December 20, 2002

Mr. J. A. Scalice
Chief Nuclear Officer and
Executive Vice President
Tennessee Valley Authority
6A Lookout Place
1101 Market Street
Chattanooga, Tennessee 37402-2801

SUBJECT: WATTS BAR NUCLEAR PLANT, UNIT 1 — SUMMARY OF CONFERENCE CALL WITH TENNESSEE VALLEY AUTHORITY CONCERNING THE 2002 STEAM GENERATOR INSPECTION RESULTS (TAC NO. MB4425)

Dear Mr. Scalice:

On March 8, 2002, U.S. Nuclear Regulatory Commission staff held a conference call with Tennessee Valley Authority representatives regarding the ongoing steam generator tube inspection activities at Watts Bar Unit 1. Enclosed is a brief summary of the conference call. This letter closes TAC No. MB4425. Please contact me if you have any questions.

Sincerely,

/RA/

L. Mark Padovan, Project Manager, Section 2
Project Directorate II
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-390

Enclosure: Call summary

cc w/enclosure: See next page

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SUMMARY OF CONFERENCE CALL WITH

TENNESSEE VALLEY AUTHORITY

REGARDING 2002 STEAM GENERATOR INSPECTION RESULTS

AT WATTS BAR UNIT 1

The U.S. Nuclear Regulatory Commission (NRC) staff participated in a conference call with Tennessee Valley Authority on March 8, 2002, to discuss the plans and preliminary results of the steam generator tube inspection activities at Watts Bar Unit 1. Topics discussed during the conference call consisted of the following:

- eddy current testing scope
- scope expansion plans
- indications identified to date
- repair/plugging plans
- new inspection findings
- in-situ pressure test plans
- actions taken in response to lessons learned from the Indian Point 2 tube failure

The inspection scope included a full length bobbin coil examination of 100 percent of the tubes in each of the four steam generators. In addition to the bobbin coil examinations, the plus-point probe was used to inspect the following:

- hot-leg (HL) top of the tubesheet (TTS) region for 100 percent of the tubes
- 100 percent of the hot-leg dented intersections over 2 volts
- 20 percent of freespan dings on the cold-leg side
- 100 percent of dents in the preheater region over 5 volts
- U-bend region of 100 percent of Row 1 and 20 percent of Row 2

The expansion criteria included the following:

- For TTS, if the results were categorized as C-3 as defined in the plant's technical specifications, the inspection would be expanded to include a 20 percent sample of the cold-leg tubes.

- For the U-bend region, if one indication is detected in Row 2, the inspection will be expanded to include 100 percent of the Row 2 tubes plus 20 percent of the Row 3 tubes in all four steam generators.

- For tube support plate (TSP) dented intersections, if a circumferential indication is detected at dents between 2 and 5 volts, the scope will be expanded to include 100 percent of the dents between 1 and 2 volts. If one circumferential indication is detected between 1 and 2 volts, the licensee will develop an expansion criteria for dents less than 1 volt which would include an evaluation of whether structural integrity would be affected by indications at dents less than 1 volt so as to warrant an inspection of these dents.

Enclosure

- At the time of this conference call, the inspections were 58 percent complete. As a result of the inspections, a large number of outside diameter (OD) circumferential indications were detected at TTS on the HL side. The licensee had predicted to have between 30 to 40 TTS circumferential indications. However, at the time of the call, 138 indications were identified. Specifically, 15 were identified in steam generator 1, 25 in steam generator 2, 16 in steam generator 3, and 82 in steam generator 4. The licensee is investigating the reason for the higher number of indications in steam generator 4. Plus-point voltages for these indications are very low (less than 1 volt). The licensee stated that the indications are believed to be circumferential segments (rather than one discrete crack) and shallow based on the low plus-point voltages.

The licensee adopted a more stringent in situ testing screening criteria for these indications than would be required by the Electric Power Research Institute (EPRI) Guidelines. Regardless of the depth of the indications, the licensee planned to in situ pressure test all indications with arc lengths exceeding 180 degrees. Based on the inspection results at the time of the call, the licensee planned to in situ pressure test the following:

- 3 tubes with circumferential indications in steam generator 1 (193°, 242°, 261° in arc length, respectively)

- 1 tube in steam generator 2 (210° in arc length)

- 2 tubes in steam generator 3 (267°, 299° in arc length, respectively)

- 12 tubes in steam generator 4 (185°, 196°, 236°, 245°, 269°, 286°, 291°, 300°, 309°, 314°, 333°, 360° in arc length, respectively)

Furthermore, the licensee planned to in situ pressure test the indication with the highest plus-point voltage in each steam generator. All in situ tests are partial length.

In addition to the circumferential OD Stress Corrosion Cracking (ODSCC) at the HL TTS, the licensee also detected the following:

- 21 axial primary water stress corrosion cracking (PWSCC) indications

- 1 circumferential PWSCC indication

- 2 axial ODSCC indications at the HL TTS

The licensee indicated that even though this is the first time circumferential PWSCC and axial ODSCC were detected at TTS, it was not unexpected given the industry experience with mill annealed alloy 600 tubing.

Although the licensee expected to have approximately 200 axial ODSCC indications at TSPs, only 58 axial ODSCC indications were detected at the time of the call. Seven of these are over 1 volt and will be plugged. The rest will be left in service based on the Generic Letter 95-05 Alternate Repair Criteria.

The licensee reviewed prior eddy current data to determine if indications would be identified with hindsight. The preliminary results indicated only about 20 to 25 percent of the indications were present in the last outage in 2000. The licensee also discussed lessons learned from the Indian Point Unit 2 tube failure and stated that they do not have a noise concern because the signal to noise ratio is significantly higher than the EPRI qualification data set.

The licensee stated that they had not found any locations with mix-mode indications (i.e., both axial and circumferential flaws at the same location). The licensee also stated that there was no detectable primary-to-secondary side leakage prior to shut-down. The licensee did not perform a secondary-side pressure test, nor did they plan to pull a tube for destructive examination. At the time of the call, the licensee did not identify any indications in the U-bend region.

The licensee indicated that they will promptly notify the NRC staff if they find any new degradation mechanisms, if any tube fails the structural and leakage integrity criteria during in situ testing, or if they detect any unusual indications.

Based on the information discussed during the conference calls, the staff did not identify any issues requiring further discussion.

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