



Tennessee Valley Authority, 1101 Market Street, Chattanooga, Tennessee 37402

CNL-16-090

June 1, 2016

10 CFR 50.90

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

Watts Bar Nuclear Plant, Unit 2
Facility Operating License No. NPF-96
NRC Docket No. 50-391

Subject: **Watts Bar Nuclear Plant Unit 2 – Revised Response to Request for Additional Information Regarding Request to Use F* Steam Generator Alternate Repair Criteria (CAC No. MF7218)**

- References:
1. TVA Letter to the NRC, CNL-15-060, "Technical Specifications Change No. WBN2-TS-15-16 - Revise Technical Specifications for Use of Steam Generator Alternate Repair Criterion F*," dated December 15, 2015 (ML15362A023)
 2. TVA Letter to the NRC, CNL-16-047, "Watts Bar Nuclear Plant Unit 2 – Response to Request for Additional Information Regarding Request to Use F* Steam Generator Alternate Repair Criteria (CAC No. MF7218)," dated May 4, 2016 (ML16127A232)

In Reference 1, Tennessee Valley Authority (TVA), submitted a license amendment request (LAR) for the Watts Bar Nuclear Plant (WBN) to allow use of the Alternate Repair Criterion (ARC) F* for the WBN Unit 2 steam generator (SG) tubes. In Reference 2, TVA submitted a response to a Nuclear Regulatory Commission (NRC) request for additional information (RAI) associated with the LAR. The purpose of this letter is to provide a revised response to NRC RAI 1 that was submitted by TVA in Reference 2.

In Reference 1, TVA added the words "(or repair)" to WBN Unit 2 Technical Specification (TS) Limiting Condition for Operation (LCO) 3.4.17, TS 3.4.17 Action Condition A, Surveillance Requirement (SR) 3.4.17.2, TS 5.7.2.12.c, TS 5.7.2.12.d, and TS 5.7.2.12.d.2. Additionally, in Reference 1, TVA added the following new item "h" to the description of the SG tube inspection report in WBN Unit 2 TS 5.9.9:

"Repair method utilized and the number of tubes repaired by each repair method."

In the TVA response to NRC RAI Number 1 (Reference 2), TVA removed the proposed addition of the parenthetical words "(or repair)" from WBN Unit 2 TS LCO 3.4.17, TS 3.4.17 Action Condition A, SR 3.4.17.2, TS 5.7.2.12.c, TS 5.7.2.12.d, and TS 5.7.2.12.d.2. Following discussions with the NRC, TVA also realized that the proposed new item "h" to TS 5.5.9 should have been deleted in the response to NRC RAI 1, because the SG ARC F* is not a repair method; rather it is a limit to the length of tube required to be examined.

Enclosure 1 to this letter contains a revised response to NRC RAI 1. The revision to this RAI response is indicated by change bars in the margin. As noted in Reference 2, deletion of the words "(or repair)" rescinded the proposed change to TS LCO 3.4.17, TS 3.4.17 Action Condition A, SR 3.4.17.2, and TS 5.7.2.12.d.2. Similarly, because the removal of item "h" to TS 5.5.9 results in TS page 5.0-35 no longer needing to be submitted. Therefore, TVA is enclosing all of the proposed TS changes superseding those pages provided in Reference 2 in their entirety. Enclosure 2 provides the existing TS pages marked-up to show the proposed changes. Enclosure 3 provides the proposed TS pages retyped to show the changes incorporated.

Consistent with the standards set forth in Title 10 of the *Code of Federal Regulations* (10 CFR), Part 50.92(c), TVA has determined that the supplemental information, as provided in this letter, does not affect the no significant hazards consideration associated with the proposed application previously provided in Reference 1.

There are no new regulatory commitments associated with this submittal. Please address any questions regarding this response to Mr. Gordon Arent at 423-365-2004.

I declare under penalty of perjury that the foregoing is true and correct. Executed on this 1st day of June 2016.

Respectfully,



J. W. Shea
Vice President, Nuclear Licensing

Enclosures: 1. Revised Response to NRC Request for Additional Information (RAI) 1
 2. Proposed Technical Specifications (Mark-Ups)
 3. Revised Proposed Technical Specifications Changes

cc (Enclosures):

NRC Regional Administrator - Region II
NRC Senior Resident Inspector - Watts Bar Nuclear Plant
NRR Project Manager - Watts Bar Nuclear Plant
Director, Division of Radiological Health - Tennessee State Department of
Environment and Conservation

ENCLOSURE 1

Revised Response To Request For Additional Information Number 1 Regarding Implementation of the F* Alternate Repair Criterion for Steam Generator Tubes for Watts Bar Nuclear Plant, Unit 2

