Tennessee Valley Authority, Post Office Box 2000, Decatur, Alabama 35609-2000

May 18, 2009

10 CFR 50.55a

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

In the Matter of) Docket No. 50-259
Tennessee Valley Authority)

BROWNS FERRY NUCLEAR PLANT (BFN) - UNIT 2 - AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME) SECTION XI, INSERVICE INSPECTION PROGRAM FOR THE THIRD TEN-YEAR INSPECTION INTERVAL - REQUEST FOR RELIEF 2-ISI-22

Browns Ferry Nuclear Plant, Unit 2, is proposing an alternative to the requirements of ASME Boiler and Pressure Vessel Code, Code Case N-504-3, Alternative Rules for Repair of Classes 1, 2, and 3 Austenitic Stainless Steel Piping. Section XI, Division 1, Paragraph (h). The alternative is proposed pursuant to the provisions of paragraph 50.55a(a)(3)(i) of Title 10 of the Code of Federal Regulations (10 CFR) as an alternative that would provide an acceptable level of quality and safety.

TVA proposes to utilize a system leakage test in accordance with IWA-5000 at a pressure not less than the pressure corresponding to 100 percent rated power (1035 psig) in lieu of the system hydrostatic test required by Paragraph (h) of Code Case N-504-3, following the weld overlay repair for a through wall leak of the safe-end on the N12A RPV nozzle. TVA considers this alternative would provide an acceptable level of quality and safety. TVA's request for relief 2-ISI-22 is provided in the enclosure of this submittal.

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NRR

This request for relief is consistent with the one submitted by letter dated November 25, 2008 for BFN Unit 1. NRC verbally approved this request on November 26, 2008. Formal NRC approval is pending.

TVA requests approval of this request for relief by May 28, 2009, in order to support transition to Mode 2 (i.e., startup) for Cycle 16 operation.

There are no new regulatory commitments in this letter. If you have any questions, please contact F. R. Godwin at (256) 729-2636.

Sincerely,

R. G. West
Site Vice President

Enclosure
cc: See Page 3

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ENCLOSURE

TENNESSEE VALLEY AUTHORITY
BROWNS FERRY NUCLEAR PLANT (BFN)
UNIT 2
AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME) SECTION XI,
INSERVICE INSPECTION (ISI) PROGRAM
(THIRD TEN-YEAR INSPECTION INTERVAL)

REQUEST FOR RELIEF 2-ISI-22

(SEE ATTACHED)

ENCLOSURE

TENNESSEE VALLEY AUTHORITY
BROWNS FERRY NUCLEAR PLANT (BFN)
UNIT 2
AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME) SECTION XI,
INSERVICE INSPECTION (ISI) PROGRAM
(THIRD TEN-YEAR INSPECTION INTERVAL)

REQUEST FOR RELIEF 2-ISI-22

Executive Summary:

An indication was discovered in the N-12A-1 weld, safe end-to-process pipe, heat affected zone on the safe end side of the weld during the BFN Unit 2 Cycle 15 refueling outage. This ultrasonic examination was performed to address a Corrective Action Program (PER 157918) extent of condition resulting from a similar failure that occurred in November 2008 on BFN Unit 1. The N-12A-1 indication extends 84 percent through wall is circumferentially oriented and is approximately 1 inch in length at the ID. The flaw is located approximately 0.25 inches from the weld centerline in the heat affected zone on the safe-end side of the weld. Characterization of the flaw utilized a PDI/IGSCC qualified ultrasonic procedure. This process pipe location is associated with Feedwater level instrumentation. The weld overlay in accordance with Code Case N-504-3 as conditioned in Regulatory Guide 1.147, Revision 15, with Appendix Q of ASME Section XI was determined to be the best repair method.

This request for relief is consistent with the one submitted by letter dated November 26, 2008 for BFN Unit 1. NRC verbally approved this request on November 26, 2008. Formal NRC approval is pending.

Unit: Two (2)

ISI Interval: ASME Section XI, Third Ten-Year ISI Inspection Interval (May 25, 2001 to May 24, 2011)

System(s): Reactor Feedwater (FW)

Components: Class 1 pressure retaining components

ASME Code Class: ASME Code Class 1 equivalent

Section XI Edition: 1995 Edition, 1996 Addenda (ISI & SPT)

Code Table: IWB-2500-1

Examination Category: B-P, All Pressure Retaining Components

Examination Item Number: B15.50, Piping - Pressure Retaining Boundary

Code Requirement: ASME Boiler and Pressure Vessel Code, Code Case N-504-3, Alternative Rules for Repair of Classes 1, 2, and 3 Austenitic Stainless Steel Piping, Section XI, Division 1. Paragraph (h) of Code Case N-504-3 states that if the flaw penetrated the original pressure boundary prior to welding or if any evidence of the flaw penetrating the pressure boundary is observed during the welding process, a system hydrostatic test shall be performed in accordance with IWA-5000.

Code Requirements From Which Relief Is Requested: Relief is requested from Paragraph (h) of Code Case N-504-3 which requires a system hydrostatic test, in accordance with IWA-5000, if the flaw penetrated the original boundary prior to welding or if any evidence of the flaw penetrating the pressure boundary is observed during the welding process.

