



South Texas Project Electric Generating Station P.O. Box 289 Wadsworth, Texas 77483

March 12, 2012  
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U. S. Nuclear Regulatory Commission  
Attention: Document Control Desk  
One White Flint North  
11555 Rockville Pike  
Rockville, MD 20852-2738

South Texas Project  
Unit 1  
Docket No. STN 50-498  
1RE16 Inspection Summary Report for Steam Generator Tubing –  
Response to Request for Additional Information (TAC ME7226)

Reference: Letter from G. T. Powell, STP Nuclear Operating Company, to NRC Document Control Desk, "1RE16 Inspection Summary Report for Steam Generator Tubing," dated September 21, 2011 (NOC-AE-11002722) (ML11272A126)

The STP Nuclear Operating Company transmitted a summary report describing the results of the South Texas Project Unit 1 steam generator tube inspection performed during refueling outage 1RE16 under the referenced correspondence. The summary report satisfies the reporting requirements of ASME Section XI, Article IWA-6230, and Section 6.9.1.7 of the South Texas Project Technical Specifications. This report provides responses to the NRC request for additional information issued January 17, 2012.

A commitment is listed in Attachment 2.

If there are any questions regarding this report, please contact either Mr. P. L. Walker at (361) 972-8392 or me at (361) 972-7566.

G. T. Powell  
Vice President,  
Generation

PLW

- Attachments: 1. RE16 Inspection Summary Report for Steam Generator Tubing –  
Response to Request for Additional Information  
2. List of Commitments

STI: 33375163

A 047  
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**SOUTH TEXAS PROJECT  
UNIT 1  
1RE16 INSPECTION SUMMARY REPORT FOR STEAM GENERATOR TUBING –  
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION**

By letter dated September 21, 2011 (Agencywide Documents Access and Management System (ADAMS) accession number ML11272A126), South Texas Project Nuclear Operating Company (the licensee), submitted information summarizing the results of the spring 2011 steam generator tube inspections at South Texas Project Unit 1. In order to complete its review of this document the Nuclear Regulatory Commission (NRC) staff requests the following additional information:

1. In Table 1, 12 tubes were identified as requiring a retest due to a restriction. Please discuss the nature and cause of these restrictions. Please also address if these restrictions were service induced?

**RESPONSE**

One tube has a legacy restriction just above the top of tube sheet cold leg. Steam generator B, row 127, column 79 has a 55 volt dent which was restricted with a standard 0.560" bobbin probe. The uninspected portion of the tube was retested with a 0.540" bobbin probe and a rotating +pt coil probe with no degradation indicated.

The remaining restricted tubes are a repeat of the experience from past outages (probes, diameters, results). The test probe specifics and delivery conduit are situated in a manner which makes it difficult to push a probe over reduced-radius u-bends. In these cases, the required test extent (the u-bend portion) was completed using a slightly smaller diameter probe (0.540") with no degradation detected.

2. Table 5 lists the visual inspection results for the top of tubesheet potential loose part signals. For steam generator D, 6 possible loose part signals were identified at the top of the tubesheet; however, only 5 are listed in Table 5. Was a visual inspection performed for the sixth possible loose part signal at the top of the tubesheet. If so, please discuss the results.

**RESPONSE**

A review of the eddy current database confirmed that only five potential loose part signals remain in the database and the results of visual inspection are as listed in Table 5. The additional signal listed on accompanying tables was erroneously included and is a previous revision to the list which reflects a signal of interest dispositioned from the database prior to final closeout. The South Texas Project (STP) report will be revised to correct this error.

3. Please discuss whether any visual inspections were performed in steam generator D for the 89 possible loose part signals located at the flow distribution baffle and 1st tube support plate. If visual inspections were performed, please discuss the results. Were these possible loose part signals present in prior outages?

## RESPONSE

Visual inspections were not performed during 1RE16 for possible loose part (PLP) signals located at the flow distribution baffle or 1st support plate. While five of the reported calls were not observed during the previous inspection, the remaining PLPs reported at the flow distribution baffle are historical. All reported PLP signals received diagnostic testing with rotating plus point (+pt) inspection. Tubes identified with PLP signals were "boxed-in" by additional eddy current inspections with no tube wear identified. All tubes with current PLP signals are tested during subsequent inspections in accordance with the EPRI Steam Generator Examination Guideline.

