Tennessee Valley Authority, 1101 Market Street, Chattanooga, Tennessee 37402

CNL-15-013

March 17, 2015

10 CFR 50.4
10 CFR 50.55a(z)(1)

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 20555-0001

Watts Bar Nuclear Plant, Unit 2
Construction Permit No. CPPR-92
NRC Docket No. 50-391

Subject: **Watts Bar Nuclear Plant Unit 2 - Request for Alternate ASME Code Section XI for Containment Inservice Inspection Utilizing ASME Code Section XI, 2007-2008**

References:

1. TVA letter to NRC, "Watts Bar Nuclear Plant (WBN) Unit 1 - American Society of Mechanical Engineers (ASME) - Code Case N-605, and Examinations of Seals and Gaskets, VT-2 Visual Examinations During Appendix J Testing, Metal Containment Areas That Have Been Repaired, and Bolted Connections - Request for Relief," dated July 8, 1999 (ML073240663)

2. TVA letter to NRC, "Sequoyah Nuclear Plant (SQN) Units 1 and 2, Watts Bar Nuclear Plant (WBN) Unit 1 - American Society of Mechanical Engineers (ASME) - VT-2 Visual Examinations During Appendix J Testing - Revised Request for Relief," dated October 14, 1999 (ML073240678)

3. NRC letter to TVA, "Relief From ASME Code Requirements for Containment Related Examinations and Tests at Watts Bar Nuclear Plant (TAC NO. MA6069)," dated November 24, 1999 (ML993340332)

Pursuant to 10 CFR 50.55a(z)(1), Tennessee Valley Authority (TVA) is submitting the enclosed request to use an alternative Edition and Addenda of American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code Section XI for the Watts Bar Nuclear Plant (WBN) Unit 2 Containment Inservice Inspection (CISI) Program.

The CISI Program applicable to WBN Unit 2 is the ASME Code Class MC (Metallic Containment) components for the "initial 120-month" or First 10-Year CISI Interval. The proposed alternative requests the use of the 2007 Edition with 2008 Addenda of ASME Code Section XI per 10 CFR 50.55a(b)(2) as conditioned by 10 CFR 50.55a(b)(2)(ix) on the date 12 months prior to Full-Power Licensing of WBN Unit 2. Justification for the proposed alternatives is provided in the enclosure.

To allow implementation of potential changes to the CISI Program prior to the first refueling outage, TVA requests that the proposed ASME Code Section XI Alternative be approved by March 31, 2016.

There are no new regulatory commitments associated with this letter. If you have any questions or comments, please contact Gordon Arent at (423) 365-2004.

I declare under penalty of perjury that the foregoing is true and correct. Executed on the 17th day of March 2015.

Respectfully,

J. W. Shea
Vice President, Nuclear Licensing

Enclosure: Tennessee Valley Authority, Watts Bar Nuclear Plant Unit 2, American Society of Mechanical Engineers Code Section XI Request For Alternative WBN-2/CISI-1

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ENCLOSURE

TENNESSEE VALLEY AUTHORITY
WATTS BAR NUCLEAR PLANT UNIT 2
AMERICAN SOCIETY OF MECHANICAL ENGINEERS CODE
SECTION XI
REQUEST FOR ALTERNATIVE
WBN-2/CISI-1

EXECUTIVE SUMMARY:

TVA requests approval per 10 CFR 50.55a(z)(1) to use an alternative Edition and Addenda of American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code Section XI for the Containment Inservice Inspection (CISI) Program for ASME Code Class MC (Metallic Containment) components for the "initial 120-month" or First 10-Year CISI Interval at Watts Bar Nuclear Plant (WBN) Unit 2 beginning at Commercial Operation. The proposed alternative is to utilize the latest-approved Edition and Addenda of ASME Code Section XI per 10 CFR 50.55a(b)(2) on the date 12 months prior to Full-Power Licensing of WBN Unit 2. The alternative Edition and Addenda are anticipated to be the 2007 Edition with the 2008 Addenda as conditioned by 10 CFR 50.55a(b)(2)(ix). Using the older Codes required by 10 CFR 50.55a(b)(2)(vi) would result in WBN Unit 2 committing to use a Code that is older than the Code being utilized for the Preservice Inspection, which is being conducted to the 2001 Edition with 2003 Addenda. The latest-approved Edition and Addenda of ASME Code Section XI for CISI incorporate years of experience and lessons learned, reduce the need for multiple ASME Code Section XI Relief Requests, and provide an acceptable level of quality and safety for the examination of ASME Code Class MC components of the WBN Unit 2 containment.

