



Tennessee Valley Authority, Post Office Box 2000, Spring City, Tennessee 37381-2000

SEP 30 2005

10 CFR 50.4

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 20555-0001

Gentlemen:

In the Matter of) Docket No. 50-390
Tennessee Valley authority)

WATTS BAR NUCLEAR PLANT (WBN) UNIT 1 - REQUEST FOR ADDITIONAL INFORMATION REGARDING THE 12-MONTH STEAM GENERATOR TUBE INSERVICE INSPECTION REPORT FOR THE END-OF-CYCLE 5 REFUELING OUTAGE IN 2003 (TAC NO. MC4955)

Reference: 1. Watts Bar Nuclear Plant (WBN) Unit 1 - Steam Generator Inservice Inspection - Cycle 5 Twelve Month Report (TAC No. MC1048) dated September 24, 2004.

2. Watts Bar Nuclear Plant (WBN) Unit 1 - Request for Additional Information Regarding the 12-Month Steam Generator Tube Inservice Inspection Report for the End-Of-Cycle 5 Refueling Outage in 2003 (TAC No. MC4955) dated August 12, 2005.

The purpose of this letter is to provide TVA's response to NRC's request for additional information concerning TVA's 12-month steam generator inservice inspection report submitted in Reference 1. The enclosure provides TVA's response to the NRC's request in Reference 2.

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U.S. Nuclear Regulatory Commission
Page 2

SEP 30 2005

There are no regulatory commitments associated with this submittal. If you have any questions concerning this matter, please call me at (423) 365-1824.

Sincerely,



P. L. Pace
Manager, Site Licensing
and Industry Affairs

Enclosure

Cc (Enclosure):

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ENCLOSURE

WATTS BAR NUCLEAR PLANT (WBN) UNIT 1
REQUEST FOR ADDITIONAL INFORMATION
END-OF-CYCLE 5 12-MONTH
STEAM GENERATOR INSERVICE INSPECTION REPORT

NRC QUESTION 1

For Steam Generator 1 (SG1), eleven tubes were preventively plugged due to possible foreign objects near by and four tubes were plugged due to loose part wear. In addition, seven tubes were plugged due to loose part wear in SG4. Please address the following questions regarding loose parts.

- a. Discuss what inspections, if any, are performed to detect loose parts.*
- b. Was the presence of possible foreign objects verified? If so, what type of foreign objects were verified.*
- c. Were the foreign objects removed? If possible foreign objects were left in service, were engineering evaluations performed to ensure that tube integrity would be maintained until the next inspection of the associated tubes?*

TVA RESPONSE

- a. During the Unit 1 end-of-cycle (EOC)-5 outage, foreign object search and retrieval (FOSAR) was performed on all four steam generators in the annulus, the tubelane, and several columns in-bundle at the top of the tubesheet. Bobbin coil exams were performed which identified potential loose parts and loose parts wear. Also, Plus Point (+Point) examinations were performed at the top of the tubesheet which would identify loose parts or wear.
- b. Twelve tubes were plugged in SG1 due to two tubes with indications of wall loss which was characterized as loose part wear at the fifth cold leg support (R37C63 and R39C63) and three tubes with potential loose part calls by eddy current (R36C63, R38C63, and R39C64) at the fifth cold support with no associated wear. The additional seven tubes were plugged to bound the potential loose part, because FOSAR in this area is not possible.

Six tubes were plugged in SG4 due to a loose part indication above the third anti-vibration bar in tube R39C90 and a potential loose part identified by eddy current in R40C91 and R41C91 with no associated wear. The other three tubes were plugged to bound the potential for loose parts as these areas can not be inspected with FOSAR.

ENCLOSURE

WATTS BAR NUCLEAR PLANT (WBN) UNIT 1
 REQUEST FOR ADDITIONAL INFORMATION
 END-OF-CYCLE 5 12-MONTH
 STEAM GENERATOR INSERVICE INSPECTION REPORT

- c. No objects could be visually confirmed and evaluated; therefore, no engineering analysis was performed. All tubes with wear were plugged and the potential parts were bound by plugging adjacent tubes.

NRC QUESTION 2

For all four SGs, please discuss the nature, cause, and severity of all volumetric indications identified this cycle except the volumetric indications in tubes 3-35-58, 3-38-18, and 4-42-55, which were addressed in a previous request for additional information response dated July 19, 2004 (ML042040158).

TVA RESPONSE

Volumetric indications and their severity in terms of axial extent, circumferential extent, maximum depth, and maximum voltage are included on the table below. In terms of voltage alone, these indications are very small and do not challenge structural or leakage integrity. The Electrical Power Research Institute (EPRI) In Situ Pressure Test Guidelines states that indications below 0.5 volts are not a challenge to structural or leakage integrity. The cause of the indication is assumed to be loose parts damage because of the location of the indication.