4. Inspections of the steam drums were performed in two steam generators. Please discuss the results of these inspections. In addition, please discuss the results of the video inspection of the ninth tube support plate in steam generator 1A.

## RESPONSE

The upper steam drum region of steam generators A and B was visually inspected. The scope of the inspection included the primary separator / swirl vanes, secondary separators, spray cans and feeding (external surfaces), and lower deck plate and sludge collector assembly. No anomalies were noted. The steam nozzle region in steam generator A was inspected with no anomalies reported.

Video inspection at the 9th support plate showed a thin layer of magnetite covering the tube support plate (TSP) top surface as well as the majority of the observed tube surfaces. No tube scale or deposit bridging across the trefoil to tube outer diameter (OD) surface was seen. No departure from the expected appearance of the TSP ligaments was observed.

5. It was indicated that signals representative of tube diameter increases (bulges) were reported from the bobbin inspection analyses. Please discuss the nature of these bulges. Are these indications service induced? Please discuss how these indications were dispositioned.

## RESPONSE

All of the tube diameter increase (bulge) signals reside within the expanded area of the hot-leg and cold-leg tubesheets or just above the tube sheet hot or tube sheet cold interface. In all cases, bulge signals were determined to have been introduced as part of the manufacturing process by comparing the signals to pre-service inspection data. The initial pre-service identification of such signals was based upon voltage and/or change in diameter (using profilometry software) and the pre-service bobbin coil database. The bulges are maintained within the database and a sample is examined via rotating plus point (+pt) inspection during each inspection outage. To date, no bulge locations have been reported as flawed at STP or any other plants with alloy 690 thermally treated tubing.

None of the identified bulges are service-induced.

6. The following paragraph is on page 3:

*Within the noise of the bobbin data is a very small signal measuring approximately 4%. The signals are very much like the residual on each edge of the TSP. For the 1RE16 inspection, the overall noise was less, the mix residual a little less, and the signal was therefore more defined from its surroundings. Wear at TSP is considered a "potential degradation mechanism" for the RSGs within the 1RE16 Degradation Assessment.*

Please clarify the context of this paragraph. Is it describing general trends in the eddy current data or results from a specific tube? If so, which tube has the 4% through-wall indication since none of the flaws identified in the submittal have a reported depth of 4% through-wall.

#### RESPONSE

The 4% through-wall indication referenced in the summary report is the result of reviewing historical data for row 3, column 155 of SG B hot-leg side at 6th TSP. Eddy current data collected during the 2006 (1RE13) inspection were reviewed and compared with the data collected during 1RE16. During the 1RE16 inspection, eddy current data analysis measured 9% through-wall due to better signal definition and a slight growth rate.

The 4% wear was not identified during 1RE13 because: 1) signal-to-noise ratios were less during the previous inspection since the OMNI tester, used during 1RE16, produces less background noise than the previous digital testers; and 2) bobbin coil probe performance has improved, producing less mechanical and electrical interference than during 1RE13. The process of discriminating small wear signals from unwanted noise, by virtue of enhancement of items (1) and (2), has therefore improved.

As a result of these enhancements, a conservatively low bobbin coil detection level for broached wear is demonstrated. This tube will be scheduled for testing during subsequent inspections in accordance with the EPRI Steam Generator Examination Guideline. Signal comparisons and growth rate determinations will be performed in accordance with the EPRI Steam Generator Examination Guideline.

### LIST OF COMMITMENTS

The following table identifies the actions in this document to which the STP Nuclear Operating Company has committed. Statements in this submittal with the exception of those in the table below are provided for information purposes and are not considered commitments. Please direct questions regarding these commitments to Philip Walker at (361) 972-8392.

<b>Commitment</b>	<b>Expected Completion Date</b>	<b>CR Action No.</b>
A review of the eddy current database confirmed that only five potential loose part signals remain in the database and the results of visual inspection are as listed in Table 5. The additional signal listed on accompanying tables was erroneously included and is a previous revision to the list which reflects a signal of interest dispositioned from the database prior to final closeout. The STP report will be revised to correct this error.	09/01/2012	12-4395-8