



UNITED STATES
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

May 31, 2013

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 2 - RELIEF REQUEST
(RR) 2-ISI-29, FOR THE THIRD 10-YEAR INSERVICE INSPECTION INTERVAL
(TAC NO. ME8854)

Dear Mr. Shea:

By letter dated May 25, 2012 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML12150A368), as supplemented on March 22, 2013 (ADAMS Accession No. ML13085A027), the Tennessee Valley Authority submitted a request for relief from weld examination coverage requirements specified in the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (ASME Code), Section XI for four Class 1 welds at the Browns Ferry Nuclear Plant (BFN) Unit 2. This relief request (RR) was requested for the Third 10-Year Inservice Inspection (ISI) interval at BFN Unit 2, which began on May 25, 2001, and ended on May 24, 2011.

Specifically, pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR), Part 50, Section 55a(g)(5)(iii), the licensee requested relief, from ISI coverage requirements for two full penetration welds in the reactor water cleanup system, one full penetration weld in the residual heat removal system, and one full penetration weld in the recirculation system, on the basis that the code requirement is impractical.

The U.S. Nuclear Regulatory Commission (NRC) staff, based on review of the information in your submittals, has determined that the request will not endanger life or property, or the common defense and security, and is otherwise in the public interest given due consideration to the burden upon the licensee that could result if the requirements were imposed on the facility. Furthermore, the NRC staff concluded that the examinations performed to the extent practical provide reasonable assurance of structural integrity of the subject components. However, because the licensee submitted the request beyond 12 months after the expiration of the inspection interval for which relief is sought, the NRC staff concluded that the licensee has not met the regulatory requirements set forth in 10 CFR 50.55a(g)(5)(iii). Therefore, relief for RR 2-ISI-29 at BFN Unit 2 is NOT granted.

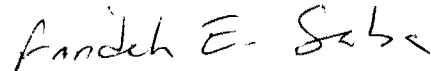
This matter, not granting the relief, has been forwarded to the NRC Region II for appropriate action.

J. Shea

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If you have any questions regarding this matter, please contact the Senior Project Manager, Ms. Farideh Saba at (301) 415-1447 or via e-mail at Farideh.Saba@nrc.gov.

Sincerely,

Handwritten signature of Farideh E. Saba in black ink.

for Jessie F. Quichocho, Chief
Plant Licensing Branch II-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-260

Enclosure:
Safety Evaluation

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

THIRD 10-YEAR INTERVAL INSERVICE INSPECTION PROGRAM PLAN

REQUEST FOR RELIEF NO. 2-ISI-29

TENNESSEE VALLEY AUTHORITY

BROWNS FERRY NUCLEAR PLANT, UNIT 2

DOCKET NUMBER: 50-260

1.0 INTRODUCTION

By letter dated May 25, 2012 (Agencywide Documents Access and Management System (ADAMS) Accession numbers ML12150A368), as supplemented by letter dated March 22, 2013 (ADAMS Accession No. ML13085A027), the Tennessee Valley Authority (TVA, the licensee) submitted Relief Request (RR) 2-ISI-29. The licensee requested relief from the weld examination coverage requirements specified in American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section XI (ASME Code), for obtaining essentially 100 percent coverage for four Class 1 welds at the Browns Ferry Nuclear Plant (BFN) Unit 2. RR 2-ISI-29 was requested for the third Inservice Inspection (ISI) interval, which began May 25, 2001, and ended May 24, 2011.

Specifically, pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR), Part 50, Section .55a(g)(5)(iii), the licensee requested relief, from ISI coverage requirements for two full penetration welds in the reactor water cleanup system, one full penetration weld in the residual heat removal system, and one full penetration weld in the recirculation system, on the basis that the code requirement is impractical.

2.0 REGULATORY EVALUATION

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 to the extent practical within the limitations of design, geometry, and materials of construction of the components. The regulations require that inservice examination 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, which was 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.

Enclosure

It states, in part, in 10 CFR 50.55a(g)(5)(iii), that licensees may determine that conformance with certain code requirements is impractical and that the licensee shall notify the Commission and submit information in support of the determination. Requests for relief made in accordance with this section must be submitted to the Nuclear Regulatory Commission (NRC or the Commission) no later than 12 months after the expiration of the initial or subsequent inspection interval for which relief is sought.

