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Mr. John T. Collins
Regional Administrator, Region IV
Nuclear Regulatory Commission
611 Ryan Plaza Dr., Suite 1000
Arlington, Texas 76012

Dear Mr. Collins:

South Texas Project
Units 1 & 2
Docket Nos. STN 50-498, STN 50-499
Final Report Concerning the
Diesel Generator Building Design

On June 23, 1982, pursuant to 10CFR50.55(e), Houston Lighting & Power Company (HL&P) notified your office of an item concerning the design of the Diesel Generator Building (DGB) on Unit #1 of the South Texas Project (STP). The item concerned discrepancies between calculations and drawings for the DGB and was identified as a result of the review of Bechtel Power Corporation (BPC) Work Package EC-138.

An evaluation has been performed and is provided as an attachment to this letter. This evaluation identifies that only two (2) of the twelve (12) discrepancies that were identified have been determined to represent a potential safety hazard (Items 9 & 12). The remaining ten (10) discrepancies do not meet the criteria for reportability.

If you should have any questions concerning this item, please contact Mr. Michael E. Powell at (713)877-3281.

Very truly yours,

J. H. Goldberg for

G. W. Oprea, Jr.
Executive Vice President

MEP/mg

Attachment

IE27

cc: G. W. Oprea, Jr.
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Final Report Concerning the Diesel Generator Building Design

I. Summary

As a result of a review of a Bechtel Power Corporation (BPC) Work Package, No. EC-138, regarding the Diesel Generator Building (DGB) design, several discrepancies were identified between drawings and calculations. An evaluation has been performed which shows that a safety hazard does not exist and that the "as-built" condition is adequate for ten of the twelve discrepancies. The remaining two items are considered to represent a potential safety hazard.

II. Description of the Incident

On June 23, 1982, pursuant to 10CFR50.55(e), Houston Lighting & Power Company (HL&P) notified your office of an item concerning the design of the DGB on Unit #1 of the South Texas Project (STP). The item concerns discrepancies between calculations and drawings for the DGB and was identified as a result of the review of BPC Work Package EC-138. The findings in this work package review revealed that in isolated areas of the DGB the rebar shown on the engineering drawings was less than that required by the calculations and anchor bolts were found to be smaller on the engineering drawing than what the calculations called for; and in an isolated case, an inconsistency was found in the specification of a structural steel connection.

The resolution by BPC of these discrepancies was accomplished through a detailed investigation of reinforcement detail drawings, responses by Brown & Root, Inc. (B&R) to the discrepancies, and by the preparation of parallel calculations, where required.

III. Safety Analysis

A review by BPC of both the reinforcement detail drawings and B&R's responses to the various items has been completed. In addition, parallel calculations were made where required. The status and the results for each identified discrepancy are listed below:

Item 1: For the slab at elevation 82'-0, B&R's comment is that calculation 3D021SC093-C, Subpart 1C was the controlling calculation. Because this calculation did not include the effects of the Flame Arrestor Room, BPC made parallel calculations and found that an adequate design margin has been provided by B&R.

Item 2: The calculation requires reinforcement at top of deep beams; whereas the drawings do not. The B&R comment is that the reference used to design the walls, PCA ST-66, "Design of Deep Girders", recommends that the reinforcement at the supports be distributed throughout the entire tensile zone. Even though the calculations show

the 14-#11 rebar at the top of the beams, the wall reinforcement provided in the horizontal direction (#8 @ 12") is adequate.

Item 3: The calculation requires additional #11 bars at 12" on each face in all walls surrounding the diesel generator fuel oil storage tank. B&R's response is that the drawings show the reinforcement as required by the calculation. BPC agrees that the apparent discrepancy originally identified did not exist and thus no additional work is planned for this item.

Item 4: The calculation requires that additional #11 vertical bars be bundled with the regular wall reinforcement on internal walls around the diesel generator fuel oil storage tank. B&R stated that the reinforcement was added to the drawing as stated in the calculations. Although the B&R response is correct, parallel calculations have been made to determine the acceptability of the external walls at column lines E and C.8, between column lines 18.2 and 19.4, since no additional vertical bars were added to account for the design basis accident thermal load as were added for all other walls around the diesel generator fuel oil storage tank. The parallel calculations have revealed that an adequate design margin has been provided in the design.

