regulations, specifically the Quality Assurance requirements of 10 C.F.R. Part 50, Appendix B, are designed to ensure compliance with the NRC's technical requirements and, thereby, to detect the very types of errors that were overlooked by PG&E.* PG&E did not detect these errors because PG&E did not comply with Appendix B. In short, PG&E violated the NRC's regulations.

*/ The NRC Staff pointed out to PG&E on October 9 that errors of the type discovered at Diablo Canyon should have been detected if Appendix B had been properly implemented by PG&E. See October 9 transcript, p. 87. Also, PG&E's Mr. Maneatis, Senior Vice President, stated on November 3 that PG&E's error was "the result of failure to follow established practice and represented a clear violation of our quality assurance program." Transcript, p. 131. Finally, on October 9, Dr. Denton stated that had the Staff known of PG&E's errors, the Staff would not have recommended issuance of the low power license.

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Substantial uncertainty now exists concerning the actual degree of quality achieved at Diablo Canyon. The Staff has recognized, to some degree, this uncertainty. As a result, on November 3, the Staff directed PG&E to conduct an expanded audit of Diablo Canyon safety systems. However, the Staff's directive does not reach far enough. It does not establish the basis for a truly independent audit of the existing and potential errors at Diablo Canyon by outside experts who have no real or apparent interest in the results of their audit.

At the November 3 meeting with PG&E, the Staff did not direct an audit of PG&E's errors by independent experts in accordance with the Governor's request. Instead, PG&E was permitted to perform an audit by a consultant selected exclusively and unilaterally by PG&E. The Governor pointed out in his October 30 letter that an audit by PG&E of the very errors which PG&E itself committed and overlooked for four years simply would not be credible.

If the Commission authorizes the kind of audit permitted on November 3 by the Staff, the credibility of the audit itself and the credibility of the Commission will be undercut. We remind the Commission that any hope for public confidence in the Commission's Diablo Canyon determinations has been shattered by the recent post-licensing disclosures of errors at Diablo Canyon. We submit that a truly independent audit ordered by the Commission is the only means by which the NRC can recapture any degree of credibility.

The importance of quality assurance at nuclear power plants was recently emphasized by the Commission in the NRC's 1980 Annual Report.

The application of disciplined engineering practices and thorough management and programmatic controls to the design, fabrication, construction, and operation of nuclear power plants is essential to the protection of public health and safety and of the environment. Quality Assurance (QA) provides this necessary discipline and control. Through a QA program that meets NRC requirements, all organizations performing work that is ultimately related to the safety of plant operation are required to conduct that work in a preplanned and documented manner; to independently verify the adequacy of completed work; to provide records that will confirm the acceptability of work and manufactured items; and to assure that all individuals involved with the work are properly trained and qualified to carry out their responsibilities. (p. 79)

These words have been put to a critical test by the multiple QA errors at Diablo Canyon. If the public is to believe that the Commission is genuinely serious about QA, then Diablo Canyon must not be permitted to operate until a truly independent audit is completed and full compliance with Appendix B is demonstrated.

Accordingly, in furtherance of the Governor's October 30 letter, we hereby ask that the Commission:

1. Order that an audit of the errors at Diablo Canyon be performed by outside experts who are independent of PG&E. At a minimum, these outside experts should be persons who have not worked for PG&E or on the Diablo Canyon project. (PG&E's current auditor, Dr. Cloud -- who was approved by the Staff on November 3 -- has previously worked on Diablo Canyon.) Moreover, the outside experts should not be selected unilaterally by PG&E; they should be acceptable to all parties in the Diablo Canyon proceeding. The final selection of the independent auditor should be approved by the Commissioners, following the Staff's consultations with all parties. We have already submitted to the Staff a suggested list of nine possible independent auditors. Surely, independent firms which are acceptable to all parties can be found.
2. Order that Diablo Canyon shall not be permitted to operate until the entire audit is completed. On November 3, the staff indicated it would permit low power operation before completion of the audit. However, there is no technical or legal basis for quality assurance differentials between operation at low power or greater power. Put briefly, Diablo Canyon should not operate at any power level unless it complies with the NRC's technical requirements and regulations.
3. Order that the staff convene a working session which leads to selection of outside experts, acceptable to all parties, who will perform a truly independent audit. At such a working session, any and all parts of our October 30 proposal could be discussed, and appropriate modifications to that proposal could be evaluated by all of the parties in a cooperative atmosphere.