It states in 10 CFR 50.55a(g)(6)(i), that the Commission will evaluate determinations under paragraph (g)(5) of this section that code requirements are impractical. The Commission may grant such relief and may impose such alternative requirements as it determines 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.

In considering whether the requested relief is authorized by law, the NRC staff noted that the date of the licensee's submittal is beyond 12 months after the expiration of the inspection interval for which relief is sought. The NRC staff determined that regulatory authority does not exist for the Commission to grant the relief requested by the licensee. Therefore, the NRC staff's review was limited to a determination of the adequacy of the achieved coverage as it relates to the functionality and structural integrity of the affected piping and associated systems.

3.0 TECHNICAL EVALUATION

3.1 Licensee's Relief Request

Applicable Code Edition and Addenda

The ASME Code of record for the third ten-year ISI interval at Browns Ferry Nuclear Plant, Unit 2 is the 1995 Edition, 1996 Addenda.

Components for Which Relief is Requested

Weld Designation	Nominal Pipe Size	Coverage Obtained (Percent)	Component Description
RWCU-2-003-070	6	85.5	Reactor Water Cleanup System Stainless steel Pipe to Stainless Steel Weld-O-Let
RCRD-2-50	4	53.4	Reactor Water Cleanup System Carbon Steel Elbow to Forged SS Valve
DRHR-2-03	24	50	Residual Heat Removal Flued Head to Cast Valve
GR-2-09	12	75	Recirculation System Pipe Branch Connection

The four welds are ASME Class 1 piping butt welds covered under the risk-informed inspection program as Category RA item number R1.16 "Elements Subject to Intergranular Stress Corrosion Cracking (IGSCC)" and B-J "Pressure Retaining Welds in piping." The risk informed ISI program at BFN Unit 2 for the third 10 year ISI inspection interval was authorized by letter dated January 19, 2001 (ADAMS Accession No. ML010190294). This program follows the

methodology contained in the Westinghouse Owners Group report WCAP-14572, Revision 1-NP-A "Westinghouse Owners Group Application of Risk-Informed Methods to Piping Inservice Inspection Topical Report" and utilizes inspection information contained in ASME Code Case N-577-2500 Table 1.

Requested Relief

ASME Code Case N-577-2500 Table 1, Examination Category R1.16, requires volumetric examination of 100 percent of the weld and adjacent base material as shown in ASME Code, Section XI, Figure IWB-2500-8(c). Table IWB-2500-1, Examination Category B-J requires volumetric examination of essentially 100 percent of the weld length.

The licensee requested relief from the essentially 100 percent volumetric examination coverage requirements of Code Case N-577-2500 Table 1, Examination Category R1.16 for four full penetration welds due to access limitations caused by design.

Basis for Relief (As Stated by Licensee)

The welds were examined with the latest ultrasonic techniques, procedures, equipment, and personnel qualified to the requirements of the Performance Demonstration Initiative (PDI) Program, in accordance with the requirements of the 1995 Edition, 1996 Addenda, as amended by 10 CFR 50.55a(b)(2)(xv)(A) and 10 CFR 50.55a(b)(2)(xxiv), of ASME Section XI, Division 1, Appendix VIII as mandated by 10 CFR 50.55a(g)(4). These examinations were of the accessible areas to the maximum extent practical due to the design configuration of the weld joints.

These examinations provided an acceptable level of quality and safety because the information and data obtained provides sufficient information to judge the overall integrity of the piping welds.

Therefore, pursuant to 10 CFR 50.55a(g)(5)(iii), TVA requests that relief be granted for the BFN Unit 2 third Ten-Year ISI inspection interval.

Duration of Relief

RR 2-ISI-29 is applicable to the third 10-Year ISI inspection interval that began May 25, 2001, and ended May 24, 2011, at BFN Unit 2.

3.2 NRC Staff Evaluation

As previously stated in Section 2.0, "Regulatory Evaluation," of this safety evaluation, pursuant to 10 CFR 50.55a(g)(6)(i), the NRC staff evaluated the technical information provided in support of the request to ensure that it is sufficient to demonstrate that the requested relief 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. The following paragraphs present the NRC staff determination of whether these acceptance criteria have been met by considering them in four groups: a) authorized by law (see Section 2.0); b) safety; c) security; and d) burden.

