



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

March 14, 2012

Mr. Joseph W. Shea
Corporate Manager - Nuclear Licensing
Tennessee Valley Authority
3R Lookout Place
1101 Market Street
Chattanooga, TN 37402-2801

SUBJECT: BROWNS FERRY NUCLEAR PLANT, UNIT 3 - SAFETY EVALUATION FOR
RELIEF REQUEST 3-ISI-26, FOR THE THIRD 10-YEAR INSERVICE
INSPECTION INTERVAL (TAC NO. ME5914)

Dear Mr. Shea:

By a letter dated March 21, 2011, as supplemented by a letter dated July 14, 2011 (Agencywide Documents Access and Management System Accession Nos. ML110830037 and ML11159A053 respectively), the Tennessee Valley Authority (TVA, the licensee) submitted Relief Request 3-ISI-26. This submittal requested relief from the American Society of Mechanical Engineers (ASME) *Boiler and Pressure Vessel Code* (Code), Section XI, Table IWB-2500-1, Examination Category B-D, Item No. B3.90 based on it being impractical to perform the required examinations. In accordance with Title 10 of the *Code of Federal Regulations* (10 CFR), Section 50.55a(g)(5)(iii), the request proposes the use of an alternative. More specifically, TVA has proposed an alternative to achieve less than the ASME Code required examination coverage for the N6A-NV nozzle-to-vessel weld.

Based on our review of your submittals, the U.S. Nuclear Regulatory Commission (NRC) has concluded that the method of record is impractical; however, the NRC staff finds that the alternative proposed provides reasonable assurance of structural integrity. Therefore, the NRC finds that granting relief pursuant to 10 CFR 50.55a(g)(6)(i) is authorized by law and will not endanger life or property or the common defense and security, and is otherwise in the public interest giving due consideration to the burden upon the licensee that could result if the requirements were imposed on the facility.

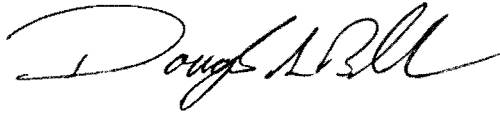
This relief is granted and the alternate proposed by TVA is authorized for the remainder of the third 10-year inservice inspection interval at Browns Ferry Nuclear Plant, Unit 3, which began November 19, 2005, and ends November 18, 2015.

J. Shea

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If you have any questions regarding this matter, please contact Ms. Eva Brown at (301) 415-2315.

Sincerely,

A handwritten signature in black ink, appearing to read "Doug Broaddus". The signature is fluid and cursive, with a large initial "D" and "B".

Douglas A. Broaddus, Chief
Plant Licensing Branch II-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-296

Enclosure: Safety Evaluation

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

THIRD 10-YEAR INTERVAL INSERVICE INSPECTION PROGRAM PLAN

REQUEST TO EXAMINE WELD TO THE MAXIMUM

EXTENT PRACTICAL

TENNESSEE VALLEY AUTHORITY

BROWNS FERRY NUCLEAR PLANT, UNIT 3

DOCKET NO. 50-296

1.0 INTRODUCTION

By a letter dated March 21, 2011, as supplemented by a letter dated July 14, 2011 (Agencywide Documents Access and Management System (ADAMS) Accession Nos. ML110830037 and ML11159A053 respectively), the Tennessee Valley Authority (TVA, the licensee) submitted Relief Request (RR) 3-ISI-26 pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR), Section 50.55a(g)(5)(iii), for the Browns Ferry Nuclear Plant, Unit 3 (BFN-3). This submittal requested relief from the American Society of Mechanical Engineers (ASME) *Boiler and Pressure Vessel Code* (Code), Section XI, Table IWB-2500-1, Examination Category B-D, Item No. B3.90. More specifically, the licensee has requested to achieve less than the ASME Code required examination coverage for the N6A-NV nozzle-to-vessel weld on Unit 3.

The Code of Record for the third inservice inspection (ISI) interval at Unit 3 is the 2001 Edition through 2003 Addenda of the ASME Code.

2.0 REGULATORY EVALUATION

Pursuant to 10 CFR 50.55a(g)(4), ASME Code Class 1, 2, and 3 components (including supports) must meet the requirements, except the design and access provisions and the preservice examination requirements, set forth in the ASME Code, Section XI to the extent practical within the limitations of design, geometry, and materials of construction of the components. The regulations require that ISI of components and system pressure tests conducted during the 10-year intervals be in compliance with the requirements in the latest edition and addenda of Section XI of the ASME Code incorporated by reference in 10 CFR 50.55a(b), 12 months prior to the start of the 120-month interval. The ASME Code of record for Unit 3 is the 2001 Edition through 2003 Addenda of the ASME Code, Section XI.

Enclosure

Pertinently, the ASME Code Case N-460, Alternative Examination Coverage for Class 1 and Class 2 Welds, Section XI, Division 1, which has been approved unconditionally in Regulatory Guide (RG) 1.147, Revision 15, "Inservice Inspection Code Case Acceptability, ASME Code Section XI, Division 1," allows that "a reduction in examination coverage for any Class 1 or Class 2 weld may be acceptable provided that the reduction in coverage for that weld is less than 10 [percent]..." Additionally ASME Code Case N-648-1, "Alternative Requirements for Inner Radius Examination of Class 1 Reactor Vessel Nozzles, Section XI Division 1," conditionally accepted by the U.S. Nuclear Regulatory Commission (NRC), permits the ASME Code users to perform a VT-1 [visual] examination in lieu of a volumetric examination for specific locations on welds such as the subject weld.

