February 7, 2007

Mr. Karl W. Singer
Chief Nuclear Officer and
Executive Vice President
Tennessee Valley Authority
6A Lookout Place
1101 Market Street
Chattanooga, TN 37402-2801

SUBJECT: BROWNS FERRY NUCLEAR PLANT, UNIT 1 - RE: REQUEST FOR RELIEF FROM THE REQUIREMENTS OF THE ASME CODE (TAC NO. MD2681)

Dear Mr. Singer:

By letter dated July 12, 2006, the Tennessee Valley Authority (TVA) submitted a request for relief from the requirements of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code), Section XI at Browns Ferry Nuclear Plant, Unit 1. Specifically, TVA requested relief from ASME Code inservice inspections (ISI) requirements for three reactor pressure vessel longitudinal shell welds as the examination requirement of essentially 100 percent coverage is impractical due to permanently installed piping that restricts access to the examination areas.

The U.S. Nuclear Regulatory Commission (NRC) staff has reviewed and evaluated the information provided in support of TVA's Relief Request 1-ISI-21, related to the first 10-year interval ISI requirements. Based on the conclusions contained in the enclosed safety evaluation, the NRC staff agrees that the ASME Code requirements are impractical and grants relief pursuant to Title 10, *Code of Federal Regulations* (10 CFR), Section 50.55a(g)(6)(i) on the basis that the inservice examination of the reactor pressure vessel welds to the maximum extent possible provides a reasonable assurance of structural integrity.

The NRC staff 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 on the facility. Therefore, relief is granted for the above requested first 10-year interval inspection pursuant to 10 CFR 50.55a(g)(6)(i).

Sincerely,

/RA Patrick D. Milano for/

L. Raghavan, Chief
Plant Licensing Branch II-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-259

Enclosure: Safety Evaluation

cc w/encl: See next page

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

AMERICAN SOCIETY OF MECHANICAL ENGINEERS SECTION XI

FIRST 10-YEAR INSERVICE INSPECTION OF REACTOR VESSEL WELDS

REQUEST FOR RELIEF 1-ISI-21

TENNESSEE VALLEY AUTHORITY

BROWNS FERRY NUCLEAR PLANT UNIT 1

DOCKET NO. 50-259

1.0 INTRODUCTION

In accordance with Section 50.55a(g)(6)(ii)(A)(2) of Part 50 to Title 10 of the *Code of Federal Regulations* (CFR), the Tennessee Valley Authority (TVA, the licensee) has requested to satisfy the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (ASME Code) inservice inspection (ISI) requirements with the examinations performed during the augmented reactor pressure vessel (RPV) circumferential and longitudinal shell weld examinations. Therefore, by letter dated July 12, 2006, the licensee submitted relief request (RR) 1-ISI-21 from certain ISI requirements in the ASME Code, Section XI, *Rules for Inservice Inspection of Nuclear Power Plant Components*, for RPV longitudinal shell welds V-3-A, V-3-B, and V-3-C for Unit 1.

2.0 REGULATORY REQUIREMENTS

The ISI requirements of ASME Code Class 1, 2, and 3 components are performed in accordance with Section XI of the ASME Code and applicable addenda as required by 10 CFR 50.55a(g), except where specific relief has been granted by the Nuclear Regulatory Commission (NRC) pursuant to 10 CFR 50.55a(g)(6)(i).

In accordance with 10 CFR 50.55a(g)(4), ASME Code Class 1, 2, and 3 components shall meet the requirements, except the design and access provisions and the pre-service examination requirements, set forth in the ASME Code to the extent practical within the limitations of design, geometry, and materials of construction of the components.

The regulations require that the ISI of components and system pressure tests conducted during the first 10-year interval and subsequent intervals comply 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, subject to the limitations and modifications listed therein. The ASME Code of record for the Unit 1 first

interval 10-year ISI program is the 1995 Edition through the 1996 Addenda of Section XI of the ASME Code.

3.0 TECHNICAL EVALUATION

3.1 Background

By letter dated March 15, 2006, TVA submitted RR 1-ISI-20 in accordance with 10 CFR 50.55a(g)(6)(ii)(A) for augmented volumetric examinations of the Unit 1 RPV shell welds when essentially 100 percent of the weld examinations was not obtained. This RR contained an alternative to the examinations for welds V-3-A, V-3-B, and V-3-C. The licensee's alternative was authorized pursuant to 10 CFR 50.55a(a)(3)(i) and 10 CFR 50.55a(g)(6)(ii)(A)(5) by the NRC staff in a safety evaluation dated August 23, 2006 (Agencywide Documents Access and Management System Accession No. ML060960040) as it provided an acceptable level of quality and safety.

3.2 Components for Which Relief is Requested

The affected component is the Unit 1 RPV; specifically, the welds identified in the table below. The examination category and item number are from the ASME Code, Section XI, Table IWB-500-1.

Examination Category	Item Number	Description	Weld Nos.
B-A	B1.12	RPV Longitudinal Shell Welds	V-3-A, V-3-B, V-3-C

3.3 ASME Code Requirements

ASME Code, Section XI, Table IWB-2500-1, Examination Category B-A, Item Number B1.12, requires volumetric examination of essentially 100 percent of the weld length of all longitudinal shell welds in accordance with the examination requirements illustrated in Figure IWB-2500-2.

