

**From:** Green, Kimberly  
**Sent:** Friday, July 15, 2022 1:35 PM  
**To:** Eckermann, Jeremy Beau  
**Subject:** Request for Additional Information Related to TVA Relief Request BFN-21-ISI-02 (CNL-21-081) (EPID L-2022-LLR-0008)  
**Attachments:** Final RAI.pdf

Dear Mr. Eckermann,

By letter dated January 14, 2022, (Agencywide Documents and Access Management System (ADAMS) Accession No. ML22014A344), the Tennessee Valley Authority (TVA) submitted request for alternative BFN-21-ISI-02 for the fifth 10-year inservice inspection (ISI) interval at Browns Ferry Nuclear Plant (Browns Ferry), Unit 2. Specifically, TVA proposed an alternative to the requirements of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (Code), Section XI, paragraph IWB-2420(b), for deferring the applicable successive examinations of the flaw identified in Weld V-3-A at Browns Ferry, Unit 2 until the normally scheduled inspection during the sixth 10-year ISI interval.

The U.S. Nuclear Regulatory Commission (NRC) staff is reviewing the submittal and has identified areas where additional information is needed to complete its review. A draft request for additional information (RAI) was previously transmitted to you by email on June 29, 2022. You indicated that TVA did not need a clarification call.

You requested a 60-day response time due to certain circumstances. Therefore, a response to the attached RAI is requested no later than 60 days from the date of this email.

The NRC staff considers that timely responses to RAIs help ensure sufficient time is available for staff review and contribute toward the NRC's goal of efficient and effective use of staff resources. If circumstances result in the need to revise the requested response date, please contact me at (301) 415-1627 or via email at [Kimberly.Green@nrc.gov](mailto:Kimberly.Green@nrc.gov).

Sincerely,  
Kimberly Green, Senior Project Manager  
Plant Licensing Branch II-2  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

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**Recipients:**  
"Eckermann, Jeremy Beau" <jbeckermann@tva.gov>  
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REQUEST FOR ADDITIONAL INFORMATION

TENNESSEE VALLEY AUTHORITY

BROWNS FERRY NUCLEAR PLANT UNIT 2

DOCKET NO. 50-260

REQUEST FOR ALTERNATIVE BFN-21-ISI-02

ALTERNATIVE EXAMINATION OF REACTOR VESSEL WELD

**Introduction:**

By letter dated January 14, 2022, (Agencywide Documents and Access Management System (ADAMS) Accession No. ML22014A344), Tennessee Valley Authority (TVA) submitted request for alternative BFN-21-ISI-02 for the fifth 10-year inservice inspection (ISI) interval at Browns Ferry Nuclear Plant (Browns Ferry or BFN), Unit 2. Pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR), Part 50, Paragraph 50.55a(z)(1), TVA proposed an alternative to the requirements of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (Code), Section XI, paragraph IWB-2420(b), for deferring the applicable successive examinations of the flaw identified in Weld V-3-A at Browns Ferry, Unit 2, until the normally scheduled inspection during the sixth 10-year ISI interval. The U.S. Nuclear Regulatory Commission (NRC) staff needs additional information to complete its review of the proposed alternative.

**Regulatory Basis:**

The regulations in 10 CFR 50.55a(g) require that the ISI of ASME Code Class 1, 2, and 3 components be performed in accordance with Section XI of the ASME Code and applicable addenda. Paragraph 10 CFR 50.55a(g)(4) states, in part, that ASME Code Class 1, 2, and 3 components will meet the requirements, except the design and access provisions and the pre-service examination requirements, set forth in the ASME Code, Section XI.

ASME Code, Section XI, paragraph IWB-2420(b) requires areas containing flaws or relevant conditions to be reexamined during the next three inspection periods listed in the schedule of the inspection program of IWB-2400 if a component is accepted for continued service in accordance with IWB-3132.3 or IWB-3142.4.

Paragraph 10 CFR 50.55a(z) states that alternatives to the requirements of paragraphs (b) through (h) of 10 CFR 50.55a or portions thereof may be used when authorized by the Director, Office of Nuclear Reactor Regulation. A proposed alternative must be submitted and authorized prior to implementation. The applicant or licensee must demonstrate that: (1) the proposed alternative would provide an acceptable level of quality and safety; or (2) compliance with the specified requirements of this section would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

**Requests for Additional Information:**

**RAI-1**

**Background**

Section 5 of the proposed alternative states, in part,

TVA proposes to apply the alternative requirements of ASME Code Case N-526 to the identified flaw, except that the IWA-3320 surface proximity rules will be used in lieu of the ASME Code Case N-526 proximity rules. The other conditional requirements of ASME Code Case N-526 will be met.

**Issue**

The staff lacks clarity regarding what is meant by “other conditional requirements.”

**Request**

Clarify what is meant by “The other conditional requirements of ASME Code Case N-526 will be met.”