Item 5: The calculation requires that 6 additional #11 bars not shown on the drawings be placed at approximately 55'-0 for the walls above the knockout panel. The B&R response is that even though the calculations show the additional bars, the reference used to design the walls, PCA ST-66, "Design of Deep Girders", recommends that the reinforcement in the tensile zone at the supports be distributed over the entire tensile zone. B&R states that the wall reinforcement provided in the horizontal direction (#8 @ 12" at both faces) satisfies the support steel requirements. BPC has prepared parallel calculations for this item and considers the design adequate.

Item 6: The vertical reinforcement on the wall at column line H should be #11 @ 6" instead of #11 @ 12" as per the calculations. BPC has reviewed the rebar detail drawings for this wall and had found that #11 bars at 6" have been provided as required by the calculations and that the callout for #11 bars at 12" is a drafting error.

Item 7: The calculations require 6-#10 bars above all personnel doors while the drawings show only two. B&R's response is that the calculations are based on a tension force in

the transfer beam resulting from the ultimate capacity of the wall above the door applied as a vertical load. By using a triangular load distribution, B&R finds the 2-#10 bars to be adequate. BPC agrees that the calculations by B&R are very conservative by assuming the ultimate capacity of the wall as the vertical load. BPC has prepared parallel calculations using the actual loads on the wall. These parallel calculations show that an adequate design margin has been provided.

Item 8: The calculations require 1" diameter anchor bolts to fasten the removable hatch cover at elevation 100'-0. Design drawings show 3/4" diameter bolts. B&R's response is that although the calculations state 1" diameter bolts, only 3/4" bolts are required. Parallel calculations have been prepared which show that an adequate margin has been provided.

Item 9: The calculation requires 5-#9 bars on the bottom of the outside removable hatch cover. The design drawing shows 4-#9 bars. The B&R response is that although the calculation shows that 5-#9 bars are required, 4-#9 bars are adequate based on the required area of steel calculated. BPC agrees with the proposed B&R resolution; however, the B&R calculations do not accurately assess the design bases. Therefore, BPC has provided parallel calculations. These parallel calculations are conservative and show that additional reinforcement should be provided for the effects of postulated tornado-generated missiles. Although a more detailed calculation may show that the original design was satisfactory, reinforcement will be added as required by the conservative Bechtel calculation.

Item 10: The calculation shows reinforcement around the 48" diameter sleeve on the slab at elevation 55'-0 that is not included on the drawing. The B&R response is that the reinforcement has been added in accordance with Detail 2 on drawing 0-C-003 even though Detail 2 is applicable for holes up to 36 inches in diameter, and that the reinforcement meets the requirements in the calculations. In addition, B&R adds that the rebar detail drawings do show the reinforcement as required by Detail 2. BPC has reviewed the rebar detail drawings and has found the reinforcement to agree with Detail 2. Therefore, BPC concurs with the proposed B&R resolution.

Item 11: The calculation requires four additional #10 bars at the top and the bottom of the edge beams for the slabs at elevations 100'-0 and 107'-0. The drawings show three. The B&R proposed resolution is that the three additional

bars are adequate based on the calculation. BPC has provided parallel calculations for this item and has found that the three additional #10 bars provide an adequate design margin.

Item 12: The calculations show fixed supports for the connection of the beams to the wall for the fan support at elevation 74'-1 3/4". The design drawing shows a simple support. This would result in an unstable condition during an Operating Basis Earthquake (OBE) or Safe Shutdown Earthquake (SSE). Rev. 2 of the drawing placed this design on hold and it has not been constructed. Previous revisions released for construction did not have the hold. A detailed analysis of the consequences of the unstable condition has not been performed. Assuming we have a safety hazard and since the design was released for construction in the past (Rev. 1, 12/79) this item is considered reportable. BPC will redesign the connection.

IV. Recurrence Control

A special recurrence control program is not considered necessary because the review of other work packages does not indicate a programmatic problem.

V. Corrective Action

Of the items evaluated, no major corrective actions are required. For items 1, 4, 5, 7, 8, and 11, the only corrective actions required are to void the B&R calculations and replace them with the BPC calculations. The BPC calculations were made reflecting the conditions on the design drawings. For Items 6 and 10, the only corrective actions required are to clarify the design drawings. For Item 9, the B&R calculations will be voided and replaced by the BPC parallel calculations. The BPC calculations have redesigned the removal hatch to resist the postulated, tornado-generated missiles per BPC methodology. A revision to the design drawing is also required to make the drawing and calculations agree. For Item 12, prior to the release of the hold on the frame, the calculations and drawings shall be revised, as required, to provide lateral support for the frame. For Items 2 and 3, no corrective actions are required.