ASME Code Case N-460, *Alternative Examination Coverage for Class 1 and Class 2 Welds*, approved for use by the NRC staff in Regulatory Guide (RG) 1.147, Revision 14, *Inservice Inspection Code Case Acceptability* (RG 1.147), states that a reduction in examination coverage due to part geometry or interference for any Class 1 and 2 weld is acceptable provided that the reduction is less than 10 percent (i.e., greater than 90-percent examination coverage is obtained).

3.4 Basis for Relief

In accordance with 10 CFR 50.55a(g)(5)(iii), the licensee has requested relief from certain ISI weld examination requirements specified in Section XI of the ASME Code for the Unit 1 RPV under RR 1-ISI-21.

TVA has determined that 3 of the 15 longitudinal shell welds in the RPV have nondestructive examination coverage limitations (less than 90 percent coverage completed), which exceeds

that specified in Table IWB-2500-1 of Section XI of the ASME Code. The licensee states that compliance with the extent of the examination which requires "essentially 100 percent" of the weld length is impractical and will result in unusual difficulty and unnecessary radiation exposure to various plant personnel without any compensating increase in the level of quality or safety.

TVA states that areas of the V-3-A, V-3-B, and V-3-C welds were inaccessible for ultrasonic examination due to the design configuration of the RPV and vessel internals. The examinations were performed with automated ultrasonic equipment from the vessel inside surface; however, portions of the shell weld scans were obstructed by core spray piping and feedwater spargers. TVA also stated that conducting ultrasonic examination of these subject welds from the outside surfaces is not practical because of inaccessibility due to RPV outside insulation design and the proximity to the biological shield wall.

In lieu of the ASME Code-required essentially 100-percent volume coverage using ultrasonic examination, TVA performed an ultrasonic examination of accessible areas to the maximum extent practical given the component design and configuration of the subject RPV welds for Unit 1.

Volumetric Coverage Obtained

Weld No.	Percent Coverage	Examination Limitation
V-3-A	77.7	Core Spray Piping and Feedwater Spargers
V-3-B	77.4	Core Spray Piping and Feedwater Spargers
V-3-C	77.6	Core Spray Piping and Feedwater Spargers

4.0 STAFF EVALUATION

The ASME Code requires volumetric examination of essentially 100 percent of the weld length of all RPV longitudinal shell welds in accordance with the examination requirements illustrated in Figure IWB-2500-2. The licensee proposed that the ultrasonic examinations performed during the augmented RPV shell weld examination of accessible areas to the maximum extent practical be accepted in lieu of the ASME Code requirements for RPV longitudinal shell welds V-3-A, V-3-B, and V-3-C.

For RPV longitudinal shell welds V-3-A, V-3-B, and V-3-C, the staff determined that, based on drawings provided and the licensee's basis for relief, complete ASME Code examination is impractical due to core spray piping and the feedwater spargers that restrict access to the examination areas. To perform the required ASME Code examination, the RPV and associated components would require design modifications. The licensee considered examining the subject welds from the outside of the RPV; however, it was not possible due to the insulation

design and biological shield wall. Therefore, the staff determined that the ASME Code-required inspections are impractical and imposition of this requirement would cause a burden on the licensee without a compensating increase in the level of quality and safety.

For welds V-3-A, V-3-B, and V-3-C the licensee obtained 77.7 percent, 77.4 percent, and 77.6 percent volumetric coverage, respectively. The licensee obtained essentially 100 percent volumetric coverage on the twelve other RPV longitudinal shell welds. The coverage obtained for welds V-3-A, V-3-B, and V-3-C by the licensee represents a significant portion of the ASME Code-required weld length. The staff determined that these examinations and the examinations on the other 12 RPV longitudinal shell welds would have detected significant patterns of degradation, if any had occurred. The staff also determined that the examinations performed on welds V-3-A, V-3-B, and V-3-C and the 12 other RPV longitudinal shell welds provide a reasonable assurance of the structural integrity of the subject welds.

5.0 CONCLUSION

For RR 1-ISI-21, the NRC staff concludes that the ASME Code-required examinations of RPV longitudinal shell welds V-3-A, V-3-B, and V-3-C are impractical to perform due to physical obstructions and that imposition of this requirement would cause a burden on the licensee. The volumetric examinations performed to the extent practical on welds V-3-A, V-3-B, and V-3-C and the twelve other RPV longitudinal shell welds provide a reasonable assurance of the structural integrity of the subject RPV welds. Therefore, pursuant to 10 CFR 50.55a(g)(6)(i), relief is granted from the ASME Code ISI requirements of essentially 100 percent coverage for RPV longitudinal shell welds V-3-A, V-3-B, and V-3-C, for the first 10-year ISI program at Unit 1.

The staff 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 on the facility. All other requirements of the ASME Code, Section XI for which relief has not been specifically requested remain applicable, including third party review by the Authorized Nuclear Inservice Inspector.

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