We note, on the basis of discussions with the Staff, that it appears that our proposal for a Steering Committee has been misunderstood. We understand that the Staff apparently regards our proposal as unacceptable because it appears to intrude upon the NRC's regulatory authority. We are sensitive to the Staff's concerns and thus wish to clarify that our proposal was intended primarily as a point of departure for discussion. We believe that this is a subject that surely can be resolved to the satisfaction of all parties at the working session.

Our intention so far has been to approach the independent audit as being an issue above and beyond the on-going adversarial proceedings. We cannot conceive how the Governor's proposal for a truly independent audit could adversely affect the interests of any party to this proceeding. In our view, PG&E should welcome such an

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audit, and the Commission should seize it as a means to shore-up the damage suffered by the NRC in mistakenly licensing Diablo Canyon as a facility safe to operate.

We bring to the Commissioners' attention the fact that the following governmental bodies have already called for an independent audit: City Council of San Luis Obispo; City Council of Santa Barbara; City Council of Pismo Beach; City Council of Thousand Oaks; Board of Supervisors of Ventura County; Board of Supervisors of Santa Barbara County. In addition, several major California newspapers have editorialized in support of the Governor's proposal for an independent audit.

We believe that it would be a profound mistake for the Commission to permit an audit of PG&E's errors under the terms directed by the Staff on November 3. In actuality, such an audit amounts to a business-as-usual approach that in no way befits the extraordinary recent disclosures at Diablo Canyon. We reiterate our interest and availability to work cooperatively with the NRC in establishing the framework for an independent audit of the quality of Diablo Canyon. We ask that the Commission now take action that results in a truly independent audit worthy of belief by the affected citizens of California.

Sincerely,



Byron S. Georgiou
Legal Affairs Secretary

cc: Commissioners
Service List

QUALITY ASSURANCE ERRORS REVEALED
SINCE SEPTEMBER 21, 1981

In the six weeks since September 21, 1981, 13 serious errors in seismic design have been discovered at Diablo Canyon. These errors have primarily involved problems in the development, distribution, and use of design data by PG&E and its engineering services subcontractors. These errors were discussed at Commission and Staff meetings in Washington, D.C. and Bethesda, Maryland and at a series of meetings during October, 1981, with PG&E in San Francisco, California. As a result of these discussions and investigations, it is now clear that each error involved a failure of PG&E to implement properly a number of the 18 quality assurance criteria of 10 C.F.R. Part 50, Appendix B. The errors are described below:

a. Error 1 - Opposite Hand Design

On September 28, 1981, PG&E reported that a diagram error had been found in a portion of the seismic qualification of the Diablo Canyon Unit 1 Nuclear Power Plant (DCPP-1). This error resulted in an incorrect application of the seismic floor response spectra in the crane wall-containment shell annulus of the Unit 1 Containment Building. The error was that the diagram used to locate Vertical Seismic Floor Response (VSFR) spectra for the Unit 1 containment annulus was erroneous. The diagram was applicable to Unit 2 but was identified as being that of Unit 1. Since the Units are opposite hand, this resulted in an incorrect orientation of VSFR spectra for Unit 1 component and system design. The origin of the error was in the PG&E transmittal, to a subcontractor (John A. Blume and Associates), of an unverified, handwritten sketch of the Unit 2 opposite hand geometry in place of the Unit 1 geometry. ^{1/} (Also see Error 3).

b. Error 2 - Document Distribution

At the October 9 meeting between the NRC Staff and PG&E, PG&E disclosed that the Seismic Category I electrical cable trays and conduit supports had been qualified to design response spectra which had been superseded. The error was caused by PG&E's failure to distribute the latest revised spectra to the responsible engineer. ^{2/}

^{1/} LER 81-002/OIT-0, October 12, 1981.

