

August 22, 2006

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. MD0534)

Dear Mr. Singer:

By letter dated March 15, 2006, the Tennessee Valley Authority (TVA) submitted a request for the use of alternatives to certain American Society of Mechanical Engineers Boiler and Pressure Vessel Code, Section XI requirements at Browns Ferry Nuclear Plant, Unit 1.

The U.S. Nuclear Regulatory Commission staff has reviewed and evaluated the information provided in support of TVA's Relief Request No. 1-ISI-20, related to augmented weld examination requirements. Based on the conclusions contained in the enclosed safety evaluation, the staff authorizes relief pursuant to Title 10, *Code of Federal Regulations* (10 CFR), Section 50.55a(a)(3)(i) and 50.55a(g)(6)(ii)(A)(5) on the basis that the augmented examination of the reactor pressure vessel welds to the maximum extent possible provides an acceptable level of quality and safety.

Relief is authorized for the above requested one-time augmented inspection as required by 10 CFR 50.55a(g)(6)(ii)(A)(2).

The staff's safety evaluation is enclosed.

Sincerely,

/RA/

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 (ASME) SECTION XI

AUGMENTED EXAMINATION OF REACTOR VESSEL WELDS

REQUEST FOR RELIEF 1-ISI-20

TENNESSEE VALLEY AUTHORITY

BROWNS FERRY NUCLEAR PLANT UNIT 1

DOCKET NO. 50-259

1.0 INTRODUCTION

By letter dated March 15, 2006, Tennessee Valley Authority (TVA) submitted Request for Relief 1-ISI-20 from certain augmented inservice inspection requirements of Title 10 of the Code of Federal Regulations (10 CFR) Part 50.55a(g)(6)(ii)(A)(2) for Browns Ferry Nuclear Plant, Unit 1 (BFN Unit 1). In support of this one-time relief request, TVA proposes conducting the inspections of reactor pressure vessel welds to the maximum extent possible.

2.0 REGULATORY REQUIREMENTS

As stated in 10 CFR Part 50.55a(g)(6)(ii)(A)(2), all licensees shall augment their reactor pressure vessel (RPV) examination by implementing once, as part of the inservice inspection interval in effect on September 8, 1992, the examination requirements for the RPV shell welds specified in Item B1.10 of Examination Category B-A, "Pressure Retaining Welds in Reactor Vessel," in Table IWB 2500-1 of Subsection IWB, Section XI of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code). The licensee has adopted the 1995 Edition through the 1996 Addenda of ASME Code, Section XI as the examination Code of record for BFN Unit 1.

For the purpose of this augmented examination, "essentially 100%" as used in Table IWB-2500-1 means more than 90 percent of the examination volume of each weld, where the reduction in coverage is due to interference by another component or part geometry.

As stated in 10 CFR Part 50.55a(g)(6)(ii)(A)(5) and 10 CFR 50.55a(a)(3)(i), licensees that make a determination that they are unable to completely satisfy the requirements for the augmented RPV shell weld examination specified in 10 CFR Part 50.55a(g)(6)(ii)(A) shall submit information to the Nuclear Regulatory Commission (NRC) to support that determination and also propose an alternative RPV examination that provides an acceptable level of quality and safety. The licensee may use this alternative examination when authorized by the Director of the Office of Nuclear Reactor Regulation.

Enclosure

3.0 TECHNICAL EVALUATION

Code Requirement:

Examination requirements for the RPV shell welds are specified in Item B1.10 of Examination Category B-A, "Pressure Retaining Welds in Reactor Vessel," in Table IWB 2500-1 of Subsection IWB, Section XI of the ASME Code. The licensee has adopted the 1995 Edition through the 1996 Addenda of ASME Code, Section XI as the examination Code of record for BFN Unit 1.

Component Identification:

The affected component is the BFN Unit 1 RPV; specifically, the components identified in the table below. The examination categories and item numbers are from the Table IWB-2500-1 of the 1995 Edition of ASME Code, Section XI.

Examination Category	Item Number	Description	Component IDs
B-A	B1.12	Longitudinal Shell Welds	V-3-A, V-3-B, V-3-C

Licensee's Code Relief Request: (as stated)

Relief is requested from the requirement to perform a volumetric examination of essentially 100 percent of the three RPV longitudinal shell welds.

