

October 24, 2003

Mr. David A. Christian
Sr. Vice President and Chief Nuclear Officer
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5000 Dominion Blvd.
Glen Allen, Virginia 23060-6711

SUBJECT: SURRY UNIT 1 - REVISED SUMMARY OF CONFERENCE CALL WITH
VIRGINIA ELECTRIC AND POWER COMPANY REGARDING THE 2003
STEAM GENERATOR TUBE INSPECTION RESULTS FOR SURRY POWER
STATION, UNIT 1 (TAC NO. MB8131)

Dear Mr. Christian:

On May 1, 2003, the U.S. Nuclear Regulatory Commission (NRC) staff participated in a conference call with the Virginia Electric and Power Company regarding the steam generator (SG) tube inspection activities during the refueling outage at Surry Power Station, Unit 1. On June 17, 2003, a conference call summary was issued for the Unit 1 SG tube inspection activities. The licensee reviewed this summary and requested that the NRC staff clarify the findings in the summary. Enclosed is a revised summary of the June 17, 2003, conference call with the corrected paragraphs appropriately marked. The conference call summary enclosed with this letter supersedes the version issued on June 17, 2003. If you have any questions, please call me at (301) 415-1055.

Sincerely,

/RA/

Christopher Gratton, Sr. Project Manager, Section 1
Project Directorate II
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-280

Enclosure: As stated

cc w/encl: See next page

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SUMMARY OF CONFERENCE CALL
WITH
VIRGINIA ELECTRIC AND POWER COMPANY
REGARDING STEAM GENERATOR INSPECTION RESULTS
AT SURRY POWER STATION, UNIT 1

On May 1, 2003, the U.S. Nuclear Regulatory Commission (NRC) staff participated in a conference call with Virginia Electric & Power Company (VEPCO, the licensee) representatives regarding the steam generator (SG) tube inspection activities at Surry Power Station, Unit 1.

The issues discussed included those listed in the enclosure to the letter documenting the arrangement of this conference call that was sent to VEPCO on March 28, 2003 (ADAMS Accession No. ML030860123). At the time of the call, the plant was in the process of performing the inspections of the SG B tubes. Approximately 20 tubes in SG C were to be inspected after the SG B inspection was complete. The purpose of the SG C inspection was to assess for potential tube damage from a sludge lancing operation performed in a previous outage. The issues discussed in the conference call are summarized below.

- The plant had less than 1 gallon-per-day total primary-to-secondary leakage during the cycle leading up to the current refueling outage. A secondary side pressure test was not performed.
- The initial SG inspection scope consisted of:

SGB

- inspection of 100 percent of the active tubes with a bobbin probe
 - inspection of approximately 20 percent (~667 tubes) of the tubes with a rotating probe in the hot leg top-of-tubesheet region (i.e., inspection from 3 inches above and below the top-of-tubesheet region in the sludge zone, periphery and other random locations)
 - inspection of 100 percent of the row one tubes in the U-bend region with a rotating probe
 - inspection of various bobbin signals, such as dents and manufacturing buff marks, with a rotating probe
 - inspection of approximately 20 percent of the dents (~ 90 dents) greater than two volts with a rotating probe
-
- The licensee investigated approximately 22 bobbin signals (i.e., non-quantifiable indications) located in the tubes within the tubesheet. These signals could be traced to baseline data and appear to be due to manufacturing, possibly the result of small gouges about 0.015-0.030 inches in length.