Section 50.55a(g)(6)(i) to 10 CFR states that:

... The Commission will evaluate determinations [submitted by the licensee] under paragraphs (g)(5) of this section [10 CFR 50.55a] that code requirements are impractical. The Commission may grant relief and may impose such alternative requirements as it determines are authorized by law and will not endanger life or property or the common defense and security and is otherwise in the public interest giving due consideration to the burden upon the licensee that could result if the requirements were imposed on the facility.

The NRC staff notes that September 24, 2008, BFN-3 precedent (ADAMS Accession No. ML082480573) cited by the licensee was applicable and applied in completing this review.

3.0 LICENSEE EVALUATION

ASME Code Requirement

The ASME Code, Section XI, Table IWB-2500-1, Item No. C3.90 component examinations require a volumetric examination of the nozzle-to-vessel welds. The extent of the examination is "all nozzles," specifically the volume illustrated in Figure IWB-2500-7(a), and essentially 100 percent of the weld and adjacent base material. ASME Code Case N-460 effectively states that 90 percent coverage is adequate to meet the ASME Code requirement. ASME Code Case N-460 has been approved for use by the NRC in RG 1.147, Revision 15.

System/Component for Which Relief is Requested

Relief is requested for the examination of the N6A-NV nozzle-to-vessel weld, a C3.90 component.

ASME Code Requirement for Which Relief is Requested

Relief is requested from meeting the required 100-percent inspection coverage of the ASME Section XI Code, Table IWB-2500-1, Examination Category B-D, Item No. B3.90 requirements for this weld.

Licensee's Proposed Alternative Examination

The licensee stated,

In lieu of the Code require[d] essentially 100 percent volume UT [ultrasonic testing] examination, on the nozzle-to-vessel weld, TVA proposes a UT examination of accessible areas to the maximum extent practical given the component design configuration of the RPV nozzle-to-vessel weld.

The licensee further stated that the examination as performed achieved a 58.9-percent coverage.

Licensee's Basis for Requesting Relief

The submittal identified that the design configuration of the subject weld precludes 100-percent examination due to inherent limitations of the barrel-type nozzle-to-vessel weld design. Achieving 100-percent coverage would require a substantial redesign of the nozzle itself. The licensee indicated that scanning from the nozzle surface is ineffective due to the weld location and asymmetrical inside surface of the nozzle-to-vessel convergence. It was noted that the licensee considered automated UT, but cited past experience to conclude that such an examination would not significantly improve the coverage. The licensee continued with a discussion on the fact that the coverage achieved included the most challenged areas of the weld, the quality of their inspection program, and the impracticality of radiographic examination.

4.0 TECHNICAL EVALUATION

The ASME Code requirement for the subject weld requires an examination of "100 [percent] welds in all components," while the licensee achieved an approximate UT coverage of 58.9 percent of the examination area. This is not unusual for subject welds of the nozzle-to-shell variety in older plant designs such as Unit 3. The licensee documented the examination in several detailed diagrams, provided in the submittal, making clear the impediment to reaching the required surface examination coverage. Geometrically the curvature of the head and the size of the fillet on the weld make achieving the required coverage impractical.

The NRC staff accepts that redesigning the nozzle is impractical. Alternatives such as automated UT or radiography are equally impractical, as they would not provide significantly enhanced surety of the integrity of the subject weld. While it may be possible to marginally increase coverage with further careful examination, the fact that the inner portion of the weld was successfully examined provides a sufficient measure of surety regarding the structural integrity of the weld, as the inner portions are the most challenged portions of the weld.

The NRC staff notes that RRs were approved for similar weld examinations at Unit 3 in 2008. Further assurance of weld integrity is provided in the form of a VT-1 visual examination performed on the inner radius of the nozzle in 2008, as noted in the July 14, 2011, letter. The visual examination was performed consistent with ASME Code Case N-648-1, which was conditionally approved for use in RG 1.147.

Based on the above, the NRC staff concludes that, if significant service-induced degradation had occurred, there is reasonable assurance that evidence of degradation would have been detected by the ultrasonic and visual examinations performed by the licensee within the examined area. In light of the above, the NRC staff concludes that relief should be granted from further action in examining this weld for the Unit 3 third 10-year ISI interval.

5.0 CONCLUSION

Due to issues at Unit 3, the ASME Code requirements with respect to the subject weld are impractical. Redesign of the nozzle performing radiographic examination of the weld to achieve of the ASME Code requirements would be a burden to the licensee. The weld coverage achieved provides reasonable assurance of the structural integrity of the subject weld. Therefore, the licensee's request for relief is granted pursuant to 10 CFR 50.55a(g)(6)(i) for the Unit 3 third 10-year ISI interval. The NRC has determined that granting relief pursuant to 10 CFR 50.55a(g)(6)(i) is authorized by law and will not endanger life or property, or the common defense and security and is otherwise in the public interest giving due consideration to the burden upon the licensee that could result if the requirements were imposed.

All other ASME Code, Section XI requirements for which relief was not specifically requested and approved in the subject request for relief remain applicable, including third-party review by the Authorized Nuclear Inservice Inspector.

This relief is granted and the alternate proposed by TVA is authorized for the remainder of the third 10-year inservice inspection interval at Browns Ferry Nuclear Plant, Unit 3, which began November 19, 2005, and ends November 18, 2015.

Principal Contributor: D. Widrevitz

Date: March 14, 2012

J. Shea

- 2 -

If you have any questions regarding this matter, please contact Ms. Eva Brown at (301) 415-2315.

Sincerely,

/RA/

Douglas A. Broaddus, Chief
Plant Licensing Branch II-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-296

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cc w/enclosure: Distribution via Listserv

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