50-2-15

# AUG 2 2 1979

Docket Nos.: 50-275 & 323

MEMORANDUM FOR: J. Stolz, Chief Light Water Reactors, No. 1 Division of Project Management

FROM:

Franz P. Schauer, Chief Structural Engineering Branch Division of Systems Safety

SUBJECT DIABLO CANYON UNITS NOS. 1 & 2 SER SUPPLEMENT INPUT FROM THE STRUCTURAL ENGINEERING BRANCH (SEB:1111)

Plant Name: Diablo Canyon Nos. 1 and 2 Licensing Stage: OL Docket Numbers: 50-275 and 323 Responsible Branch and Project Manager: LW1, B. Buckley Requested Completion Date: August 15, 1979

Applicant's Response Date Necessary for Completion of Next Action Planned on Project: Unknown

Description of Response: Answers to Questions

Review Status: Awaiting for additional information

Reference: Supplement No. 8 to the Safety Evaluation of the Diablo Canyon Nuclear Power Station Units 1 and 2, dated November 1978.

The information submitted by the applicant pertaining to the following unresolved items specified in the Reference have been reviewed by the Structural Engineering Branch:

1] Section 3.8.5.4.1(2), further analysis of the containment foundation mat.

2. Section 3.8.5.4.4(4), further stability analysis of intake structure.

3. Section 3.8.5.4.8, cranes.

Because of the incomplete information on hand, the review of the first two items have not been completed at this time. During the two telephone conferences we had with the applicant, we identified and discussed the information we need to complete our review. The review of the two items will be completed when the needed information is made available to us by the applicant.

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## J. Stolz, Chief

We reviewed the item 3 covering the structural analysis of cranes and we find that additional information is required before we can complete our review. The additional information requested, is contained in the enclosure. The review was performed by R. Lipinski of the Structural Engineering Branch.

> Franz P. Schauer, Chiëf Structural Engineering Branch Division of Systems Safety

Enclosure: As Stated

cc: J. Knight

F. Schauer

D. Jeng

P. Kuo

B. Buckedy

R. Lipinski

NRC Form 318B (4-79) NRCM 0240

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UNITED STATES NUCLEAR REGULATORY COMMISSION WASHINGTON, D. C. 20555

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Enclosure: As Stated

cc:

J. Knight

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B. Buckley

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PACIFIC GAS AND ELECTRIC COMPANY DIABLO CANYON SITE NUCLEAR STATION UNITS 1 AND 2 DOCKET NOS. 50-275 AND 50-323 . STRUCTURAL ENGINEERING BRANCH REQUEST FOR ADDITIONAL INFORMATION

## I. Manipulator and Spent Fuel Pool Cranes

- 1. It appears that the stress evaluations were performed in accordance with the ASME Boiler and Pressure Vessel Code Section III, Division 1, Article XVII-2000, Linear Elastic Analysis. During the early stages of re-evaluation of Diablo Canyon Plant for Hosgari event a set of methods and criteria was proposed by you, for evaluation of structures (see Supplement No. 7 to the Safety Evaluation Report of the Diablo Canyon Nuclear Plant Station Units 1 and 2, Section 3.8.4.1), entitled "Specification for Seismic Review of Major Structures for 7.5 Hosgri Earthquake", dated February 2, 1977, Revised February 8, 1977. It is the position of the staff that structural re-evaluation of cranes should be performed in accordance with these Specifications. In view of the above, compare the results of the analysis of the Manipulator and Spent Fuel Pool Cranes with the allowable stress contained in the Specifications.
- 2. Specify which of the two options to account for accidental torsion contained in Section 4.1 of the Hosgri Report that you used in your analysis of the subject cranes and describe how is it reflected in your results.

3. Describe what is meant by the "Cases Analyzed A, B, C and D in Table 4A-5".

4. Describe the method used to combine the three-dimensional responses from dynamic analysis with the static analysis to obtain the total result. In your response, indicate if combining of stresses was made using square-rootof-the-squares (SRSS) method or by direct algebraic addition and how the final stress ratio was obtained by using the inter action formula.



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### II. FUEL HANDLING BUILDING CRANE POLAR CRANE TURBINE BUILDING CRANE INTAKE STRUCTURE CRANE

The Fuel Handling Building Crane and Polar Crane are located in the 1. auxiliary building and the containment structure respectively. Both of these structures are classified as Class I structures. The structural acceptance criteria, allowable stresses etc., should be based on the codes and standards listed in the FSAR unless otherwise noted in the "Specification for Seismic Review of Major Structures for 7.5 Hosgri Earthquake" dated February 2, 1977, Revised February 8, 1977. The Turbine Building Crane and the Intake Structure Crane are located in the turbine building and over the intake structure which are classified as Class II structure. These cranes should be designed according to the appropriate criteria contained in the Specification provided for such structures. Your descrip-• tion of the structural criteria contained in Section 4A, Cranes, indicates that all of these cranes have been re-evaluated according to one set of criteria regardless of their location. The basic approach of the Specifications "calls for the use of the same analysis procedures and criteria which were used and accepted at the time of the original DDE analysis .... " the allowable stresses contained in Section 4A.4.3, Structural Evaluation are based on the elastic limit instead of working stress approach. Additionally, it appears that the allowable stresses are those which are contained in the AISC Specifications, Part 2, plastic design, and applied to the methods of · .... the AISE Specifications, Part 1, Elastic Design.

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In view of the above, you are requested to discuss the rationale of your structural criteria for evaluation of the subject cranes, and justify the allowable stresses used and demonstrate that your approach meets the intend of the Specifications.

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2. The results of the total maximum stress ratios, appear to be obtained by means of the square-root-of-the-sum-of-the-squares (SRSS). Indicate if the tabulated ratios (transverse, longitudinal and vertical) components have been obtained by means of SRSS or by direct addition.

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