



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

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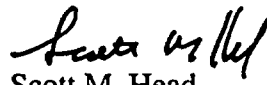
U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
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11555 Rockville Pike
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South Texas Project
Unit 1
Docket No. STN 50-498
1RE12 Refueling Outage Inservice Inspection Results for Steam Generator Tubing

Enclosed are four copies of the summary report describing the results of the steam generator tube inservice inspection performed during refueling outage 1RE12. This 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.

There are no commitments in this letter.

If there are any questions regarding this report, please contact Dan Sicking at (361) 972-7678 or me at (361) 972-7136.


Scott M. Head
Manager, Licensing

jtc

Enclosure: 1RE12 Inservice Inspection Summary Report for Steam Generator Tubing of the
South Texas Project Electric Generating Station - Unit 1

1047

STI: 31934910

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1RE12 INSPECTION SUMMARY REPORT
FOR STEAM GENERATOR TUBING
of the
SOUTH TEXAS PROJECT ELECTRIC GENERATING STATION
UNIT 1

USNRC DOCKET NO.: 50-498

OPERATING LICENSE NO.: NPF-76

COMMERCIAL OPERATION DATE: August 25, 1988

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1RE12 INSPECTION SUMMARY REPORT FOR STEAM GENERATOR TUBING

Introduction

This summary report describes the inspection of Steam Generator D tubing at South Texas Project Electric Generating Station, Unit 1 performed during the 1RE12 refueling outage in April 2005. A steam generator sludge lancing and Foreign Object Search And Retrieval (FOSAR) program was conducted in Steam Generators A, B, C, and D during the 1RE12 refueling outage. The FOSAR activities determined that flexitallic gasket material was present in Steam Generators A, B, C and D. In addition, wire remnants from a feedwater cable stabilizer from the feedwater heater migrated into Steam Generator D during cycle 10. The visible wear scar in Steam Generator D was found on the hot leg side of the tube just above the tube sheet in Row 86 Column 22 (86-22).

This report provides the information required by STPEGS Technical Specification Section 6.8.3.o for maintaining steam generator tube integrity and the reporting requirements of Technical Specification 6.9.1.7.

Scope of Examinations

Based on the FOSAR examination of Steam Generator D and the visual identification of a wear scar on a peripheral tube, a Degradation Assessment (DA) established the scope of eddy current (ET) inspections as recommended by Section 3.2.3.1 of NEI 97-06 for secondary side visually defined tube damage.

The planned scope of bobbin coil ET in Steam Generator D was:

- A continuous ring of 435 tube areas on the periphery of the tube bundle,
- A randomly distributed buffer zone of 87 tube areas adjacent to the peripheral ring sample (a twenty percent sample),
- A continuous circle of 791 tube areas beneath the cut out of the flow distribution baffle plate, and
- A randomly distributed buffer zone of 61 tube areas adjacent to the circular sample (a twenty percent sample).

The total number of tubes examined with the bobbin coil technique for Steam Generator D was 2748 (1374 for both hot and cold legs). The bobbin coil tube examination areas extended from the top of the tube sheet, through the flow distribution baffle plate, to the ninth tube support plate.

The planned scope of motorized rotating probe coils (MRPC) ET in Steam Generator D was:

- A continuous ring of 1049 tube areas on the periphery of the tube bundle, and
- A randomly distributed buffer zone of 112 tube areas adjacent to the peripheral ring sample (a twenty percent sample).

The total number of tubes examined with MRPC for Steam Generator D was 2322 (1161 for both hot and cold legs). All of the tube examination areas extended from one inch below the secondary face of the tubesheet to five inches above the secondary face. The sample was the same on the hot and cold leg sides.

The FOSAR secondary side visual examination also identified the location of some loose parts near the top of the tubesheet. The MRPC ET bounded the locations of parts identified by FOSAR.

Summary of Examinations

Bobbin coil ET techniques were performed on 2748 straight tube areas and 56 U-bend regions in Steam Generator D.