Licensee's Basis for Requesting Relief: (as stated)

Areas of the V-3-a, V-3-B and V-3-C welds are inaccessible for ultrasonic examination due to the design configuration of the RPV and vessel internals.

Licensee's Proposed Alternative Examination: (as stated)

In lieu of the Code required essentially 100 percent volume ultrasonic examination, BFN Unit 1 proposes an ultrasonic examination of accessible areas to the maximum extent practical given the component design, and configuration of the subject welds.

Basis for Proposed Alternative

In accordance with 10 CFR 50.55a(g)(6)(ii)(A)(5), the licensee has requested relief from certain augmented weld examination requirements, which are performed according to Section XI of the ASME Boiler and Pressure Vessel Code.

TVA maintains that some areas of the V-3-A, V-3-B, and V-3-C welds are inaccessible for ultrasonic examination due to the design configuration of the RPV and vessel internals. The examinations were performed to the maximum extent practical with automated ultrasonic equipment from the vessel inside surface. The V-3-A, V-3-B, and V-3-C RPV longitudinal shell weld scans were partially obstructed by the core spray piping and feedwater spargers. TVA also states that conducting ultrasonic examination of these subject welds from the outside

surfaces is not practical because of the design of the RPV insulation and proximity of the bio-shield wall. The licensee states in the relief request that performing 100 percent volumetric examination of the RPV shell welds as required by the ASME Code would not provide a substantial increase in quality and safety.

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

4.0 STAFF EVALUATION

To comply with the augmented reactor vessel examination requirements of 10 CFR 50.55a(g)(6)(ii)(A), licensees must volumetrically examine essentially 100 percent of each of the Item B1.12 longitudinal shell welds. However, given design and geometry considerations, essentially 100 percent coverage is sometimes not physically practical. Thus, pursuant to 10 CFR Part 50.55a(g)(6)(ii)(A)(5), an alternative examination can be approved for use if that alternative can provide an acceptable level of quality and safety. As an alternative to the 10 CFR Part 50.55a(g)(6)(ii)(A) requirements, the licensee proposes that the examination coverage obtained provides an acceptable level of quality and safety for the subject RPV welds.

At BFN Unit 1, the augmented coverage requirements could not be met for 3 of the 15 RPV longitudinal shell welds due to interference by the core spray piping and feedwater spargers. These physical obstructions limit the coverage to less than essentially 100 percent of the required volume. To achieve complete coverage, design modifications would be required to increase access from the inside surface.

As a result of the augmented volumetric examination requirements, licensees must make a reasonable effort to maximize examination coverage of their RPV welds. In cases where examination coverage from the inside surface is inadequate, examination from the outside surface using manual inspection techniques may be an option. However, extensive surface preparation (removal of insulation, weld preparation and scaffolding erection) would be required for the licensee to perform supplemental examinations from the outside surface. The effort expended to obtain access to the examination surface from the outside surface would result in considerable radiological exposure that is not warranted for the additional volumetric coverage that may be achieved. Therefore, imposition of this requirement would result in a significant hardship without a compensating increase in the level of quality and safety.

TVA justifies their proposed alternative weld examination on grounds that 12 of the 15 RPV longitudinal shell welds received essentially 100 percent coverage using the ultrasonic examination technique while the remaining three welds (V-3-A, V-3-B, and V-3-C) received coverage to the maximum extent possible. The lowest coverage obtained was still greater than 76 percent. Based on the volumetric examination coverage attained, the fact that no reportable findings resulted from the inspections that were performed, and the low likelihood of significant fatigue damage, the staff concludes that any significant patterns of degradation, if present, would have been detected and that the examinations performed provide reasonable assurance of the continued structural integrity of the subject welds.

5.0 CONCLUSION

The staff concludes that the licensee's proposed alternative of conducting the augmented examination of the subject RPV welds to the maximum extent possible provides an acceptable level of safety and quality. Therefore, the licensee's proposed alternative is authorized pursuant to 10 CFR 50.55a(a)(3)(i) and 10 CFR 50.55a(g)(6)(ii)(A)(5). 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. Relief is authorized for the above requested one-time augmented inspection as required by 10 CFR 50.55a(g)(6)(ii)(A)(2).

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