List Of Items Associated With The Relief Request: Safe-end to process pipe weld overlay (RFW-2-018-001) on the N12A RPV Nozzle.

Basis For Relief Request: The additional benefits from the performance of a hydrostatic pressure test at an elevated pressure, above nominal operating pressure, has been reviewed by the ASME Code Committee and by the NRC and precedence has established associated with Code Cases N-416 series and the N-498 series and incorporated into ASME Section XI Code beginning with the 1998 Edition, 1999 Addenda. The precedence developed acknowledges that the hydrostatic pressure test provides very little additional benefit, above that provided by a pressure test at nominal operating pressure, to the proof or verification of the quality and acceptability of the repairs. Assuming the repairs were performed following approved welding programs and the NDE was performed using the methods and acceptance criteria required by Section III, in addition to a system leakage test performed at nominal operating pressure little benefit is gained from the added challenge to the piping system provided by an elevated pressure hydrostatic test. Stress induced in the piping geometry does not exceed 50 percent of the material stress allowable during either the system leakage test, performed at nominal operating pressure or the system hydrostatic pressure test, performed above operating pressure.

Also, in previous actions, relief has been granted from the hydrostatic pressure test requirement associated with Code Case N-504-3 to the Cooper Nuclear Station (ML0821304183). This relief request was submitted as a contingency for disposition of examination results of multiple dissimilar metal welds and portion related to exception from the requirements of paragraph (h) of Code Case N-504-3 is similar to this relief request.

Alternative Examination: In lieu of the system hydrostatic test required by Paragraph (h) of Code Case N-504-3, TVA proposes to utilize a system leakage test at a pressure not less than the pressure corresponding to 100 percent rated power (1035 psig). This pressure test will be performed following completion of NDE required by Section III, Code Case N-504-3, Section XI Nonmandatory Appendix Q, and the construction code (Section III). The ultrasonic (UT) methods are Performance Demonstration Initiative (PDI) qualified methods and are capable of identifying flaws indicative of Intergranular stress corrosion cracking (IGSCC).

Justification For The Granting Of Relief: Indications of leakage resulting from visual VT-2 examinations during either a system leakage test or a system hydrostatic test will not be significantly different between the two tests. The magnitudes of pressure required by those exams will not induce significant differences in leakage rates, should a through-wall leak already exist, and will not create a significant difference in the magnitude of the structural challenge to the material based on the stress allowables associated with the applicable materials.

The safe end material in question is SA336 GR F8 with a 2.4375" nominal outside diameter and a 0.242" wall thickness (0.206 inch minimum). As a general indication and as an example of the stresses generated in this material during the two pressure tests in question, the following comparison is presented. The stress generated in the material during the pressure test at 1035 psig would be approximately 30 percent of the allowable stress and the stress generated by the hydrostatic pressure test (1138.5 psig) would be the low 30 percent region (between 30 and 35 percent) of the allowable stress for that material. Material stress conditions in these ranges would not tend to drive flaw growth to such an extent that leakage would be generated or significantly increased. Therefore, no significant observable differences would be provided by the performance of the hydrostatic pressure test and the system leakage test would provide an acceptable alternative. This is the general logic behind the previous acceptance of Code Cases N-416 series and the N-498 series and the eventual removal of the hydrostatic test requirements from the Section XI Code as a pressure test requirement.

Implementation Schedule: This request for relief is applicable to the Third Ten-Year Inspection Interval for BFN Unit 2 (May 25, 2001 to May 24, 2011).

References: TVA drawing 2-47E803-5, Revision 030

Additional Information: The stainless steel Safe-End is fabricated from ASME SA-336 Gr. F8 and is welded to 2-inch Schedule 80, ASTM A312 or A376, Gr TP304 or TP316 piping, according to the Bill of Materials (47BM600-1-13) for this piping. The proposed overlay will be comprised of weld overlay ER308L stainless steel with 0.02 wt. % carbon maximum and 7.5 FN minimum. (ER309L and ER316L are acceptable alternatives if the same ferrite requirement is met.)

The use of Automated GTAW process to apply this overlay ensures the least change in chemical composition from the wire to the deposit and further ensures limited dilution carryover as subsequent weld passes are applied, therefore ensuring the minimum Ferrite Number in the weld deposit is achieved in the first clean weld layer above the seal pass, and subsequent layers, of the designed overlay thickness.

The extent of condition was determined to be other nozzle safe-end to process pipe welds fabricated using similar materials and processes. These nozzle safe-ends are also 2-inch diameter and similar thicknesses. The nozzle numbers associated with these safe-end to process pipe welds are N11A, N11B, N12B, N16A, N16B, and N10. PDI qualified ultrasonic examination of these nozzles has been completed as part of the corrective actions associated with BFN PER 157918 and no other relevant UT indications were noted.

The N12A overlay weld (RFW-2-018-001) will be entered into the Unit 2 BFN Inservice Inspection Program (2-SI-4.6.G) and future examinations of this overlay will be in accordance with Section XI Nonmandatory Appendix Q.