

October 16, 2003

Mr. J. A. Scalice
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 - AMERICAN SOCIETY OF
MECHANICAL ENGINEERS SECTION XI, INSERVICE INSPECTION
PROGRAM REQUESTS FOR RELIEF NOS. PDI-1 AND PDI-2
(TAC NOS. MB6595 AND MB8127)

Dear Mr. Scalice:

The U.S. Nuclear Regulatory Commission (NRC) has completed its review of the submittal by the Tennessee Valley Authority (TVA) dated October 25, 2002, as supplemented by letters dated June 18 and September 12, 2003. The submittals requested NRC staff review and approval of two requests for relief from certain inservice inspection (ISI) requirements associated with the implementation of Section XI of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code at Browns Ferry Unit 1. The two relief requests (RRs) outline proposed alternatives to meet the requirements of Appendix VIII, "Performance Demonstration for Ultrasonic Examination Systems," of the 1995 Edition through the 1996 Addenda of Section XI of the ASME Code.

The NRC staff has reviewed the information provided in support of TVA's relief requests. Based on the conclusions contained in the enclosed safety evaluation, the staff finds that: (1) the Performance Demonstration Initiative (PDI) RR No. PDI-1 which permits the licensee to conduct annual ultrasonic examination training in accordance with Title 10 of the *Code of Federal regulations* (10 CFR) in lieu of Subarticle VII-4240 to Appendix VII of Section XI of the Code provides an acceptable level of quality and safety; and (2) RR No. PDI-2 which permits the licensee to reduce the examination volume to ½ inch from each side of the weld crown, in lieu of ½ through-wall thickness from each side of the weld, provides an acceptable level of quality and safety provided that any potential repair area of the weld is bounded by the reduced volume. Should the repair area exceed the ½ inch defined volume, the volume of examination must be expanded so as to fully capture the repair area. Accordingly, the staff authorizes the use of such alternatives pursuant to 10 CFR Section 50.55a(a)(3)(i), for the first 10-Year ISI Program Interval which will conclude 1 year following the restart of the unit.

Sincerely,

/RA/

Allen G. Howe, Section Chief, Section 2
Project Directorate II
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No: 50-259

Enclosure: Safety Evaluation

cc w/encl: See next page

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The NRC staff has reviewed the information provided in support of TVA's relief requests. Based on the conclusions contained in the enclosed safety evaluation, the staff finds that: (1) the Performance Demonstration Initiative (PDI) RR No. PDI-1 which permits the licensee to conduct annual ultrasonic examination training in accordance with Title 10 of the *Code of Federal regulations* (10 CFR) in lieu of Subarticle VII-4240 to Appendix VII of Section XI of the Code provides an acceptable level of quality and safety; and (2) RR No. PDI-2 which permits the licensee to reduce the examination volume to ½ inch from each side of the weld crown, in lieu of ½ through-wall thickness from each side of the weld, provides an acceptable level of quality and safety provided that any potential repair area of the weld is bounded by the reduced volume. Should the repair area exceed the ½ inch defined volume, the volume of examination must be expanded so as to fully capture the repair area. Accordingly, the staff authorizes the use of such alternatives pursuant to 10 CFR Section 50.55a(a)(3)(i), for the first 10-Year ISI Program Interval which will conclude 1 year following the restart of the unit.

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

FIRST 10-YEAR INTERVAL INSERVICE INSPECTION PROGRAM

REQUESTS FOR RELIEF NOS. PDI-1 AND PDI-2

TENNESSEE VALLEY AUTHORITY

BROWNS FERRY NUCLEAR PLANT, UNIT 1

DOCKET NO. 50-259

1.0 INTRODUCTION

By letter dated October 25, 2002, as supplemented by letters dated June 18 and September 12, 2003, the Tennessee Valley Authority (TVA, the licensee) requested relief from certain requirements of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (Code) regarding the ultrasonic testing (UT) criteria. The licensee's proposed alternatives to the Code requirements are contained in Performance Demonstration Initiative (PDI) Relief Requests Nos. PDI-1 and PDI-2 for the first 10-Year Inservice Inspection (ISI) Interval at Browns Ferry Nuclear Plant, Unit 1. Specifically, PDI-1 proposed changes to the annual training criteria for UT personnel, and PDI-2 proposed using a reduced examination volume for nozzle-to-reactor pressure vessel welds.

