50-275

For: The Commissioners

From: William J. Dircks
Executive Director for Operations

Subject: ABNORMAL OCCURRENCE RECOMMENDATION - SEISMIC DESIGN ERRORS AT DIABLO CANYON NUCLEAR POWER PLANT

Purpose: Approval of an abnormal occurrence determination.

Discussion: Enclosed is a draft Federal Register notice in regard to the seismic design errors at the Diablo Canyon Nuclear Power Plant with the subsequent suspension of the fuel load and low-power operating license of Unit 1 on November 19, 1981.

This item is proposed for reporting based on one of the general criteria of the Abnormal Occurrence Policy Statement; i.e., major deficiencies in design, construction, use of, or management controls for licensed facilities or material can be considered an abnormal occurrence.

CONTACT:
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492-4425/492-4426

Recommendation: That the Commission:

1. Approve the subject proposed abnormal occurrence together with its associated Federal Register Notice and
2. Note that following approval, the Office of Congressional Affairs will notify the appropriate Congressional Committees of the intent to publish the Federal Register Notice.

Scheduling: While no specific circumstances require Commission Action by a particular date, it is desirable to disseminate abnormal occurrence information to the public as soon as possible. It is expected that Commission action within two weeks of receipt of this draft proposal would permit publication in the Federal Register about 10 days later.

William J. Dircks
Executive Director for Operations

Enclosure:
Draft Federal Register
Notice

[7590-01]

NUCLEAR REGULATORY COMMISSION

ABNORMAL OCCURRENCE

SEISMIC DESIGN ERRORS AT DIABLO

CANYON NUCLEAR POWER PLANT

Section 208 of the Energy Reorganization Act of 1974, as amended, requires the NRC to disseminate information on abnormal occurrences (i.e., unscheduled incidents or events which the Commission determines are significant from the standpoint of public health and safety). The following incident was determined to be an abnormal occurrence using the criteria published in the Federal Register on February 24, 1977 (42 FR 10950). One of the general criteria notes that major deficiencies in design, construction, use of, or management controls for licensed facilities or material can be considered an abnormal occurrence. The following description of the incident also contains the remedial actions taken to date.

Date and Place - On September 28, 1981 and September 30, 1981, Pacific Gas and Electric (PG&E) submitted letters to the NRC stating that certain drawings ("diagrams") used in the seismic design in the Diablo Canyon Unit 1 containment annulus area were in error. The "diagrams" used were applicable to Diablo Canyon Unit 2, but were identified for use in the Unit 1 seismic design. Subsequent investigation into this issue revealed additional design errors. This resulted in suspension of the Diablo Canyon Unit 1 fuel load and low-power operating license. (Unit 2 was still under construction and had not yet received an operating license). Diablo Canyon Units 1 and 2 utilize pressurized water reactors and are located in San Luis Obispo County, California.

It is not clear what the basis for determining "major deficiencies" is. I don't believe the significance of the design deficiencies has been determined yet.

Nature and Probable Consequences - On September 21, 1981, an engineer employed by PG&E in the hanger design group, was performing work for Diablo Canyon Unit 2 in response to NRC IE Bulletin NO. 79-14 ("Seismic Analysis for As-Built Safety-Related Piping Systems"). This work involved the use of "diagrams" of the containment building annulus area. The engineer became suspicious that the supposed Unit 2 "diagrams" did not accurately represent Unit 2 structural configuration. On September 21-22, 1981, he continued to investigate this apparent discrepancy and brought it to the attention of his immediate supervisor. On September 24, the responsible Senior Civil Engineer had been informed of the apparent discrepancy. On September 25, second level PG&E management were notified and they in turn contacted their seismic design contractor, URS/John A. Blume and Associates (URS/Blume). URS/Blume confirmed that the wrong "diagrams" had been used. On September 26, PG&E management continued to evaluate the problem. On September 27, the Plant Superintendent notified the NRC Senior Resident Inspector that a problem did indeed exist.

NRC investigation into the situation disclosed the following:

(1) The "diagrams" were developed at PG&E and apparently given to URS/Blume on March 8, 1977 for their use in the development of vertical seismic response spectra for the Unit 1 and Unit 2 containment building annulus areas.

(2) URS/Blume, when given the "diagrams," knew the "diagrams" were applicable to Unit 2. However, they were not aware that the Unit 1 and Unit 2 containment annulus areas are mirror images. Therefore, during the

development of the associated seismic response spectra, URS/Blume assumed that both Unit 1 and Unit 2 containment buildings were of the same configuration.

(3) PG&E, upon receipt of the seismic response spectra in May 1977 and July 1977, developed by URS/Blume, assumed the spectra and associated containment annulus frame orientation "diagrams" were for the Unit 1 containment since it was identified as such by URS/Blume. In actuality, the containment annulus frame orientation "diagrams" represented the Unit 2 containment. PG&E, in turn, performed subsequent design calculations for Unit 2 and, thus in turn, erroneously used Unit 1 containment annulus frame orientation "diagrams" for the development of Unit 2 design requirements.