ENCLOSURE

- The secondary side SG inspection scope consisted of visual inspections of the drum and feed ring using remote video and foreign object search and retrieval (FOSAR). These inspections were performed in all three SGs. Ultrasonic inspection of the feed ring was performed to determine if degradation from flow-accelerated corrosion was present. Sludge lancing was performed in the three SGs.
- The licensee indicated that they took two exceptions to the Electric Power Research Institute examination guidelines. The first exception related to the length of time between SG tube examinations. The licensee indicated that they have typically operated for three cycles in between inspections of the SGs. The second exception related to the inspection of SG tube plugs. The licensee only performs visual inspections of the plugs (in lieu of eddy current or ultrasonic inspections). However, the licensee indicated that all the plugs in both the hot leg and cold leg are made from Alloy 690 thermally treated material and that industry operating experience supports this exception.
- The licensee had 43 tubes plugged prior to this refueling outage: 16 in SG A; 14 in SG B; and 13 in SG C. Currently seven tubes are scheduled to be plugged in SG B as a result of the 2003 inspection. Four tubes are being plugged due to sludge lance monorail damage from a prior outage. The most significant of these indications was 41 percent throughwall and 1.5 inches long. The degradation is in the same area as that observed on SG A during the previous SG inspection. The other three tubes with wear due to the sludge lance monorail equipment have degradation ranging between 20 percent - 39 percent throughwall. Three other tubes will be plugged for various reasons: one tube had significant permeability that prevented a thorough inspection because the licensee concluded the permeability could mask a flaw; and one tube had a small indentation in the expansion transition zone at the top of the tubesheet that the licensee believed was a result of the chemical cleaning pulsing process. These two tubes were preventively plugged. The third tube had a 55-volt dent. This dent had been previously identified in 1994 and in 1998 and has exhibited essentially no change in voltage since being identified in 1994. The 55-volt dent was inspected with a 0.680-diameter rotating probe. No degradation was identified; however, use of the 0.680 probe is not qualified, and the licensee could not inspect the dent with the larger qualified probe, so the tube will be preventively plugged.
- The licensee had expected the tube damage (i.e., location and depth) from the sludge lance monorail in SG B to be similar to that previously observed in SG A. Due to damage actually being more significant, the licensee decided to inspect 20 tubes in SG C in the area of expected damage.
- The plant saw no evidence of loose parts during the inspection.
- No new degradation modes were observed. No insitu pressure testing or tube pulls were anticipated.
- The SGs contain thermally treated Alloy 600 tubing. The licensee reported that the hot leg temperature was approximately 605 °F and that the plant had accumulated 16.9 effective full-power years since SG replacement. No evidence of eddy current offset, similar to that observed at Seabrook and identified in NRC Information Notice 2002-21 and 2002-21 Supplement 1, was identified during the SG B inspection. The offset is believed to indicate problems with heat treatment of the tubes.

- The NRC requested information regarding the sludge pile thickness and uniformity. The request pertained to the identification of a defect reportedly caused by foreign material that was identified in the licensee's 2001 SG Inspection Report. The foreign material and associated degradation were assumed by the NRC staff to be located within the sludge pile based on the report's description. The licensee noted that sludge may form collars around the tubes rather than a sludge pile, and that the sludge thickness (elevation) is quite inconsistent across the tubesheet. Thus, the foreign material may not have been located in sludge, but directly on the tubesheet and in contact with the tube.
- The licensee reported that it had experienced a condenser excursion during the past operating cycle, and that due to corrosion and corrosion product transport to the SG, a much greater amount of sludge was expected in the SG compared to past inspections.
- Recently another licensee notified the NRC that loose parts associated with flexitallic gaskets had caused tube damage. The NRC questioned whether the licensee for Surry, Unit 1, used flexitallic gaskets in the feedwater system and if foreign material traceable to the flexitallic gasket had been identified in the SGs during past FOSAR inspections. The licensee stated that flexitallic gaskets are used, and that the licensee has found small (approximately 1/16 diameter by 1-inch long) pieces of metal that are believed to be from the gaskets in the SGs during past inspections. However, no SG tube wear has been attributed to the loose parts.
- The plant will inform the NRC staff if any unexpected results are identified during the remaining portion of the inspection or if insitu testing will be performed.

Mr. David A. Christian
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Surry Power Station
Units 1 and 2

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