2.0 REGULATORY EVALUATION

The ISI required by the ASME Code of Class 1, 2, and 3 components is to be performed in accordance with Section XI of the ASME Code and applicable editions and addenda as required by Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.55a(g), except where specific written relief has been granted by the Commission pursuant to 10 CFR 50.55a(g)(3)(i). As stated in 10 CFR 50.55a(a)(3), alternatives to the requirements of paragraph (g) may be used, when authorized by the U. S. Nuclear Regulatory Commission, if the licensee demonstrates that: (i) the proposed alternatives would provide an acceptable level of quality and safety, or (ii) compliance with the specified requirements would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

Pursuant to 10 CFR 50.55a(g)(4), ASME Code Class 1, 2, and 3 components (including supports) shall meet the requirements, except the design and access provisions and the preservice examination requirements, set forth in the ASME Code, Section XI, "Rules for ISI of Nuclear Power Plant Components," 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 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) on the date

Enclosure

12 months prior to the start of the 120-month interval, subject to the limitations and modifications listed therein. The ISI Code of record for Browns Ferry Unit 1 for the first 10-year interval is the 1995 Edition with 1996 Addenda of the ASME Code. The components (including supports) may meet the requirements set forth in subsequent editions and addenda of the ASME Code incorporated by reference in 10 CFR 50.55a(b) subject to the limitations and modifications listed therein and subject to Commission approval.

2.0 RELIEF REQUEST PDI-1, SUBARTICLE VII-4240, SUPPLEMENTAL TRAINING FOR UT PERSONNEL

2.1 Code Requirements for Which Relief is Requested

The licensee is requesting relief from the 1995 Edition with 1996 Addenda, Appendix VII to Section XI of the Code, Subarticle VII-4240, "Annual training," for qualified UT personnel at Browns Ferry Unit 1. Subarticle VII-4240 requires a minimum of 10 hours of annual UT training.

2.2 Licensee's Proposed Alternative to Code

Pursuant to 10 CFR 50.55a(a)(3)(i), the licensee proposed conducting annual UT training in accordance with 10 CFR 50.55a(b)(2)(xiv) requirements in lieu of Subarticle VII-4240 to Appendix VII of Section XI of the Code.

2.3 Evaluation

Subarticle VII-4240, Appendix VII of Section XI of the Code, requires 10 hours of annual training to impart knowledge of new developments, material failure modes, and any pertinent technical topics as determined by the licensee. No hands-on training or practice is required to be included in the 10 hours of training. This training is required of all UT personnel qualified to perform examinations of ASME Code Class 1, 2, and 3 components. Independent of the ASME Code, 10 CFR 50.55a(b)(2)(xiv) imposes the requirement for Appendix VIII qualification that 8 hours of hands-on training with specimens containing cracks be performed no earlier than 6 months prior to performing examinations at a licensee's facility. The licensee contends that maintaining separate UT annual training programs for Appendix VIII and non-Appendix VIII qualified personnel could create confusion, redundancies, and extra paper work.

As part of the staff's rulemaking effort to revise 10 CFR 50.55a(b)(2), the issue of UT annual training requirements was reviewed. This review was included in the summary of comments to the September 22, 1999, rulemaking (64 FR 51370). In the review, the staff determined that the 10 hours of annual training requirement specified in the ASME Code was inadequate for two reasons. The first reason was that the training does not require practice with flawed specimens. Practice with flaws is necessary because signals can be difficult to interpret. The second reason is related to the length of training and its frequency. Studies have shown that an examiner's capability begins to diminish within 6 months if skills are not maintained. Therefore, examiners must practice on a frequent basis to maintain their capability for proper interpretation of flaws.