**RAI-2**

**Background**

Section 6.0 of the proposed alternative states:

The proposed alternative is requested for BFN, Unit 2 for the next two subsequent inspection periods, following identification of the flaw during the Unit 2, Cycle 21 refueling outage in spring 2021. After such time, the successive examinations of the subject weld will resume in the sixth inservice examination interval, in accordance with the schedule of ASME Code, Section XI, Table IWB-2500-1.

It is the NRC staff's understanding that TVA proposes to defer the required successive examinations of weld V-3-A during the next two inspection periods instead of three successive periods, as required by IWB-2420(b), because a third successive examination would resume in the sixth ISI interval.

**Issue**

Subsection IWB-2420(b) of Section XI (2007 Edition with 2008 Addenda), states

If a component is accepted for continued service in accordance with IWB-3132.3 or IWB-3142.4, the areas containing flaws or relevant conditions shall be reexamined during the next three inspection periods listed in the schedule of the Inspection Program of IWB-2400. Alternatively, acoustic emission may be used to monitor growth of existing flaws in accordance with IWA-2234.

The NRC staff interprets the requirements of IWB-2420(b), regarding the required reexaminations, as performing three consecutive inspections (one inspection per period) irrespective of the ISI interval. Therefore, the third successive inspection of weld V-3-A would be required to be performed in the first period of the sixth ISI interval because it seems that the weld was examined during the first period of the fifth ISI interval.

#### Request

1. Confirm whether the flaw in weld V-3-A was identified during the first period of the fifth ISI interval.
2. Clarify whether the intent of the proposed alternative is to not perform the first two successive examinations but perform the third required successive examination during the first period of sixth ISI interval. If not, provide the timeframe of when the inspection of weld V-3-A is planned to be performed and justify why this inspection plan is compliant with the ASME Code, Section XI.

#### **RAI-3**

#### Background

TVA states that the flaw in weld V-3-A at BFN, Unit 2, was identified in the fifth ISI interval during the Cycle 21 refueling outage. Furthermore, the weld was ultrasonically examined in accordance with Appendix VIII, "Performance Demonstration for Ultrasonic Examination Systems," of Section XI of the ASME Code as incorporated by referenced in 10 CFR 50.55a. Specifically, TVA performed automated scanning from the reactor vessel inside surface using 45-degree shear wave and 60-degree refracted longitudinal (RL) search units. TVA states that a portion of the automated examination was restricted due to the proximity of the feedwater spargers and core spray piping. Consequently, a manual ultrasonic examination was performed using a qualified 60-degree RL search units in the area restricted for automated examination.

#### Issue

TVA did not provide details regarding previous inspections of weld V-3-A. The NRC staff notes that weld V-3-A is classified as ASME examination category B-A, "Pressure Retaining Welds in Reactor Vessel," which are required to be examined once per ASME Code ISI interval (i.e., 10 years). The NRC staff lacks clarity whether the indication in weld V-3-A had been previously identified.

#### Request

1. Provide details regarding the examination and results of weld V-3-A during the previous four 10-year ISI intervals. In your response, include details on the ultrasonic capabilities for each examination that was performed.
2. Provide details on whether an evaluation (e.g., root cause) was performed to identify why the flaw was not identified in previous examinations but was identified during the Cycle 21 refueling outage.

## **RAI-4**

### Background

In Attachment 1 of the proposed alternative, the plant-specific assessment states, "The Service Level A/B RPV transient in Table 4 of Reference [12] with the highest  $\Delta T$  was chosen as the bounding transient which is the Start-up Transient."

### Issue

The NRC staff notes that the Browns Ferry Final Safety Analysis Report (FSAR), Appendix C, "Structural Qualification of Subsystems and Components," describes the basic structural loading criteria and qualification methods used in the original design of BFN, Unit 2, components and piping subsystems. These conditions include normal, upset, emergency, and faulted loading conditions. Furthermore, the staff notes that these loading conditions are the equivalent to the ASME Code, Section III, Level A, B, C, and D service limits. Based on the above statement in Attachment 1 of the proposed alternative, the staff is not clear if loading conditions applicable to service levels C and D were considered in the licensee's analysis provided in the submittal.

### Request

Discuss the applicability of all service loadings (i.e., normal, upset, emergency, and faulted) and any combination of them that were taken into consideration in the licensee's analysis in the submittal. Discuss whether loading conditions applicable to service levels C and D were considered in the licensee's analysis. If not considered, provide a justification for not considering the loading conditions applicable to service level C and D in the analysis in the submittal.

## **RAI-5**

### Background

The pressure-temperature (P-T) limit curves for the operation of the reactor vessel during heat up and cooldown evolution as shown in the plant technical specifications are constructed based on a postulated flaw that has a depth of  $\frac{1}{4}$  of the wall thickness of the reactor vessel shell. The flaw is postulated to initiate from the inside surface and outside surface of the reactor vessel shell.

### Issue

TVA has not indicated if the flaw in weld V-3-A affects the P-T limit curves.

### Request

Discuss whether the flaw in weld V-3-A affects the existing P-T limit curves in the plant technical specifications. If yes, indicate when TVA plans to revise the P-T limit curves to reflect the impact of the flaw on the P-T limit curves in the technical specifications via a separate license amendment request.