SG	Row	Column	Location	Axial Extent (inches)	Circumferential Extent (degrees)	Maximum Depth (percentage)	Maximum Voltage (volts)
3	22	51	HTS+0.58	0.15	25	32	0.17
3	35	56	HTS-0.10	0.12	90	26	0.26
3	36	52	HTS-1.07	0.15	90	33	0.20
4	21	57	HTS+0.23	0.22	42	5%	0.12
4	46	30	HTS-0.36	0.66	80	36	0.30
4	46	31	HTS-0.11	0.50	94	Undetermined	0.31
4	48	29	HTS-0.14	0.49	84	Undetermined	0.57
4	48	34	HTS-0.18	0.48	96	Undetermined	0.21
1	39	63	C05+0.93	0.26	107	49	0.32
4	39	90	AV3+3.52	0.16	28	42	0.27

ENCLOSURE

WATTS BAR NUCLEAR PLANT (WBN) UNIT 1 REQUEST FOR ADDITIONAL INFORMATION END-OF-CYCLE 5 12-MONTH STEAM GENERATOR INSERVICE INSPECTION REPORT

NRC QUESTION 3

In Table 1 you indicated that you performed +Point exams in the low row U-Bends and array probe exams in higher row U-Bends. Please consider which rows are considered low or high. Also discuss the percentage of tubes in each of these categories. If a 100 percent inspection was not performed in these areas, discuss the basis for limiting the scope.

TVA RESPONSE

Because the array probes are too large to traverse the bends in Rows 4 and lower, +Point probes were used in these rows and considered "low rows." A 100 percent inspection was performed in Rows 1 through 4 using the +Point probe. A 100 percent inspection was performed in Rows 5 through 10 using the Mitsubishi Intelligent Array (MHI) probe. A 20 percent sample was performed in Rows 17 through 23 using the MHI array probe. This scope is based upon recommendations from Westinghouse in a report titled "Generic Evaluation of U-Bend PWSCC Susceptibility for Model 51 SGs with Mill Annealed Alloy 600 Tubing," dated September 15, 2003. This report documented a study on the stress strain levels associated with U-Bend tubes in Model 51 SGs and also specifically addressed WBN Model D SGs. Industry data has validated this scope as conservative.

NRC QUESTION 4

Several indications were identified in the sludge pile (i.e., +6" to -3"). Please describe the +Point exam extent at the top of the tubesheet. Does this scope include the entire sludge pile height? If not, discuss the basis for the axial extent of the rotating probe examinations.

TVA RESPONSE

Axial outside diameter stress corrosion cracking (ODSCC) identified in the sludge region were all less than 2-inches above the top of the tubesheet. The planned Plus Point exam above the tubesheet was 2-inches. This is typically exceeded by acquisition. The 2-inches was based on the height of the sludge measured during the Unit 1 Cycle 4 inspection. During the Unit 1 Cycle 5 inspection, sludge calls from eddy current were reviewed

ENCLOSURE

WATTS BAR NUCLEAR PLANT (WBN) UNIT 1 REQUEST FOR ADDITIONAL INFORMATION END-OF-CYCLE 5 12-MONTH STEAM GENERATOR INSERVICE INSPECTION REPORT

every shift and if the sludge pile was discovered higher in a certain area, that area would be reexamined to encompass the sludge pile, if necessary. The final examination included the entire sludge pile height.

NRC QUESTION 5

Freespan outside diameter stress corrosion cracking was identified in tubes 2-13-66 and 3-3-111. Please discuss how these indications were detected (bobbin, rotating coil). If the indications were not found with bobbin coil, discuss the technical basis for the scope of your examinations. Discuss the severity (structural and leakage) of these indications.

TVA RESPONSE

One of the freespan ODSCC crack-like indications was identified by bobbin coil between the first and second support plate. The voltage on this indication was 0.19 volts and the axial extent was measured as 0.28 inches, which indicates that the indication is very small and would not challenge structural or leakage integrity. The other freespan indication was identified during +Point inspections of the U-Bend areas. SG 3 Row 3 Column 11 had an outside diameter crack-like indication in the straight section tubing above the top cold leg support and just before the U-bend starts. This area is not tested with bobbin since it is tested with +Point. Therefore it is not known if the bobbin exam would have identified the indication; however, the indication is only 0.07 volts and the axial extent was measured as 0.12 inches. Since the bobbin coil identified one of the indications and because of the extensive U-Bend examinations, TVA did not consider it necessary to expand the inspection scope.

NRC QUESTION 6

In general, did you confirm that all tubes inspected had adequate structural and leakage integrity at the time of your last inspection?

TVA RESPONSE

TVA did confirm that all tubes inspected had adequate structural and leakage integrity at the time of the last inspection. Condition monitoring was performed considering each indication

ENCLOSURE

WATTS BAR NUCLEAR PLANT (WBN) UNIT 1
REQUEST FOR ADDITIONAL INFORMATION
END-OF-CYCLE 5 12-MONTH
STEAM GENERATOR INSERVICE INSPECTION REPORT

identified during the inspection. All tubes met structural and leakage integrity from the past cycle and for the full planned Cycle 6.