^{2/} October 9 meeting transcript, pp. 105-07.

c. Error 3 - Incorrect Weights

On October 22, 1981 inspectors from the NRC's Office of Inspection and Enforcement determined that, in addition to the improper application of the diagram as reported to the NRC by PG&E on September 28, 1981, the weights listed on the diagram and used as an input to John A. Blume and Associates for their development of response spectra, could not be verified as being accurate. PG&E representatives recalculated the weights, using current as-built drawings, and determined the new weights to be different.^{3/}

PG&E concluded that the "substantial" weight variations resulted from three principal causes:

- (i) The large bore piping equipment weights were not associated with the correct frames because the Unit 1 piping orientation was used in conjunction with the Unit 2 frame orientation.
- (ii) PG&E's current calculations include additional contributors to the total weight: e.g., conduit and cable trays and steel grating, which were considered to be insignificant in the 1977 analysis.
- (iii) A more detailed calculation of large bore piping weights, piping support weights and equipment weights.

d. Error 4 - Containment Spray System Pipe Supports

On September 18, 1981, the NRC's resident inspector was notified by telephone of a deficiency reportable under 10 CFR 50.55(e).^{4/} The report from PG&E addressed deficiencies in the design of the containment spray system pipe supports located within containment.

The following four deficiencies were identified:

- (i) An incorrect thermal analysis was used for hanger loads.

^{3/} PNO-V-81-59, Preliminary NRC Notification of Event or Unusual Occurrence, October 26, 1981.

^{4/} Letter from Crane to Engelken, October 19, 1981. Inexplicably this error was not brought to the NRC's Commissioners' attention September 21, 1981.

- (ii) This analysis was performed with one snubber modeled as a rigid member.
- (iii) The variable spring settings for the pipe supports were improperly set, based on a deadload analysis which assumed, incorrectly, that the pipes contained water.
- (iv) In designing a pipe anchor, the loads from only one side were used.

The root cause of the preceding series of errors has not yet been explained by PG&E.

e. Error 5 - Wrong Spectra

During the period of October 14 through 16, 1981, representatives of the NRC staff and their consultants from Brookhaven National Laboratories met with the PG&E staff in San Francisco. During the meeting, piping problem (PG&E #6-11) was reviewed. PG&E initially asserted that this problem did not require reevaluation as a result of the opposite hand error. However, it was subsequently determined that the original PG&E calculation used erroneous spectra input and hence required reanalysis with the appropriate spectra. ^{5/} The cause of the error has not yet been identified by PG&E.

f. Errors 6 to 10 - Additional Design Errors

At the November 3 meeting between PG&E and the NRC, PG&E disclosed that during its internal review undertaken as a result of the diagram frame orientation error, it has identified five additional design errors requiring plant modifications from causes not related to the diagram error. These design deficiencies are:

- (i) In a single case, parallel piping lines which were qualified and designed from a single analysis actually require two analyses to properly model both configurations.

^{5/} NRC Meeting Summary for October 14-16, 1981, Discussions and Preliminary Audit of Seismic Analysis for Equipment and Components in Diablo Canyon, Unit 1 Containment Annulus, p. 4.

h. Error 12 - Misapplications of Hosgri Spectra

Error 12 involved misapplication of the Hosgri spectra. Electrical raceway and conduit supports are unistrut type supports, are all Class I equipment, and are all laterally braced. The PG&E seismic analysis is based on an enveloping procedure using static analysis. In this analysis, which contains a large number of configurations, the largest weight that a particular configuration is considered to be able to have applied to it is determined, and the highest acceleration the support can experience owing to its location in the building, is also determined. Then, with those two inputs, the first mode frequency of the supports is calculated, and the corresponding acceleration level is taken from the response spectra and the stress analysis is conducted. The misapplication errors were basically of two kinds. First, the analyst selected the wrong number off the response spectra curve; and second, in some cases the engineer apparently used one of the Hosgri spectra from a different location in the building. As before, the cause of the errors has not yet been determined by PG&E.^{9/}

i. Error 13 - Further Spectra Misapplication

For the heating and ventilating system components, Dr. Cloud reviewed the seismic input for the fans and dampers. He found one instance where the Hosgri spectra were misapplied. Once again, the manner in which this analysis was conducted is very similar to that for the conduit supports (Error 12). The engineer confirmed that the equipment was rigid, and then went to the zero portion of the response spectra curve and selected the wrong value for the acceleration level. In this case, PG&E believes that the engineer used a spectra from a different location of the building. The cause of the error has not been determined by PG&E.^{10/}

^{9/} November 3 meeting transcript, pp. 204-205.

^{10/} November 3 meeting transcript, p. 206.