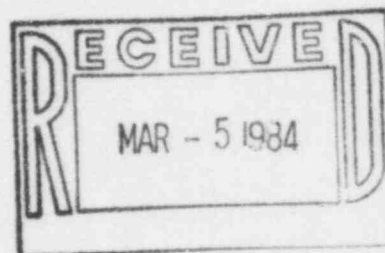


The Light company

Houston Lighting & Power P.O. Box 1700 Houston, Texas 77001 (713) 228-9211

February 29, 1984
ST-HL-AE-1057
File No.: G12.167

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



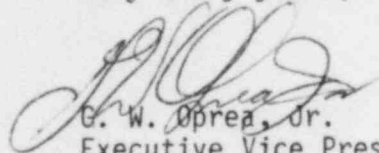
Dear Mr. Collins:

South Texas Project
Units 1 & 2
Docket Nos. STN 50-498, STN 50-499
Final Report Concerning the
Reactor Containment Building Post-Tensioning System Tendons

On August 26, 1983, pursuant to 10CFR50.55(e), Houston Lighting & Power Company (HL&P) notified your office of an item concerning the Reactor Containment Building (RCB) post-tensioning system tendons. Attached is the final report concerning this item.

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

Very truly yours,


G. W. Oprea, Jr.
Executive Vice President

SMH/mpg

Attachment: Final Report Concerning the Reactor Containment Building
Post-Tensioning System Tendons

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IE-2711

cc:

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Revised 12/21/83

Final Report Concerning the
Reactor Containment Building Post-Tensioning System Tendons

1. SUMMARY

Post-tensioning system tendons in long term storage at the vendors warehouse have been identified as exhibiting corrosion (e.g., rust and pitting). Evaluations were performed to determine if the corrosion will impair the structural function of the tendons during the lifetime of the plant. Although no quantitative safety analysis was performed, the assumed consequence of impaired tendon strength is the reduction of containment structural integrity.

II. DESCRIPTION OF DEFICIENCY

On August 26, 1983, pursuant to 10CFR50.55(e), Houston Lighting & Power Company (HL&P) notified the NRC Region IV of an item concerning the Reactor Containment Building (RCB) post-tensioning system tendons.

The tendons for the post-tensioning system of the RCB (Units 1 & 2) have been fabricated and held in storage at the fabricator's (Prescon Corporation) warehouse in San Antonio, Texas. The project specification requires that the fabricated tendons be periodically dipped in a corrosion inhibiting compound and visually inspected to ensure that no corrosion has developed. The specified care of the tendons is periodically surveyed in accordance with project procedures.

Visual inspection of some tendons by Bechtel Vendor Surveillance revealed rust and pitting of the tendon wires. The corrosion of the fabricated tendons is attributed to exposure to moisture caused by several factors with varying degrees of influence. The causes appear to be:

- a. The delay in implementing rigorous long-term protection upon identification that the tendons would be subject to delayed installation and prolonged storage.
- b. Storage in a facility without temperature and humidity control.
- c. Use of a combination of rust inhibitors that resulted in initial application of Visconorust P4256 (water base grease) with subsequent over coating with Visconorust P1601 (oil-base grease).

While long term storage provisions are included in all project specifications, these provisions were not implemented early enough to prevent the initiation of tendon corrosion. The principal cause for this delay was that the original project schedule called for the tendons to be shipped to the site after fabrication for immediate installation. During early schedule slippages, immediate installation was still assumed, thereby delaying further the institution of long term storage procedures.

A program was implemented to assess the extent and nature of corrosion with the ultimate objective of determining the suitability of the tendons to perform their intended function for the lifetime of the plant. The basic approach for the evaluation of the tendon corrosion was to investigate a representative sample of the tendons for suitability and then extend the findings by statistical projections to the entire tendon population.

Fourteen (14) selected tendons have been examined by Pittsburgh Testing Laboratory and Aptech Engineering Services, Co. Results of this examination indicate that the corrosive pitting prevails in most of the wires, and it is not restricted to certain locations within the tendons. In some cases, pit depths exceeding 15 mils have been measured. Tensile test results indicate that at the present time the pitted wire material strength and ductility exceed the minimum specified limits. However, further evaluation of the test results has led to the determination that the corrosion process is still active and can be expected to continue under the existing storage conditions. An evaluation of the existing condition coupled with projections of continued corrosion in storage (at the same rate) and anticipated corrosion while the tendons are in service indicates that the structural integrity of the tendons cannot be assured throughout the lifetime of the plant.

III. CORRECTIVE ACTION

The damaged tendons will be replaced.

IV. RECURRENCE CONTROL

Replacement tendons will be manufactured in a time frame which will preclude the need for long term storage. However, the project specification for the replacement tendons will include provisions to implement controlled storage procedures in the event that long-term storage of the tendons becomes necessary. The storage procedures will require, as a minimum;

1. Storage in a facility with the temperature and humidity control.
2. Initial and periodic application of an oil based corrosion inhibitor.
3. Periodic surveillance.

V. SAFETY ANALYSIS

No quantitative safety analysis was performed. The assumed safety consequence of impaired tendon strength is reduced containment structural integrity following a LOCA.