



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

Mr. David A. Heacock  
President and Chief Nuclear Officer  
Virginia Electric and Power Company  
Innsbrook Technical Center  
5000 Dominion Boulevard  
Glen Allen, VA 23060-6711

SUBJECT: SURRY POWER STATION, UNIT 1 - REVIEW OF THE STEAM GENERATOR  
TUBE INSERVICE INSPECTION REPORT FOR THE REFUELING OUTAGE IN  
2010 (TAC NO. ME6375)

Dear Mr. Heacock:

By letter dated May 24, 2011, (Agencywide Documents Access and Management System (ADAMS) Accession No. ML11154A101), Virginia Electric and Power Company (the licensee) submitted steam generator (SG) tube inspection results from the fall 2010 inspections at Surry Power Station, Unit 1. The licensee provided additional information in a letter dated December 15, 2011, (ADAMS Accession No. ML12003A242).

The U.S. Nuclear Regulatory Commission Staff has completed its review of these reports and concludes that the licensee provided the information required by their technical specifications and that no additional follow-up is required at this time. The staff's review of the report is enclosed.

Sincerely,

A handwritten signature in black ink, reading "Karen Cotton", is positioned above the typed name.

Karen Cotton, Project Manager  
Plant Licensing Branch II-1  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Docket No. 50-280

Enclosure: As Stated

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## REVIEW OF THE 2010 STEAM GENERATOR TUBE

### INSERVICE INSPECTION REPORT

#### SURRY POWER STATION, UNIT 1

#### DOCKET NO. 50-280

By letter dated May 24, 2011, (Agencywide Documents Access and Management System (ADAMS) Accession Number ML11154A101), Virginia Electric and Power Company (the licensee) submitted steam generator (SG) tube inspection results from the fall 2010 inspections at Surry Power Station (SPS), Unit 1. The licensee provided additional information in a letter dated December 15, 2011 (ADAMS Accession No. ML12003A242).

SPS Unit 1 has three SGs that were replaced in 1981. The replacement SGs were fabricated by Westinghouse. Each SG contains 3,342 thermally treated Alloy 600 tubes. Each tube has a nominal outside diameter of 0.875 inches and a nominal wall thickness of 0.050 inches. The tubes were hydraulically expanded at both ends for the full length of the tubesheet and are supported by a number of stainless steel tube support plates (TSPs). The U-bends of the tubes installed in rows 1 through 8 were thermally stress relieved after bending.

The licensee provided the scope, extent, methods, and results of their steam generator tube inspections in the documents referenced above. In addition, the licensee described corrective actions (e.g., tube plugging) taken in response to the inspection findings.

After review of the information provided by the licensee, the U.S. Nuclear Regulatory Commission (NRC) staff has the following comments/observations:

- A circumferentially oriented indication attributed to outside diameter stress corrosion cracking was detected in the expansion transition portion of a tube at the top of the tubesheet on the hot-leg side of the SG. This indication was estimated to have a circumferential extent of 73 degrees; amplitude of 0.62 volts, an equivalent percent degraded area of 3.5 percent, and was located 0.03 inches below the top of the tubesheet (TTS). This tube, located at row 30 column 21, was stabilized and plugged. Although a crack has been detected in both SG A (in 2009) and SG C (in 2010), only 75 percent of the tubes were inspected at the TTS on the hot-leg side in SG B (100 percent were inspected in SGs A and C).
- The licensee stated that they replaced the feedrings in all three SGs, as a preventative measure to address flow assisted corrosion that has historically been monitored in the SGs. After installing the new feedrings, the licensee performed foreign object search and retrieval examinations in each SG at the TTS, in the annulus, and in the no-tube lane.
- During examination of localized areas of the upper surface of the flow distribution baffle plate (in response to eddy current possible loose part (PLP)/wear indications) in SGs B and C, accumulations of exfoliated scale were noted.

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- In SG B, a cluster of tubes with wear and eddy current PLP indications at the flow distribution baffle plate on the hot-leg side were identified. Visual exams revealed no foreign objects in these areas and the licensee concluded that the PLP signals were likely caused by the copious scale identified in the region.
- A pit-like indication was detected in SG A and not plugged during the 2010 outage (the pit-like indication had been detected in prior outages as well). This pit-like indication is discussed in the NRC staff's previous review of the SG inspection results (ADAMS Accession No. ML102580831). There were two pit-like indications reported by the licensee in prior outages, but the licensee revised one of the indications as foreign object wear due to proximity to piece of wire which was lodged in place in the most recent SG tube inspection report.
- All tubes with no tube expansions were plugged. In addition, all tubes with the bottom of the expansion transition located more than 1 inch from the TTS were plugged.

Based on a review of the information provided by the licensee, the staff concludes that the licensee provided the information required by their technical specifications. The SG tube inspections at SPS Unit 1 appear to be consistent with the objective of detecting potential tube degradation and the inspection results appear to be consistent with industry operating experience at similarly designed and operated units (with the possible exception of the pit-like indications).

February 27, 2012

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/RA/

Karen Cotton, Project Manager  
Plant Licensing Branch II-1  
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ADAMS Accession No. ML12046A849

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