The NRC staff considered the safety aspects of the requested relief to determine if the performed inspections provide reasonable assurance of the structural and leak tight integrity of the welds under consideration and that the regulatory acceptance criteria of "not endanger life or property" and "in the public interest" are met. The NRC staff evaluation of the inspections conducted for each weld under consideration is provided in the paragraphs below.

The weld designated RWCU-2-003-070 is an SA376 TP316 stainless steel pipe to A403 WP304 stainless steel weld-o-let weld in the Reactor Water Cleanup System. The weld metal is ER316/316L. The weld was examined using 45 and 70-degree shear waves from both sides of the weld. The design of the weld-o-let limited the coverage to 85.5 percent. The scans achieved 100 percent code coverage for circumferential flaws and 71 percent coverage for axial flaws. Significant axial cracking would likely grow into the inspected areas as the missed coverage region is in the thicker weld-o-let region.

The weld designated RCRD-2-50 is a dissimilar metal weld between a valve made of A182 F316 stainless steel and an elbow made of SA420 GRWPL6 ferritic steel. The weld metal used is ER309 stainless steel. The weld was examined using 45, 60, and 70-degree shear and longitudinal waves. The coverage for circumferential flaws is 57 percent for the longitudinal waves and 35 percent for the shear waves. For axial flaws the coverage is 67.9 percent for the longitudinal waves and 35 percent for the shear waves.

Weld DRHR-2-03 is a flued head made from SA182 F304 stainless steel welded to a valve cast from A351 CF8M stainless steel. The inspection was conducted using 45 degree shear wave probes from both sides of the weld. The cast stainless steel material is challenging to inspect and no code coverage is claimed from the cast side of the weld, and only 50 percent coverage on the flued head was achieved. The material that was not inspected was cast stainless steel, which has no history of cracking.

Weld GR-2-09 is a Recirculation System pipe branch connection between a weld-o-let made of A403 WP304 stainless steel and a pipe made of A358 Class 1 stainless steel. The weld metal used is ER308 stainless steel. The weld was examined using 45-degree shear waves and 60-degree longitudinal waves. The inspections achieved 100 percent coverage for axial flaws and 50 percent coverage for circumferential flaws.

Based on the materials of construction, the potential degradation mechanisms present, and volumetric inspection coverage obtained for the four welds, it is reasonable to conclude that, in the absence of any indications during the exam conducted, the structural and leak tight integrity of the welds will be maintained until the next scheduled inspection.

The NRC staff considered the security aspects of this request. The staff found that this request contains no security issues. Therefore, the staff finds that the security acceptance criterion is met.

The NRC staff considered the burden upon the licensee that could result if the requirements were imposed on the facility. The staff notes that the limitation of the inspection coverage is due to the design and materials of the subject welds. The staff also notes that in order to increase coverage, the welds would have to be re-designed and rewelded. The staff considers this process to be a significant burden on the licensee.

Based on the above analysis, the staff finds that the technical requirements of 10 CFR 50.55a(g)(6)(i), that is, the requested relief will not endanger life, or property, or the common defense and security, and is otherwise in the public interest have been met. Based on the above analysis the staff also finds that imposition of the ASME Code requirements would impose a burden on the licensee. Therefore, the NRC staff finds the technical aspects of the relief request acceptable.

4.0 CONCLUSION

As set forth above, the NRC staff determines that: it is impractical for the licensee to comply with the requirement; that the proposed inspection provides reasonable assurance of structural integrity or leak tightness of the subject components; and granting relief 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. However because the submittal is beyond 12 months after the expiration of the inspection interval for which relief is sought, the NRC staff concluded that the licensee has not met the regulatory requirements set forth in 10 CFR 50.55a(g)(5)(iii). Therefore, relief for RR 2-ISI-29 at BFN Unit 2 is NOT granted.

Principal Contributors: Stephen Cumblidge
Michael Farnan

Date: May 31, 2013

J. Shea

- 2 -

If you have any questions regarding this matter, please contact the Senior Project Manager, Ms. Farideh Saba at (301) 415-1447 or via e-mail at Farideh.Saba@nrc.gov.

Sincerely,

/RA by FSaba for/

Jessie F. Quichocho, Chief
Plant Licensing Branch II-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-260

Enclosure:
Safety Evaluation

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