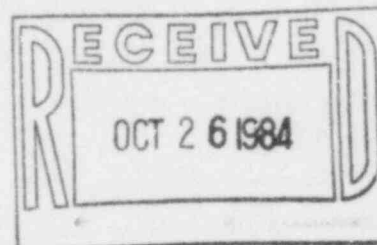


The Light company

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

October 24, 1984
ST-HL-AE-1142
File No.: G12.212

Mr. Robert D. Martin
Regional Administrator, Region IV
Nuclear Regulatory Commission
611 Ryan Plaza Drive, Suite 1000
Arlington, Texas 76012



Dear Mr. Martin:

South Texas Project
Units 1 & 2
Dockets Nos. STN 498, STN 50-499
Final Report Concerning Incomplete
Expansion of Steam Generator Tubes

On September 24, 1984, Houston Lighting & Power Company notified the Nuclear Regulatory Commission that an item regarding incomplete expansion of steam generator tubes was potentially reportable pursuant to 10CFR50.55(e). Our subsequent evaluation of this concern concluded that safe operation of the South Texas Project would not have been adversely affected even if the partially expanded tubes had not been reworked prior to initial operation. Therefore, this item does not meet the criteria for reportability under 10CFR50.55(e). The evaluation for this item is attached.

If you should have any questions on this matter please contact Mr. Michael E. Powell at (713) 993-1328.

Very truly yours,

G. W. Oprea, Jr.
G. W. Oprea, Jr
Executive Vice President

JSP/wb

Attachment: Final Report Concerning Incomplete
Expansion of Steam Generator Tubes

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PDR ADDCK 05000498
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IE-27

cc:

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U.S. Nuclear Regulatory Commission
Washington, DC 20555

South Texas Project
Units 1 & 2
Dockets Nos. STN 498, STN 50-499
Final Report Concerning Incomplete
Expansion of Steam Generator Tubes

I. Summary

Profilometry data was obtained on 1,544 Unit 1 steam generator tubes in the tubesheet area. All of the tubes were on the cold leg side of the steam generators. Review of the data indicates nine tubes had no expansion in the tubesheet, except at the tack roll. Fourteen tubes were found to have skip rolls and four tubes were found to have area either not rolled or not successfully expanded.

All tubes in the steam generators will be examined and all nonrolled or partially rolled tubes will be properly rolled.

An evaluation has been performed to assess the several conditions of partially expanded tubes. On the basis of this evaluation, it is concluded that no condition which could have adversely affected safety of operations at the plant would have resulted had these conditions not been identified and reworked.

II. Description

On September 24, 1984, Houston Lighting & Power Company (HL&P) notified Region IV of the Nuclear Regulatory Commission that a number of South Texas Project (STP) steam generator tubes were not rolled into the tubesheet as specified. HL&P has taken profilometry data on selected Unit 1 SG tubes. Profilometry data was obtained on 1,544 tubes in the tubesheet area. All of the tubes examined were on the cold leg side of the steam generators. Review of the profilometry data indicates that nine tubes had no expansion in the tubesheet, except at the tack roll. Fourteen tubes were found to have skip rolls (areas in the tube sheet where at least one expansion was not made along the length of the tube) and four tubes were found to have large areas either not rolled or not successfully expanded.

III. Corrective Action

Tube locations with these conditions will be identified through an inspection of the steam generators and reworked in the field so that each tube is expanded for the full depth of the tubesheet. This inspection is independent of profilometry data previously obtained by HL&P.

IV. Recurrence Control

This condition is unique to the steam generators; therefore, no recurrence control is necessary.

V. Safety Analysis

The tube-to-tubesheet welding performed during steam generator fabrication is the structural weld upon which the design loads affecting the tubing act. In the stress analysis of the steam generator, no credit for adding any structural integrity to the tube bundle is taken for expansion of the tubing within the tubesheet. Therefore, the structural integrity of the tube bundle would not be compromised by unexpanded tubes.

Full depth expansion of the tubing within the tubesheet was a design modification made after earlier steam generator models which were not full depth expanded experienced crevice corrosion of the tubing due to the concentration effects of the tube-to-tubesheet annulus. In addition to the full depth expansion design modification, operating experience has demonstrated that AVT secondary water chemistry and strict secondary water chemistry control are effective measures for minimizing the potential for crevice corrosion. However, even in the earlier model steam generators, crevice corrosion does not represent a safety issue. The tight tube-to-tubesheet annulus acts to restrict the amount of primary-to-secondary leakage in the unlikely event that a tube would degrade through wall within the tubesheet. Additionally, the tube sheet provides support to the tube and limits tube wall opening should any degradation of the tubewall within the tubesheet occur. These leak-limiting and tubewall support characteristics also apply to unexpanded tubes in the Model E Steam Generators at STP. Due to these characteristics provided by the tubesheet, the effect of any postulated condition which may have resulted had the partial tube expansions not been reworked prior to operation would have been enveloped by existing FSAR Chapter 15 safety analyses. Primary-to-secondary leakage originating from a tube within the length of the tubesheet, if experienced, would be limited and detectable, allowing for an orderly plant shutdown to perform inspections and any necessary repairs.

Primary-to-secondary steam generator leakage does not necessarily adversely affect the safety of operation. Plant technical specifications allow plant operation with primary-to-secondary steam generator leakage. The limit in the technical specification for primary-to-secondary leakage in a steam generator is based on the concept of leak-before-break. As discussed in the Bases for Westinghouse Standard Technical Specification 3/4.4.5, the extent of any postulated corrosion induced cracking of a tube would be restricted by the limitations on primary-to-secondary steam generator leakage. Cracks having a primary-to-secondary tube leakage less than this limit during normal operation have an adequate margin of safety to withstand the loads imposed during a postulated accident. Leakage in excess of this limit would require plant shutdown. The primary-to-secondary leakage limit associated with this leak-before-break concept is conservatively established to apply to any location along the tube. This includes locations along the free span of the tube such as between the tube-sheet and the first tube support plate (TSP) or between TSP's. For the length

of the tube within the tubesheet, the margin of safety of the tube to withstand normal and postulated accident loads is significantly increased over that of the free span tube length due to the support provided by the tubesheet. Therefore, the ability to monitor primary-to-secondary steam generator leakage and the Technical Specification limit on this leakage provide a significant margin of safety for tubes with postulated corrosion within the tubesheet.

Based on the evaluation performed, safe operation of STP would not have been adversely affected even if the partially expanded tubes had not been reworked prior to initial operation.