

July 18, 2005

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 UNITS 2 AND 3 - SAFETY EVALUATION FOR
REQUEST FOR RELIEF REGARDING USE OF ASME CODE CASE -700
(TAC NOS. MC6437 AND MC6438)

Dear Mr. Singer:

By a letter dated March 11, 2005, the Tennessee Valley Authority (TVA, the licensee) submitted a request for relief from the inservice inspection (ISI) requirements specified in American Society for Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (Code), for Browns Ferry Nuclear Plant (BFN) Units 2 and 3. In accordance with Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.55a(a)(3)(i), the licensee proposed an alternative to certain Code requirements. Specifically, the submittal proposed to use the alternatives of Code Case -700, Alternative Rules for Selection and Class 1, 2, and 3 Vessel Welded Attachments for Examinations, Section XI, Division 1, for the selection of Class 1, 2, and 3 vessel welded attachments for examination.

Based on our review of your submittal, we have concluded that the licensee's proposed alternative provides an acceptable level of quality and safety. Therefore, the licensee's alternative is authorized pursuant to 10 CFR 55.55a(a)(3)(i) for BFN, Units 2 and 3 third and second 10-year ISI interval, respectively, or until ASME Code Case N-700 is approved for general use by reference in Regulatory Guide 1.147, Inservice Inspection Code Case Acceptability, ASME Section XI, Division 1. After that time, the licensee must follow the conditions, if any are specified in Regulatory Guide 1.147. All other requirements of the ASME Code, Sections III and 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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These reliefs are authorized for the remainder of the second 10-year ISI interval at Browns Ferry Unit 2, which ends May 24, 2011, and Browns Ferry Unit 3 for the remainder of the third 10-year ISI interval which ends on November 18, 2005.

Sincerely,

/RA/

Michael L. Marshall, Jr., Chief, Section 2
Project Directorate II
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket Nos. 50-260 and 50-296

Enclosure: Safety Evaluation

cc w/encl: See next page

K. Singer

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Sincerely,

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Michael L. Marshall, Jr., Chief, Section 2
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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

INSERVICE INSPECTION PROGRAM

RELIEF REQUEST NOS. 2-ISI-23 AND 3-ISI-20

TENNESSEE VALLEY AUTHORITY

BROWNS FERRY NUCLEAR PLANT, UNITS 2 AND 3

DOCKET NOS. 50-260 AND 50-296

1.0 INTRODUCTION

By a letter dated March 11, 2005, the Tennessee Valley Authority (TVA, the licensee) submitted a request for relief from the inservice inspection (ISI) requirements specified in American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (Code), for Browns Ferry Nuclear Plant (BFN) Units 2 and 3. In accordance with Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.55a(a)(3)(i), the licensee proposed an alternative to certain Code requirements. Specifically, the submittal proposed to use the alternatives of Code Case-700, Alternative Rules for Selection and Class 1, 2, and 3 Vessel Welded Attachments for Examinations, Section XI, Division 1, for the selection of Class 1, 2, and 3 vessel welded attachments for examination.

2.0 REGULATORY REQUIREMENTS

Section 50.55a(g) requires that ISI of ASME Code Class 1, 2, and 3 components be performed in accordance with Section XI of the ASME Code and applicable addenda, except where specific written relief has been granted by the NRC pursuant to 10 CFR 50.55a(g)(6)(i). According to 10 CFR 50.55a(a)(3), alternatives to the requirements of paragraph (g) may be used, when authorized by the NRC, if an applicant demonstrates that the proposed alternatives would provide an acceptable level of quality and safety or if the specified requirement 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 Inservice Inspection (ISI) of Nuclear Power Plant Components," to the extent practical within the limitations of design, geometry, and materials of construction of the components. The

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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) 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 BFN, Unit 2, third 10-year ISI interval is the 1995 Edition through the 1996 Addenda of the ASME Code, Section XI. For BFN, Unit 3 the ASME Code of record second 10-year ISI interval is the 1989 Edition. For the examination of ASME Code Class 1, 2, and 3 attachments for vessels, piping, pumps, and valves the licensee was authorized by NRC safety evaluation dated November 5, 2001, to update to the 1995 Edition through the 1996 Addenda of the ASME Code, Section XI for BFN, Unit 3. The BFN, Unit 2 third 10-year ISI interval is scheduled to end on May 24, 2011, and BFN, Unit 3 second 10-year ISI interval is scheduled to end on November 18, 2005.