MRPC ET techniques were performed on 2322 straight tube areas in Steam Generator D. The possible flaw signals reported by the bobbin coil ET were subjected to a diagnostic MRPC examination. The scope of the MRPC included tube areas with FOSAR and/or ET indications of a possible loose part. A total of 3049 straight tube areas were examined by MRPC ET from one inch below the secondary face of the tubesheet to five inches above. A total of 88 straight tube areas were examined by MRPC ET from one inch below the secondary face of the tubesheet to two inches above the centerline of the flow distribution baffle plate.

Examination Results and Corrective Measures

There were no axial or circumferential crack-like indications or active degradation mechanisms identified in the steam generator. Wall thinning was identified on three tubes with a combination of visual and ET examinations.

The location of the indications were recorded relative to the adjacent tubesheet, tube support plate, baffle plate, and/or anti-vibration bar.

There were 159 indications of possible loose parts (PLP's) reported by bobbin coil or MRPC ET. This includes the previously detected (1RE10) loose part indication reported in tube 43-79 with bobbin coil. It has not moved since 1RE10 and no wear was detected during 1RE12. Three other indications were detected by both MRPC and bobbin coil ET.

Bobbin coil ET detected 166 dings and were reported in the support plate suppression process channel (P1).

All other reported indications were non-flaw signals, i.e., absolute drift signals (ADS), distorted tubesheet signals (DTS), manufacturing burnish marks (MBM) and non-quantifiable signals (NQS).

The following table lists the number of indications and tubes associated with each three-letter indication code.

| Indication Type | Number of Indications | Number of Tubes |
|-----------------|-----------------------|-----------------|
| ADS | 1 | 1 |
| DNG | 166 | 127 |
| DTS | 4 | 4 |
| MBM | 72 | 61 |
| NQS | 12 | 11 |
| PLP | 159 | 132 |
| VOL | 3 | 3 |

The total number of degraded and defective tubes detected during the bobbin coil ET and MRPC ET is as follows:

Two adjacent tubes had indications that were measured to be 21 and 38 percent through-wall. They were both categorized as being degraded. The degradation in the two tubes was the result of cable stabilizer wire-induced wear. The wire was removed from these tube locations. Another adjacent tube that had an indication with a measured depth of 8 percent through-wall was also caused by the cable stabilizer wire mentioned above. These three MRPC indications were assigned the three-letter code "VOL". All three were within the critical area originally defined by the FOSAR activities. The details of these VOL indications are as follows:

| Row | Col. | Volts | Deg. | Percent | Ch. | Landmark | Offset | Length | Width | Circ. Extent |
|-----|------|-------|------|---------|-----|----------|--------|--------|-------|--------------|
| 84 | 22 | 0.21 | 64° | 21 | 6 | *TSH | 0.05" | 0.17" | 0.47" | 79° |
| 84 | 24 | 0.05 | 95° | 8 | 6 | *TSH | 0.17" | 0.14" | 0.42" | 71° |
| 86 | 22 | 0.47 | 74° | 38 | 6 | *TSH | 0.1" | 0.25" | 0.49" | 82° |

*TSH – Tubesheet Hot

The depths of these VOL indications were measured using the technique prescribed by the degradation assessment and based on the EPRI-published ETSS 21998.1.

No tubes were considered to be defective.

Although the 38 percent through-wall indication in Tube 86-22 did not exceed the Technical Specification plugging criteria, STPNOC decided to remove it from service. Tube 86-22 was removed from service by installing ribbed mechanical alloy 690 plugs in the hot and cold leg tube ends. There were no other tubes removed from service during

1RE12. Nine tubes were removed from service during manufacturing activities by Westinghouse. Therefore, at the conclusion of the 1RE12 outage a total of ten tubes (0.13 percent of the original population) had been removed from service in Steam Generator D.

No active damage mechanisms were found during the 1RE12 inspections. Appendix F of EPRI Technical Report 1003138, "Pressurized Water Reactor Steam Generator Examination Guidelines: Revision 6," specifically excludes "loose part wear" from the definition of an "active damage mechanism."

None of the observed indications exceeded the screening thresholds for in situ testing.

No tubes were pulled or subjected to in-situ pressure testing.

A Condition Monitoring and Operational Assessment was performed for the 1RE12 refueling outage. It concluded that all tubes in service during cycles 11 and 12 met the Technical Specification performance criteria. It further concluded that the expected performance of all Steam Generators would meet the performance criteria for the next 18 EFPM of operation.