**Tennessee Valley Authority
Watts Bar Nuclear Plant Unit 2
Docket No. 50-391**

“By letter dated December 15, 2015 (Agencywide Document and Management System (ADAMS) Accession No. ML15362A023), the Tennessee Valley Authority (the licensee), submitted a license amendment request to revise portions of the Watts Bar Nuclear Plant, Unit 2, technical specifications, to allow implementation of the F alternate repair criterion (ARC) for steam generator tubes. In order to complete its review of the above document, the staff requests the following additional information:”*

Nuclear Regulatory Commission (NRC) Request 1

“The proposed amendment inserts the parenthetical words “(or repair)” in various places in Technical Specifications (TS) 3.4.17 “Steam Generator (SG) Tube Integrity,” 5.7.2.12 “Steam Generator (SG) Program,” and 5.9.9 “Steam Generator Tube Inspection Report.” As noted in the model safety evaluation for plant-specific adoption of Technical Specifications Task Force Traveler (TSTF-510), Revision 2 (ADAMS Accession No. ML112101513), the term “repair criteria” is only used when a specific repair method has been approved for use by the applicable unit. While the title “F Alternate Repair Criterion” uses the word “Repair,” the F* Alternate Repair Criterion is, in fact, an alternate plugging criterion. Please discuss your plans to remove the proposed addition of the parenthetical words “(or repair)” in the following places:*

- TS 3.4.17
- TS 3.4.17 A
- SR 3.4.17.2
- 5.7.2.12.c
- 5.7.2.12.d
- 5.7.2.12.d.2”

Tennessee Valley Authority (TVA) Revised Response:

TVA has removed the proposed addition of the parenthetical words “(or repair)” in the following places:

- TS 3.4.17
- TS 3.4.17 A
- SR 3.4.17.2
- TS 5.7.2.12.c
- TS 5.7.2.12.d
- TS 5.7.2.12.d.2

Additionally, as a result of these TS and SR changes, TVA is also deleting the proposed new item “h” to TS 5.5.9 that was included in Reference 1 because the SG ARC F* is not a repair method; rather it is a limit to the length of tube required to be examined.

ENCLOSURE 1

A revised Enclosure 2, "Proposed Technical Specifications (Mark-Ups)," and Enclosure 3, "Revised Proposed Technical Specifications Changes," showing the revisions to TS 5.7.2.12.c, and TS 5.7.2.12.d, are provided with this Request for Additional Information (RAI) response. These enclosures replace Enclosures 2 and 3 provided in Reference 1 in their entirety. Because the addition of the words "(or repair)" was the only proposed change to TS Limiting Condition for Operation 3.4.17, TS 3.4.17 Action Condition A, SR 3.4.17.2, and TS 5.7.2.12.d.2, these pages are not included in this response. Similarly, because the addition of the item "h" was the only proposed change to TS 5.5.9, this page is also not included in this response.

Reference:

1. TVA Letter to NRC, CNL-15-060, "Technical Specifications Change No. WBN2-TS-15-16 - Revise Technical Specifications for Use of Steam Generator Alternate Repair Criterion F*," dated December 15, 2015 (ML15362A023)

ENCLOSURE 2

PROPOSED TECHNICAL SPECIFICATIONS (MARK-UPS)

5.7 Procedures, Programs, and Manuals

5.7.2.12 Steam Generator (SG) Program (continued)

2. Accident induced leakage performance criterion: The primary-to-secondary accident induced leakage rate for any design basis accident, other than an SG tube rupture, shall not exceed the leakage rate assumed in the accident analysis in terms of total leakage rate for all SGs and leakage rate for an individual SG. Leakage is not to exceed 1 gpm per SG.
3. The operational leakage performance criterion is specified in LCO 3.4.13, "RCS Operational LEAKAGE."
- c. Provisions for SG tube plugging criteria. Tubes found by inservice inspection to contain flaws with a depth equal to or exceeding 40% of the nominal tube wall thickness shall be plugged.
- d. Provisions for SG tube inspections. Periodic SG tube inspections shall be performed. The number and portions of the tubes inspected and methods of inspection shall be performed with the objective of detecting flaws of any type (e.g., volumetric flaws, axial and circumferential cracks) that may be present along the length of the tube, ~~from the tube to tubesheet weld at the tube inlet to the tube to tubesheet weld at the tube outlet, and that may satisfy the applicable tube plugging criteria. The tube to tubesheet weld is not part of the tube.~~ In addition to meeting the requirements of d.1, d.2, ~~and~~ d.3 below, the inspection scope, inspection methods, and inspection intervals shall be such as to ensure that SG tube integrity is maintained until the next SG inspection. A degradation assessment shall be performed to determine the type and location of flaws to which the tubes may be susceptible and, based on this assessment, to determine which inspection methods need to be employed and at what locations.
 1. Inspect 100% of the tubes in each SG during the first refueling outage following SG installation.