Based on the resolution of public comments for the above rulemaking, the staff accepted an industry initiative advanced by the Electric Power Research Institute, which proposed 8 hours of

hands-on practice with flawed specimens containing cracks. The practice would occur no earlier than 6 months prior to performing examinations at a licensee's facility. The initiative was adopted in 10 CFR 50.55a(b)(2)(xiv) for personnel maintaining their Appendix VIII qualifications. The staff believes that the proposed alternative to use 10 CFR 50.55a(b)(2)(xiv) in lieu of Subarticle VII-4240 for both Appendix VIII and non-Appendix VIII qualifications will maintain the skill and proficiency of UT personnel at or above the level provided in the Code for annual UT training, thereby providing an acceptable level of quality and safety.

2.4 Conclusion

Based on the above discussion, the staff concludes that the proposed alternative PDI-1 will provide an acceptable level of quality and safety. Therefore, pursuant to 10 CFR 50.55a(a)(3)(i), the staff authorizes the proposed alternative for Browns Ferry Unit 1 for the first 10-year interval which will conclude 1 year following the restart of the unit.

3.0 RELIEF REQUEST PDI-2, EXAMINATION CATEGORY B-D, ITEM B3.90, PRESSURE-RETAINING NOZZLE-TO-VESSEL WELDS

3.1 Code Requirements for Which Relief is Requested

The licensee is requesting relief from the nozzle-to-vessel examination volume shown in Figures IWB-2500-7(a) and (b) of the 1995 Edition with the 1996 Addenda of Section XI of the Code for Browns Ferry Unit 1.

3.2 Licensee's Proposed Alternative to the Code

Pursuant to 10 CFR 50.55a(a)(3)(i), the licensee proposed reducing the examination volume to one-half ($\frac{1}{2}$) inch from each side of the weld crown, in lieu of the $\frac{1}{2}$ through-wall thickness from each side of the weld required by Figures IWB-2500-7(a) and (b).

3.3 Evaluation

The licensee proposed reducing the examination volume to $\frac{1}{2}$ inch from each side of the weld crown, in lieu of the $\frac{1}{2}$ through-wall thickness from each side of the weld required by Figures IWB-2500-7(a) and (b). The acceptability of this reduced-volume examination is based on prior examinations of the weld and $\frac{1}{2}$ through-wall thickness of base metal from each side of the weld crown, and internal stress distribution near the weld. The weld and base metal were extensively examined during construction, preservice inspection, and prior ISIs. These examinations show the ASME Code volume to be free of unacceptable flaws. The creation of flaws during plant service in the volume excluded from the proposed reduced examination is unlikely because of the low stress in the base metal away from the weld. The stresses caused by welding are concentrated at and near the weld. Cracks, should they initiate, occur in the high-stressed areas of the weld. The prior thorough examination of the base metal and the examination of the high-stressed areas of the weld provided an acceptable level of quality and safety. The high-stressed areas are within the volume included in the reduced examination volume proposed by the licensee, provided that significant repairs were not performed on the weld. Therefore, the licensee's proposed reduction of the examination volume to $\frac{1}{2}$ inch from each side of the weld crown is acceptable provided that any potential repair area of the weld is

bounded by the reduced volume. Should the repair area exceed the $\frac{1}{2}$ inch defined volume, the volume of examination must be expanded so as to fully capture the repair area.

3.4 Conclusion

Based on the above discussion, the staff concludes that the proposed alternative to reduce the examination volume to $\frac{1}{2}$ inch from each side of the weld crown, in lieu of $\frac{1}{2}$ through-wall thickness from each side of the weld, provides an acceptable level of quality and safety provided that any potential repair areas of the weld are bounded by the reduced volume. Therefore, pursuant to 10 CFR 50.55a(a)(3)(i), the proposed alternative PDI-2 is authorized for Browns Ferry Unit 1 for the first 10-Year ISI Interval which will conclude one year following the restart of the unit.

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Date: October 16, 2003

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BROWNS FERRY NUCLEAR PLANT

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