3.0 RELIEF REQUESTS 2-ISI-23 AND 3-ISI-20

3.1 ASME Code Requirement:

The 1995 Edition through the 1996 Addenda of ASME Code, Section XI, Table IWB-2500-1, Examination Category B-K, Footnote 4; Table IWC-2500-1, Examination Category C-C, Footnote 4; and Table IWD-2500-1, Examination Category D-A, Footnote 3 requirements are as follows:

ASME Code, Section XI, Examination Category B-K, Footnote 4 and Examination Category C-C, Footnote 4 states that for multiple vessels of similar design, function, and service, only one of the multiple vessels shall be selected for a surface examination.

ASME Code, Section XI, Examination Category D-A, Footnote 3 states that selected samples of welded attachments shall be examined each inspection interval. All welded attachments selected for examination shall be those most subject to corrosion, as determined by the Owner, such as the welded attachments of the Service Water or Emergency Service Water systems. For multiple vessels of similar design, function and service, the welded attachments of only one of the multiple vessels shall be selected for examination. For welded attachments of piping, pumps, and valves, a 10% sample shall be selected for examination. This percentage sample shall be proportional to the total number of nonexempt welded attachments connected to the piping, pumps, and valves in each system subject to these examinations.

3.2 System/Component(s) for Which Relief is Requested:

Class 1, 2, and 3 vessel welded attachments.

3.3 Code Requirement from Which Relief is Requested (As stated):

Relief is requested to use the alternatives of [ASME] Code Case N-700 [*Alternative Rules for Selection and Class 1, 2, and 3 Vessel Welded Attachments for Examinations*, Section XI, Division 1] for the selection of Class 1, 2, and 3 vessel welded attachments for examination.

3.4 Licensee's Proposed Alternative Examination (As stated):

In lieu of the requirements specified in the earlier [ASME] Code Requirements Section [XI], [ASME] Code Case N-700 will be used for selection of Class 1, 2, and 3 vessel welded attachments for examination. [ASME] Code Case N-700 was approved by the ASME Code Committee on November 18, 2003.

3.5 Licensee's Basis for Requesting Relief (As stated):

The BFN Unit 2 ISI program is based on the 1995 Edition, 1996 Addenda of ASME [Code] Section XI. The BFN, Unit 3 ISI program is based on the 1989 Edition of ASME [Code] Section XI. The BFN, Unit 3 ISI program for the examination of Class 1, 2, and 3 welded attachments for vessels, piping, pumps, and valves was updated to the 1995 Edition, 1996 Addenda of ASME [Code] Section XI. NRC approved this update request on November 5, 2001 (TAC No. MB2586).

[ASME] Code Case N-509 [*Alternative Rules for the Selection and Examination of Class 1, 2, and 3 Integrally Welded Attachments*, Section XI, Division 1] and the 1996 Addenda state in Examination Categories B-K, C-C, and D-A that "For multiple vessels of similar design, function and service, only one welded attachment of only of the multiple vessels shall be selected for examination". There is no criterion for selection of the one welded attachment that must be examined. [ASME] Code Case N-509 and the 1996 Addenda do not specifically address selection criteria for single vessels. [ASME] Code Case N-700 utilizes the basis for development of [ASME] Code Case N-509 to provide criteria for selection of Class 1, 2, and 3 vessel welded attachments for examination. [ASME] Code Case N-700 requires that for multiple vessels of similar design, function and service, only one welded attachment of only one of the multiple vessels shall be selected for examination.

