

October 19, 2006

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

SUBJECT: WATTS BAR NUCLEAR PLANT, UNIT 1 - SUMMARY OF THE STAFF'S  
REVIEW OF THE 12-MONTH STEAM GENERATOR TUBE INSERVICE  
INSPECTION REPORT FOR THE END-OF-CYCLE 6 REFUELING OUTAGE IN  
SPRING 2005 (TAC NO. MD1063)

Dear Mr. Singer:

By letter dated March 27, 2006, Tennessee Valley Authority (TVA, the licensee) submitted the 12-month steam generator (SG) tube inservice inspection (ISI) report for the End-of-Cycle (EOC) 6 refueling outage (RFO) at the Watts Bar Nuclear Plant (WBN), Unit 1, in accordance with Technical Specification (TS) Section 5.9.9. The 15-day and 90-day SG tube ISI reports for the EOC 6 RFO were reviewed by U.S. Nuclear Regulatory Commission (NRC) staff as documented by letter dated January 17, 2006. The NRC staff participated in a conference call with WBN representatives to discuss the EOC 6 RFO SG tube ISI on March 15, 2005, which is documented in a summary dated June 20, 2005. Additional information regarding the EOC 6 RFO SG tube ISI was provided by the licensee during a conference call on August 15, 2006, and is summarized in the enclosed review summary.

The NRC staff has completed its review of the 12-month SG tube ISI report and the information provided during the conference calls and concludes that the licensee provided the information required by the WBN TSs and that no additional follow-up is required at this time. The staff's review summary is enclosed.

Sincerely,

*/RA/*

Douglas V. Pickett, Senior Project Manager  
Plant Licensing Branch II-2  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Docket No. 50-390

Enclosure: As stated

cc w/enclosure: See next page

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WATTS BAR NUCLEAR PLANT, UNIT 1

SUMMARY OF THE STAFF'S REVIEW OF THE 12-MONTH STEAM GENERATOR TUBE  
INSERVICE INSPECTION REPORT FOR THE END-OF-CYCLE 6 REFUELING OUTAGE

TAC NO. MD1063

DOCKET NO. 50-390

By letter dated March 27, 2006 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML060890288), Tennessee Valley Authority (TVA, the licensee), submitted the 12-month steam generator (SG) tube inservice inspection (ISI) report for the End-of-Cycle (EOC) 6 refueling outage (RFO) at the Watts Bar Nuclear Plant (WBN), Unit 1, in accordance with Technical Specification (TS) Section 5.9.9. The 15-day and 90-day SG tube ISI reports for the EOC 6 RFO were reviewed by U.S. Nuclear Regulatory Commission (NRC) staff as documented by letter dated January 17, 2006 (ADAMS Accession No. ML060110110). The NRC staff participated in a conference call with WBN representatives to discuss the EOC 6 RFO SG tube ISI on March 15, 2005, which is documented in a summary dated June 20, 2005 (ADAMS Accession No. ML051510040). Additional information regarding the EOC 6 RFO SG tube ISI was provided by the licensee during a conference call on August 15, 2006.

WBN has four Westinghouse Model D3 SGs which are designated SG1 through SG4. All four SGs were inspected during the Spring 2005 EOC 6 RFO. The Westinghouse Model D3 SG contains approximately 4,700 tubes which have an outside diameter of 3/4-inch and a wall thickness of 0.043-inch. The tubes have been hard roll expanded for the full-length of the tubesheet and the 3/4-inch carbon steel tube support plates contain drilled holes. The WBN SGs began operation in 1996 and have mill-annealed Alloy 600 tubing. The WBN SGs are scheduled to be replaced during the Fall 2006 RFO.

The licensee provided the scope, extent, methods, and results of WBN SG tube ISI in the 12-month SG tube ISI report and the conference calls. In addition, the licensee described corrective actions (i.e., tube plugging or repair), taken in response to the inspection findings.

The following information regarding the EOC 6 RFO SG tube ISI was provided by the licensee during a conference call on August 15, 2006.

- Tube Row 14 Column 69 in SG1 and Tube Row 48 Column 39 in SG 4 were plugged due to loose part wear. The licensee indicated that since the loose part wear was found in the preheater region of the SGs, which is not readily accessible for visual inspection, they did not visually verify the presence of loose parts. The licensee indicated that the

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indications were small. The tubes were plugged but not stabilized due to the SGs being scheduled for replacement in the Fall 2006 RFO.

- The licensee reported that the nature and cause of the 51 percent through-wall volumetric indication identified in Tube Row 15 Column 58 in SG4 was not determined. The licensee indicated that the volumetric indication does not behave as a crack and there were no possible loose parts near this location. As a result of detecting this indication, the licensee expanded their inspection in SG4 to include a 100 percent inspection of freespan dings greater than or equal to 2 volts in the preheater region.
- Several indications were identified in the sludge pile for each SG. The extent of the licensee's +Point™ exam at the top of the tubesheet is typically +3 inches to -2 inches. The licensee indicated that eddy current technicians make several checks during the inspections to ensure that their inspections encompass the entire sludge pile height. There were two tubes with sludge pile heights greater than 3 inches above the top of the tubesheet and the +Point™ exam for these tubes included the entire sludge pile height.
- The licensee reported a 3.8-volt outside diameter (OD) circumferential crack (100 percent through-wall and 187 degree circumferential extent) at the top-of-tubesheet that experienced leakage during operation (0.000417 gallons per minute (gpm)) but did not experience leakage at simulated steam line break pressure during an in-situ pressure test. The licensee indicated that the OD circumferential crack did not leak because the operational leakage was small and the in-situ pressure test is only expected to detect a leak rate of approximately 0.00144 gpm when the test pressure is held for 5 minutes. In addition, the licensee indicated the exact leak rate under steam line break conditions would not have mattered since they had considerable margin to their leakage limit.

The staff has the following note/observation as a result of reviewing the 12-month SG tube ISI report for the EOC 6 RFO.

- The licensee reported that two tubes (Row 42 Column 28 and Row 45 Column 45) on the cold leg side of SG3 had primary water stress corrosion cracking which is associated with an overexpansion above the tubesheet. Each tube had multiple indications and both tubes were plugged.

Based on a review of the information provided, the staff concludes that the licensee provided the information required by the WBN TSs. In addition, the staff concludes that there are no technical issues that warrant follow-up action at this time since the inspections 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.

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Date: October 19, 2006

Mr. Karl W. Singer  
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