SYSTEM/COMPONENTS FOR WHICH AN ALTERNATIVE IS REQUESTED:

The affected System/Components are the ASME Code Class MC components including all Examination Categories and Item Numbers.

REQUIREMENTS FROM WHICH AN ALTERNATIVE IS REQUESTED:

AMSE Codes and standards 10 CFR 50.55a(b)(2)(vi) requires the First 10-Year CISI Interval at WBN Unit 2 Code of Record to be in accordance with either the 1992 Edition with 1992 Addenda (1992/A92) or the 1995 Edition through the 1996 Addenda (1995/A96) of ASME Code Section XI. No options to use other editions and addenda are given.

ALTERNATIVE REQUESTED:

Approval is requested to adopt, for the First 10-Year CISI Interval at WBN Unit 2, the Code Edition and Addenda referenced in 10 CFR 50.55a(b)(2) on the date 12 months prior to full-power licensing. All related requirements of the later applicable edition and addenda as conditioned by 10 CFR 50.55a(b)(2)(ix) will be met.

BASIS FOR ALTERNATIVE:

The provision in 10 CFR 50.55a(g)4(iv) allow the use of subsequent Code Editions and Addenda, which are incorporated by reference in 10 CFR 50.55a(b) as long as all related requirements are met. The 2007 Edition through 2008 Addenda of ASME Code Section XI incorporated lessons learned which are not incorporated in the older 1992/A92 or 1995/A96 ASME Code Section XI currently required in 10 CFR 50.55a.

The NRC has previously approved the edition and addenda of codes referenced in 10 CFR 50.55a(b)(2), so no additional review is required by the NRC or TVA. The 2007 Edition through 2008 Addenda has already been adopted by several plants in this country with no problems noted.

The 2001 Edition through 2003 Addenda of ASME Section XI is presently being utilized for the WBN Unit 2 Containment Preservice Inspection (CPSI) Program. Going back to the older 1992/A92 or 1995/A96 ASME Code Section XI would negate the advancements made in recent years in application of ASME Code Section XI and would require multiple relief requests from ASME Code Section XI.

The NRC issued Regulatory Issue Summary (RIS) 2004-12 (ML042090436) on July 28, 2004, on the use of later-approved Editions and Addenda. RIS 2004-12 requires when a later Code is used, that all related requirements be met. WBN Unit 2 will comply with this requirement.

PROPOSED ALTERNATIVE:

WBN Unit 2 proposes to utilize the latest Edition and Addenda of ASME Section XI referenced in 10 CFR 50.55a(b)(2) as conditioned by 10 CFR 50.55a(b)(2)(ix), for WBN Unit 2 CISI activities for the First 10-Year CISI Interval. This is anticipated to be the 2007 Edition with Addenda through 2008 of ASME Section XI. WBN Unit 2 shall utilize those Code Cases approved for use by Regulatory Guide 1.147 and adopted by WBN Unit 2, or where specific relief has been requested and granted by the NRC.

JUSTIFICATION FOR AUTHORIZING ALTERNATIVE:

Justification to use the latest Edition and Addenda of ASME Section XI referenced in 10 CFR 50.55a(b)(2) as conditioned by 10 CFR 50.55a(b)(2)(ix), for WBN Unit 2 CISI activities for the First 10-Year CISI Interval is based on the following:

1. Later Editions and Addenda of ASME Code Section XI incorporate lessons learned; including those contained in multiple relief requests, and is more comprehensive than the older 1992/A92 or 1995/A96 ASME XI Codes currently required by 10 CFR 50.

2. The later Editions and Addenda of ASME Code Section XI incorporate the five WBN Unit 1 relief requests discussed below (see References 1 and 2 of the cover letter). The five WBN Unit 1 relief requests listed below are applicable to WBN Unit 2. The Safety Evaluation for the WBN Unit 1 relief requests is given in Reference 3 of the cover letter.

CISI-1:

Relief request is to not perform VT-3 visual examinations of inaccessible seals and gaskets for Class MC components.

Justification for Alternative

ASME Section XI requires visual examinations of seals and gaskets when performing containment examinations. The penetrations discussed below contain seals and gaskets:

Electrical Penetrations

Electrical penetrations use a header plate(s), or header plate canister assembly, welded to the containment penetration nozzle. Modules through which electrical conductors pass are installed in the header plate(s). The electrical penetrations presently installed at Watts Bar are manufactured by Conax. Penetrations manufactured by Conax use a set of compression fittings and may include sealant compounds and/or O-rings. The Conax penetration seals are completely inaccessible without disconnecting cabling and removal of the modules.

