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APR 13 1982

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 M. Hester



MEMORANDUM FOR: Richard H. Vollmer, Director
 Division of Engineering, NRR

FROM: Darrell G. Eisenhut, Director
 Division of Licensing

SUBJECT: DIABLO CANYON DESIGN VERIFICATION PROGRAM - PG&E TECHNICAL PROGRAM

The PG&E design verification program for Diablo Canyon Unit 1 consists of two parts. One part is the Independent Design Verification Program (IDVP) which was established in response to the Commission Order CLI-81-30 of November 19, 1981 and which is now managed for PG&E by Teledyne Engineering Services (TES) as the independent auditor. By my memo of April 12, 1982 you were provided with a consolidated and updated version of the TES document for the IDVP with a request for your review.

The second part of the PG&E design verification program is the PG&E Technical Program (TP) which has been ongoing informally since the first design errors were identified in late September 1981 and which was formally established in the eighth semi-monthly status report, dated February 26, 1982. The TP includes those design verification activities performed by PG&E in accordance with its responsibility as the licensee for Diablo Canyon Unit 1.

Attached is the PG&E report, "Overall Management Plan for Design Verification Program of the Diablo Canyon Power Plant (Revision 1, April 6, 1982)" which references the IDVP of TES and describes the Technical Program of PG&E. The report responds to the staff request for a single program plan (letter of March 19, 1982 from H. Denton to M. Furbush) and for a definition of the scope and methodology of the TP (NRC meeting with PG&E on March 15, 1982).

We request that you review the PG&E Technical Program, in particular with respect to the method of resolution of errors and open items that are identified in the IDVP and the interfaces between the two programs. The results of your review should be provided by April 19, 1982 so that they can be incorporated into the same memo to H. Denton on our review results of the independent program.

Original Signed By:

Darrell G. Eisenhut, Director
 Division of Licensing

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cc: H. Denton
 R. Engelke

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JULY 28 1982

50-225

MEMORANDUM FOR: R. C. DeYoung, Director
 Office of Inspection and Enforcement
 R. H. Engelken, Regional Administrator
 Region V
 R. H. Vollmer, Director
 Division of Engineering, NRR

FROM: D. G. Eisenhut, Director
 Division of Licensing, NRR

SUBJECT: DIABLO CANYON DESIGN VERIFICATION PROGRAM - SCOPE OF PHASE I

The Commission Order of November 19, 1981 suspended the Pacific Gas & Electric Company (PG&E) license for fuel loading and low power testing (LP license) for Diablo Canyon Unit 1 and directed PG&E to perform an independent design verification program on all safety-related activities performed prior to June 1978 under all seismic service-related contracts. Verification of quality assurance program effectiveness and performance of sample calculations are principal elements identified in the Order. The requirements in the Order for reinstatement of the LP license, defined as Phase I of the verification program, centered around several assumptions:

- a. the annulus area in the containment is a principal concern
- b. symmetry considerations (mirror image) are a problem
- c. QA programs and implementation for seismic service-related contracts prior to June 1978 are a major concern.

The staff approved (letter of April 27, 1982) the Phase I program plan which consists of the Independent Design Verification Program (IDVP) with Teledyne as the Program Manager and the PG&E Internal Technical Program for verification efforts performed by PG&E, e.g. analyses of piping and equipment in the annulus region.

The requirements for issuance of the full power license are set forth in the NRR letter of November 19, 1981 to PG&E and are defined as Phase II of the design verification program. On July 18, 1982 Teledyne submitted its proposed plan for Phase II of the IDVP.

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The design verification efforts have been in progress since last fall with PG&E and the IDVP organizations submitting semi-monthly status reports pursuant to the Commission Order. Recent developments in the program, as discussed below, indicate that it is appropriate for the staff at this time to reassess the scope of the Phase I requirements as defined in the Commission Order. The potential need for such reassessment had been recognized in the Order which stated that "the NRC may impose additional requirements" and that "this may include some or all of the requirements" of Phase II of the program. Furthermore, the staff letter of April 27, 1982 approving the program plan for Phase I states that the approval is "limited to the activities covered by the plan and does not apply to the adequacy of the Phase I activities" as the basis for reinstating the LP license.