Insert A



Insert: "from 1.64 inches below the bottom of the roll transition or 1.64 inches below the top of the tubesheet, whichever is lower at the tube inlet, to 1.64 inches below the bottom of the roll transition or 1.64 inches below the top of the tubesheet, whichever is lower at the tube outlet, and that may satisfy the applicable tube plugging criteria."

(continued)

Insert A:

The following alternate tube repair criteria shall be applied as an alternative to the 40% depth based criteria:

1. Tubes with service-induced flaws located in the portion of the tube from the top of the tubesheet to 1.64 inches below the top of the tubesheet, or from the bottom of the roll transition to 1.64 inches below the bottom of the roll transition, whichever is lower, shall be plugged. Tubes with service-induced flaws located below this elevation do not require plugging.

ENCLOSURE 3

REVISED PROPOSED TECHNICAL SPECIFICATIONS CHANGES

5.7 Procedures, Programs, and Manuals

5.7.2.12 Steam Generator (SG) Program (continued)

2. Accident induced leakage performance criterion: The primary-to-secondary accident induced leakage rate for any design basis accident, other than an SG tube rupture, shall not exceed the leakage rate assumed in the accident analysis in terms of total leakage rate for all SGs and leakage rate for an individual SG. Leakage is not to exceed 1 gpm per SG.
 3. The operational leakage performance criterion is specified in LCO 3.4.13, "RCS Operational LEAKAGE."
- c. Provisions for SG tube plugging criteria. Tubes found by inservice inspection to contain flaws with a depth equal to or exceeding 40% of the nominal tube wall thickness shall be plugged.

The following alternate tube repair criteria shall be applied as an alternative to the 40% depth based criteria:

1. Tubes with service-induced flaws located in the portion of the tube from the top of the tubesheet to 1.64 inches below the top of the tubesheet, or from the bottom of the roll transition to 1.64 inches below the bottom of the roll transition, whichever is lower, shall be plugged. Tubes with service-induced flaws located below this elevation do not require plugging.

(continued)

5.7 Procedures, Programs, and Manuals

5.7.2.12 Steam Generator (SG) Program (continued)

- d. Provisions for SG tube inspections. Periodic SG tube inspections shall be performed. The number and portions of the tubes inspected and methods of inspection shall be performed with the objective of detecting flaws of any type (e.g., volumetric flaws, axial and circumferential cracks) that may be present along the length of the tube, from 1.64 inches below the bottom of the roll transition or 1.64 inches below the top of the tubesheet, whichever is lower at the tube inlet, to 1.64 inches below the bottom of the roll transition or 1.64 inches below the top of the tubesheet, whichever is lower at the tube outlet, and that may satisfy the applicable tube plugging criteria. In addition to meeting the requirements of d.1, d.2, and d.3 below, the inspection scope, inspection methods, and inspection intervals shall be such as to ensure that SG tube integrity is maintained until the next SG inspection. A degradation assessment shall be performed to determine the type and location of flaws to which the tubes may be susceptible and, based on this assessment, to determine which inspection methods need to be employed and at what locations.
1. Inspect 100% of the tubes in each SG during the first refueling outage following SG installation.
 2. After the first refueling outage following SG installation, inspect each SG at least every 24 effective full power months or at least every refueling outage (whichever results in more frequent inspections). In addition, inspect 100% of the tubes at sequential periods of 60 effective full power months beginning after the first refueling outage inspection following SG installation. Each 60 effective full power month inspection period may be extended up to 3 effective full power months to include a SG inspection outage in an inspection period and the subsequent inspection period begins at the conclusion of the included SG inspection outage. If a degradation assessment indicates the potential for a type of degradation to occur at a location not previously inspected with a technique capable of detecting this type of degradation at this location and that may satisfy the applicable tube plugging criteria, the minimum number of locations inspected with such a capable inspection technique during the remainder of the inspection period may be prorated.

(continued)

5.7 Procedures, Programs, and Manuals

5.7.2.12 Steam Generator (SG) Program (continued)

The fraction of locations to be inspected for this potential type of degradation at this location at the end of the inspection period shall be no less than the ratio of the number of times the SG is scheduled to be inspected in the inspection period after the determination that a new form of degradation could potentially be occurring at this location divided by the total number of times the SG is scheduled to be inspected in the inspection period.

3. If crack indications are found in any SG tube, then the next inspection for each affected and potentially affected SG for the degradation mechanism that caused the crack indication shall not exceed 24 effective full power months or one refueling outage (whichever results in more frequent inspections). If definitive information, such as from examination of a pulled tube, diagnostic non-destructive testing, or engineering evaluation indicates that a crack-like indication is not associated with a crack(s), then the indication need not be treated as a crack.
- e. Provisions for monitoring operational primary-to-secondary LEAKAGE.