The code case [ASME Code Case N-700] requires that only one welded attachment on a single vessel be examined. However, the case also requires that the attachment selected for examination on one of the multiple vessels or the single vessel, as applicable, to be an attachment under continuous load during operation if such an attachment exists.

[ASME] Code Case N-509 was incorporated in the [ASME Code, Section XI] 1995 Edition, 1995 Addenda. The technical basis for development of [ASME] Code Case N-509 concluded that operational transients/water hammers to be the major potential for welded attachment failures (possibility exists for corrosion related failures). The technical basis of [ASME] Code Case N-509 also concluded that welded attachment

failures have been identified as a result of connected support member deformation and have not been identified by the present Code examinations. That is the basis for [ASME] Code Case N-509 and the 1995 Addenda, and later addenda, which requires welded attachments to be examined whenever component support deformation is identified.

3.6 Evaluation

The 1995 Edition through the 1996 Addenda of ASME Code, Section XI, Table IWB-2500-1, Examination Category B-K, Footnote 4; Table IWC-2500-1, Examination Category C-C, Footnote 4; and Table IWD-2500-1, Examination Category D-A, Footnote 3. Footnote 4 and Footnote 3 requirements are as stated in Section 3.0 of this safety evaluation.

As an alternative to the ASME Code requirements, the licensee proposed to invoke ASME Code Case N-700 for the selection of Class 1, 2, and 3 vessel welded attachments for examination. ASME Code Case N-700 requires that for multiple vessels of similar design, function, and service, only one welded attachment of only one of the multiple vessels shall be selected for examination. In addition, ASME Code Case N-700 requires that only one welded attachment on a single vessel is to be examined. The attachment selected for examination on one of the multiple vessels or the single vessel, as applicable, is to be an attachment under continuous load during operation if such an attachment exists.

ASME Code Case N-700 utilizes the basis for development of ASME Code Case N-509. ASME Code Case N-509 was incorporated in the ASME Code Section XI, 1995 Edition, 1995 Addenda. The technical basis for development of ASME Code Case N-509 concluded that operational transients and water hammers to be the major potential for welded attachment failures and that the possibility for corrosion related failures also existed. Industry experience found that welded attachment failures have been identified as a result of connected support member deformation and have not been identified by the present ASME Code examinations. ASME Code, Section XI, 1995 Addenda, and later addenda, requires welded attachments to be examined whenever component support deformation is identified.

ASME Code Case N-700 maintains the same sampling philosophy for welded attachments on vessels as does ASME Code Case N-509, and most of the ASME Code examination requirements. The sampling philosophy ensures the detection of service-induced degradation. For multiple vessels the ASME Code Case N-700 sampling plan requires only one welded attachment of only one of the multiple vessels to be selected for examination and for a single vessel only one welded attachment is to be examined. ASME Code Case N-700 also requires that the attachment selected for examination is to be an attachment under continuous load during operation if such an attachment exists. Therefore, the staff determined that ASME Code Case N-700 provides an acceptable level of quality and safety.

4.0 CONCLUSION

Based on the information provided in the licensee's submittals, the NRC staff has determined that the licensee's proposed alternative to use ASME Code Case N-700 for welded attachments on vessels provides an acceptable level of quality and safety. Therefore, the licensee's alternative is authorized pursuant to 10 CFR 55.55a(a)(3)(i) for BFN, Units 2 and 3 third and second 10-year ISI interval, respectively, or until ASME Code Case N-700 is approved for general use by reference in Regulatory Guide 1.147 *Inservice Inspection Code Case Acceptability*, ASME Section XI, Division 1. After that time, the licensee must follow the conditions, if any are specified in Regulatory Guide 1.147. All other requirements of the ASME Code, Sections III and XI for which relief has not been specifically requested remain applicable, including third party review by the Authorized Nuclear Inservice Inspector.

Principal Contributor: T. McLellan

Date: July 18, 2005

Mr. Karl W. Singer
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BROWNS FERRY NUCLEAR PLANT

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