

August 15, 2003

Mr. J. A. Scalice
Chief Nuclear Officer and
Executive Vice President
Tennessee Valley Authority
6A Lookout Place
1101 Market Street
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SUBJECT: WATTS BAR UNIT 1 - SUMMARY OF NRC'S REVIEW OF STEAM
GENERATOR TUBE INSERVICE INSPECTION REPORTS FROM THE
SPRING 2002 OUTAGE (TAC NO. MB6629)

Dear Mr. Scalice:

By letters dated March 12, March 14, and June 14, 2002, Tennessee Valley Authority (TVA) submitted a summary of the degraded steam generator tubes that remained in service based on the F* alternate repair criteria, a summary of the degraded steam generator tubes that were plugged, and an analysis of the degraded tubes that remained in service based on the voltage-based alternate repair criteria during the Watts Bar Unit 1 Cycle 4 refueling outage in the spring of 2002. By letter dated November 1, 2002, TVA submitted the report that describes the complete results of the spring 2002 steam generator tube inservice inspection. TVA submitted these reports pursuant to Watts Bar Unit 1 Technical Specification 5.9.9.

The results of the staff's review of these submittals are enclosed. As discussed in the enclosure, the staff concludes that TVA has provided the information required by the Watts Bar Unit 1 Technical Specifications and that no additional followup is required. The enclosed evaluation completes our review of the submittals under TAC No. MB6629.

If you have any questions regarding this matter, please contact me at (301) 415-4041.

Sincerely,

/RA/

Margaret H. Chernoff, Project Manager, Section 2
Project Directorate II
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-390

Enclosure: NRC Evaluation

cc w/Enclosure: See next page

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U.S. NUCLEAR REGULATORY COMMISSION
EVALUATION OF SPRING 2002 (END OF CYCLE 4)
STEAM GENERATOR INSPECTION REPORTS
WATTS BAR UNIT 1
DOCKET NO. 50-390

By letter dated March 12, 2002, Tennessee Valley Authority (TVA) submitted a summary of the degraded steam generator (SG) tubes that remained in service based on the F* alternate repair criteria during the Watts Bar Unit 1 Cycle 4 refueling outage in the spring of 2002. By letter dated March 14, 2002, TVA submitted a summary of the degraded SG tubes that were plugged. By letter dated June 14, 2002, TVA submitted an analysis of the degraded SG tubes that remained in service based on the voltage-based alternate repair criteria. By letter dated November 1, 2002, TVA submitted the report that describes the complete results of the spring 2002 SG tube inservice inspection. TVA submitted these reports pursuant to Watts Bar Technical Specification (TS) 5.9.9.

Watts Bar Unit 1 has four Westinghouse Model D3 SGs. The tubes of these SGs are fabricated with mill-annealed Alloy 600. The tubes in the tubesheets are installed with a full-length hard-roll joint. The tube support plates use drilled-hole configurations and are made of carbon steel.

In the June 14, 2002, letter, TVA reported that it had detected 152 degraded tubes having axial outside diameter stress corrosion cracking (ODSCC) indications at the tube support plate intersections. TVA performed the condition monitoring and operational assessments of these indications as a part of the voltage-based alternate repair criteria in the plant TSs. For the condition monitoring assessment, TVA calculated the maximum burst probability and steam line break leak rate of the four SGs at the end of Cycle 4 to be 8.3×10^{-5} and 0.0075 gallons per minute (gpm), respectively. This result is much lower than the acceptance criteria of 1.0×10^{-2} and 1 gpm, respectively.

For the operational assessment, TVA used a bounding growth rate distribution taken from other similar plants because the small number of axial ODSCC indications detected during the Cycle 4 refueling outage did not provide a meaningful crack growth rate distribution. Using the conservative growth rates, TVA predicted that at the end of Cycle 5 the highest burst probability and leak rate would be 7.79×10^{-3} and 0.419 gpm, respectively. TVA implemented the voltage-based alternate repair criteria for the first time during the Cycle 4 refueling outage.

TVA submitted the condition monitoring and operational assessment of the circumferential indications detected at the top of the tubesheet in the June 14, 2002, letter. For the condition monitoring assessment, TVA performed in situ pressure tests on the 15 worst tubes. All 15 tubes withstood three times normal operating pressure without leaking. For the operational assessment, TVA projected that the structural integrity of the circumferential indications would be acceptable at the end of Cycle 5 based on the percentage of degraded area (PDA) of the indications as compared to the structural limit PDA. This methodology is based on the Electric Power Research Institute Steam Generator Integrity Assessment Guidelines. TVA plugged all tubes with circumferential indications.

Enclosure

To monitor the circumferential indications at the expansion transition zones, TVA inspected 100 percent of the hot leg tube region at the top of the tubesheet using the +Point probe in all four steam generators during the Cycle 4 refueling outage. TVA also inspected 20 percent of the cold leg tubes in the top of the tubesheet region in SG 4 using the +Point probe.

Based on its review of the above inspection reports, the staff concludes that TVA has provided the SG tube inspection information required by Watts Bar TS 5.9.9 and that no additional follow-up is required.