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March 27, 1986

Director, Office of Nuclear Reactor Regulation  
Attention: G. E. Lear, Director  
PWR Project Directorate No. 1  
U. S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Gentlemen:

Subject: Docket No. 50-206  
Structural Calculations  
SEP Topic III-6, Seismic Design Considerations  
San Onofre Nuclear Generating Station  
Unit 1

During audits of the Bechtel seismic calculations of the SONGS 1 South Turbine Building Extension and the auxiliary feedwater pump grade beams, the NRC requested that we document several clarifications provided during the audits. Accordingly, the requested information is provided as an enclosure to this letter.

If you have any questions on this, please call me.

Very truly yours,

*M. O. Medford*

Enclosures

cc: F. R. Huey, USNRC Senior Resident Inspector  
M. J. Russell, EG&G  
L. Shieh (LLNL)  
E. C. Rodabaugh

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ENCLOSURE

QUESTIONS ON:

BALANCE OF PLANT STRUCTURES  
SEISMIC REEVALUATION PROGRAM

AS-BUILT REEVALUATION OF THE TURBINE BUILDING SOUTH EXTENSION

SAN ONOFRE NUCLEAR GENERATING STATION, UNIT 1

JUNE 1985

Q. What are the effects of the gantry crane legs lifting up on one side and then lowering down; what are the margins in the crane rail girder of the parking structure?

A. The August 26, 1982 submittal indicated that the gantry crane legs may lift up, however a factor of safety of about 22 against overturning exists. As requested in the NRC/SCE meeting of December 13, 1986, additional structural evaluation of the crane rail girder was performed to determine the safety margins for two loading cases: a) the crane lifts up on one side, for example the east side, and the weight of the gantry crane is shifted to the girder on the west side and b) after lift-up, the crane lowers down and impacts the girder.

For case a) evaluation, the crane rail girder SE-B8 has a margin of safety of 1.61 against elastic allowable stresses. Similarly, the vertical column R-8 has a safety margin of 2.03 against elastic allowable stresses.

For case b) evaluation, the crane rail girder, SE-B8 has a margin of safety of 2.45. By comparison, case a) column loads are higher than case b) therefore, the safety margin of column R8 for case b) is higher than 2.03.

It is, therefore, concluded that a minimum safety margin of 1.61 exists in the turbine building south extension crane rail columns and girders for crane lift-up and impact.

Q. In reference Page 10 of the report, clarify the first statement about acceptance criteria for members which used method of comparison of forces with the previous analysis.

A. The first sentence of Page 10 is modified to read as follows: "The structural element satisfied the seismic evaluation criteria when the computed forces for the "as-built" analysis were less than, or equal to, those in Reference 1, and when those individual structural elements (beam column, or connection) met the SEP acceptance criteria."

Q. The computer plot in Fig. 3 of the summary report does not show bracing members for the as-built condition. Are they included in the model analyzed?

A. The bracing members that have been installed in the south extension are described in Section 2.1 of the summary report. They are part of the model used to analyze the "as-built" condition of the south extension. In the computer plot shown in Figure 3, the bracing members were not plotted for clarity.

QUESTIONS ON:

SAN ONOFRE NUCLEAR GENERATING STATION

UNIT 1

SOIL BACKFILL CONDITIONS

Summary of the Design of the Grade Beams for the  
Auxiliary Feedwater Pump Foundations

June 1985

- Q. Clarify that Tables 2 and 3 of the report are consistent with the as-built condition. Specifically, state what the final reinforced concrete design is and whether the values include jet impingement loads.
- A. The revised Tables 2 and 3 are attached. The tables have been revised to indicate results with jet impingement loads (i.e. the final design case) and without jet impingement loads. They also indicate the reinforcing in the final design.

TABLE 2. SUMMARY OF RESULTS FOR GRADE BEAM B2

<u>Maximum Applied Moment (k-ft)</u>	<u>Ultimate Moment Capacity (k-ft)</u>
286(1)	374(2)
182(3)	300

<u>Maximum Applied Shear (k)</u>	<u>Allowable Shear (k)</u>
86.5(1)	98.4(2)
53.4(3)	91.7

NOTES

- (1) With jet impingement loads.
- (2) Final design with 5 #9 T/B and #6 ties at 10" O/C.
- (3) Without jet impingement loads.

TABLE 3. EFFECT OF GRADE BEAMS B1 AND B2 ON FOOTING F-12

<u>Bearing Pressures (ksf)</u>		
<u>Allowable</u>	<u>Without Grade Beams</u>	<u>With Grade Beams</u>
30	10	25.5(1)

NOTES

- (1) With jet impingement loads.