Semi-monthly status reports have been issued since last fall pursuant to the Commission Order. The latest PG&E report (No. 18) indicates that a total of 177 Error or Open Item (EOI) reports have been issued so far by the IDVP with 12 reports being classified as Error Reports, potential or final. In addition 32 items have been identified by PG&E in its Internal Program. These items are not limited to the general areas of concern stated in the assumptions above.

Secondly, the staff recently received a report from Brookhaven National Laboratory (BNL) on a design analysis sponsored by the NRC. The Brookhaven study was performed for the staff to independently analyze certain aspects of the seismic response of the containment annulus steel structure and a sample of attached piping and to compare the results with those of the PG&E analyses. The report was transmitted to Teledyne on July 1, 1982. As stated in the transmittal letter it is the staff's view that the following issues, among others, require further assessment:

1. the apparent omission of the distributed masses of steel members in the mathematical model,
2. the type of joints between beams and columns used in the mathematical model,
3. the response spectrum smoothing techniques, and
4. design dimensions as compared to as-built dimensions.

The above are fundamental conclusions, which, if they have generic implications, will require a generation of new response spectra, possibly for all structures.

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Thirdly, Teledyne has started to submit Interim Technical Reports (ITR). A total of about 25 to 30 such ITR's will be submitted on completed aspects of the Phase I program. The first ITR indicates that additional verification and sampling will be required in most areas of the initial generic sample including building, piping, equipment qualification, conduit supports and Hosgri spectra. For example, a generic concern of design control of building changes with respect to design spectra requires a verification of all as-built safety-related buildings with respect to the design of the building for which spectra were generated and with respect to the fundamental seismic design criteria. The findings in the report indicate that on the basis of the design verification conducted under the IDVP to date, the fundamental seismic design information and response spectra on the record are in doubt. Another major concern is the significant number of apparent differences between the as-built and design conditions. The report does not recommend an integrated approach for dealing with the noted deficiencies. In our view a sequential approach appears appropriate to first verify the building response spectra and then perform component and piping analyses.

ITR No. 2 on Quality Assurance indicates that Teledyne has accepted in general, the findings of the R. F. Reedy reports, issued during March of this year, on the audit of quality assurance programs and their implementation by PG&E and six companies with service-related contracts. Teledyne states that additional verification or sampling in the area of quality assurance is not required and that the IDVP Phase I program is responsive to the deficiencies noted in the Reedy reports. In our view an integrated finding regarding all QA activities by PG&E and its contractors with seismic service-related contracts is needed. In particular, a verification of the QA effectiveness for information flow between organizations appears to be needed.

ITR No. 3 on Tanks was issued by Cloud on July 16, 1982 and is currently under staff review.

Thus, based on our preliminary review of the above information it appears that the assurance of the seismic design adequacy of Diablo Canyon Unit 1 essentially must be based on a verification of all safety-related structures and equipment using as-built conditions. As a first step in this process the appropriate response spectra for the Hosgri earthquake must be developed or confirmed. The continuation of the design verification program in its current form will require staff effort to review the IDVP activities and results (about 25 ITR) as well as the PG&E corrective activities.

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In view of the above observations and based on your evaluation of the same information we request your views and recommendations regarding the adequacy of Phase I of the design verification program as currently structured as the basis for reinstating the LP license. Obviously, if we consider the current scope of Phase I of the program to be inadequate, we should consider recommending a modification of the Commission's Order. For example, it might be appropriate to require PG&E to (1) verify that the design spectra of buildings are current, consistent with FSAR commitments and based on as-built conditions (2) analyze systems, equipment and piping using the above spectra and as-built conditions, and (3) modify the plant based on the results of the design verification program.

I would appreciate your views on such possible modifications to Phase I and Phase II of the program by July 30, 1982.

Original signed by
Darrell G. Eisenhut

Darrell G. Eisenhut, Director
Division of Licensing
Office of Nuclear Reactor Regulation

- cc: H. Denton
- E. Case
- R. Mattson
- L. Chandler
- B. Jones
- J. Knight
- J. Crews
- T. Bishop

DIST:
Document Control (50-275/323)
PRC

LB#3 Rdg.
FMiraglia
JLee
HSchierling
Eisenhut/Purple
RTedesco/TNovak

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SURNAME	HSchierling:cz	FMiraglia	TNovak	DEEisenhut			
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