Upon confirmation that wrong "diagrams" were used in the development of Unit 1 design requirements, PG&E reanalyzed the design requirements using the appropriate containment annulus frame orientation "diagrams" and determined that, as a result of the error, modifications were required to be made on 31 Unit 1 pipe supports. These modifications involved such actions as adding snubbers, changing the snubber size, adding braces, replacing structural members, and stiffening base plates.

The number of supports requiring modifications changed based on the new evaluation of the annulus for the weight problem.

Subsequent investigations by the NRC, and design reviews by PG&E and their consultant have identified a significant number of additional design concerns. These include: failure to use the latest revision of the vertical response spectra in design of conduit and cable tray supports; incorrect weight distribution used to determine the containment annulus vertical seismic response spectral curves; erroneous spectra used to

complete safety injection piping problem; and two small bore piping snubbers required by seismic analyses were not designed or installed. The design reviews are continuing at this time.

Cause or Causes - The problem related to the use of the wrong "diagrams" appears to have been caused by the informal manner in which certain data were developed by PG&E and transmitted to URS/Blume and the lack of independent review of these data within PG&E prior to submittal to URS/Blume. Identification of the additional design errors indicates a more general failing in the licensee's design quality controls for service type contractors.

Actions Taken to Prevent Recurrence

Licensee - At the end of September 1981, the licensee verbally requested the services of a consultant, R. L. Cloud Associates, Inc. (R. L. Cloud) to conduct a seismic design review to determine if other errors had been made in the seismic design of Diablo Canyon Unit 1. This request was subsequently formalized by the licensee with the issuance of a contract to R. L. Cloud.

NRC - In October 1981, the NRC conducted a special inspection at the PG&E URS/Blume offices in San Francisco, California to evaluate the quality assurance programs and other management control systems in effect at PG&E and at URS/Blume during the period from 1970 to present; the extent to which these quality assurance programs and management control systems were implemented as they relate to the development, transmittal, and use of safety-related design information; and, how the identified seismic problems involving the Diablo Canyon containment building annulus areas

were caused and subsequently discovered. The results of this special inspection indicated, among other things, that required quality controls were not imposed upon PG&E's safety-related, service type contractors until late 1977 or early 1978; and, many of the work activities performed by PG&E with regard to the URS/Blume contract were performed in an informal manner.

On November 19, 1981, an order was issued by the Commission which suspended License No. DPR-76. DPR-76 had been issued on September 22, 1981, and had authorized fuel loading and the conduct of tests at up to five percent of rated power at Diablo Canyon Unit 1. This order, in conjunction with a letter from the NRC Office of Nuclear Reactor Regulation, defined what would be required from PG&E prior to start of fuel loading and prior to power operation above five percent power at Diablo Canyon Unit 1. These requirements included the completion of an independent design verification program for seismic related service contracts. In conjunction with this the licensee was directed to submit a detailed program plan for conducting the design verification and to supply information that demonstrates the independence of the companies proposed to conduct the independent verfication. The licensee has submitted a program plan and information regarding the independence of the contractor (R. L. Cloud) selected by the licensee. Prior to an NRC decision on the acceptability of the program plan and the designated independent contractor an additional issue arose. This issue involves the licensee's review and comment on draft editions of the independent consultant's report prior to the submittal of the report to the NRC, and statements made by licensee representatives to the NRC which led the NRC to believe that the licensee had not seen drafts of the report. The issue is currently under NRC investigation.

Future reports on the findings of the investigation, acceptability of the program plan and the independent contractor will be made, as appropriate, in the Quarterly Report to Congress on Abnormal Occurrences (NUREG-0090 Series).

Dated at Washington, D.C. this day of 1982.

Samuel J. Chilk
Secretary of the Commission

PLEASE REVIEW THE DUE DATE IMMEDIATELY

If the due date does not allow adequate time to respond to this ticket, you may request a revised due date. The request must include a valid justification and be submitted through your correspondence coordinator to the NRR mail room. Such request for green tickets must be made within 3 days after assignment. Requests for revision of yellow ticket due dates may be made, with justification, through the weekly WITS update.

The revised due date, if approved by PPAS, will be used to track division correspondence completion schedules. All green tickets are due to Mr. Case/via NRR mail room two days before the EDO-stated due date.

FROM	DATE OF DOCUMENT	DATE RECEIVED	NO.
Carlyle Michelson	2/5/82	2/8/82	NRR-82-057
	LTR. MEMO. REPORT:		OTHER
TO	ORIG.: CC:	OTHER:	
H. Denton	ACTION NECESSARY ☐ NO ACTION NECESSARY ☐	CONCURRENCE ☐ COMMENT ☐	DATE ANSWERED. BY: 2/12/82
CLASSIF.: POST OFFICE REG. NO:	FILE CODE:		

DESCRIPTION: (Must Be Unclassified)

proposed abnormal occurence - seismic design errors at Diablo Canyon Nuclear Power Plant

ENCLOSURES:

REFERRED TO	DATE	RECEIVED BY	DATE
Bissenhut	2/8	cc: Case	
		Denton	
		1. PPAS	
		2. Hanauer	
		3. Mattson	
		4. Vollmer	
		5. Thompson	
	2/8	6. Check	
		7. Snyder	

REMARKS

U. S. NUCLEAR REGULATORY COMMISSION

MAIL CONTROL FORM

FORM NRC-326 (1-75)