Containment Personnel Airlocks (2), Equipment Hatch, and Miscellaneous Blind Flanges

The personnel airlock doors utilize an inner and outer door with double sets of gaskets and knife-edges to ensure leak tight integrity. These airlocks also contain other gaskets and seals for items such as the handwheel shaft seals, electrical penetrations, blind flanges, and equalizing pressure connections which require disassembly to gain access to the gaskets and seals. The equipment hatch consists of a single hatch cover. The equipment hatch cover and all miscellaneous blind flanges utilize double O-ring seals.

Seals and gaskets receive a 10 CFR 50, Appendix J, Type B test. As noted in 10 CFR 50, Appendix J, the purpose of the Type B test is to measure leakage of containment penetrations whose design incorporates resilient seals, gaskets, or sealant compounds or flexible metal seal assemblies. Examination of seals and gaskets require the joints, which are proven adequate through Appendix J testing, to be disassembled. For electrical penetrations, this would involve performance of an Appendix J, Type B test prior to disassembly; de-termination of cables at electrical penetrations if enough cable slack is not available; disassembly of the joint (if designed to permit disassembly); removal and VT-3 visual examination of the seals and gaskets; reassembly of the joint; re-termination of the cables if necessary; post maintenance testing of the cables; and performance of an Appendix J, Type B test upon final assembly. This imposes the risk that equipment could be damaged. In addition, a VT-3 examination does not ensure that these items, when reassembled, will not leak. Note 1 in Examination Category E-D was modified in the 1992 Edition, 1993 Addenda, of ASME Section XI to state that sealed or gasket connections need not be disassembled solely for performance of examinations. However, without disassembly, in most cases all of the surface of the seals and gaskets would be inaccessible.

In addition to the testing conducted prior to disassembly and after reassembly, the containment personnel airlocks receive a Type B test within seven days after each opening. Containment entries are normally made each week. For periods of multiple containment entries where the airlock doors are routinely used for access more frequently than once every seven days, door seals may be tested once every thirty days during this time period. The airlock door gaskets are visually inspected as a normal surveillance practice at least

once every thirty months. Since the Type B tests assure the leak tight integrity of primary containment, the performance of a VT-3 visual examination would not increase the level of safety or quality.

For the equipment hatch penetration, which is routinely disassembled, a Type B test is required prior to disassembly and upon final assembly. Since the Type B tests assure the leak tight integrity of primary containment, the performance of a VT-3 visual examination would not increase the level of safety or quality. In addition, when the hatch is disassembled, the O-rings seals are visually inspected as a normal maintenance practice.

For the blind flange penetrations, should the connection(s) be disassembled, a Type B test is required prior to disassembly and upon final assembly prior to startup. Since the Type B tests assure the leak tight integrity of primary containment, the performance of the VT-3 visual examination would not increase the level of safety or quality.

When the airlocks, hatch, and blind flanges containing these seals and gaskets are tested in accordance with 10 CFR 50, Appendix J, degradation of the seal or gasket material would be revealed by an increase in the leakage rate. Corrective measures would be applied and the component retested. Repair or replacement of seals and gaskets is not subject to ASME Section XI rules in accordance with Paragraph IWA-4111(b)(5).

The visual examination of seals and gaskets in accordance with Table IWE 2500-1, Examination Category E-D, Item Numbers E5.10 and E5.20, is a burden without any compensating increase in the level of safety or quality.

Overall containment leakage is verified by 10 CFR 50, Appendix J, Type A tests. Although the Type A test does not verify individual penetration leakage, it does provide additional assurance that there is no significant leakage through the containment pressure boundary, which includes all sealed penetrations.

Compliance with the specified requirements of performing a VT-3 visual examination of inaccessible seals and gaskets would result in hardship or unusual difficulty without a compensating increase in the level of safety or quality. Testing the seals and gaskets in accordance with 10 CFR 50, Appendix J, provides adequate assurance of the leak-tight integrity of the seals and gaskets. The requirement to examine seals and gaskets has been removed in the 1998 Edition of ASME Section XI.

Alternative Examination(s):

The leak-tightness of seals and gaskets is tested in accordance with 10 CFR 50, Appendix J. Type B testing is performed at least once each inservice inspection interval as required by 10 CFR 50, Appendix J, in addition to the Type B tests performed prior to disassembly and after reassembly. Appendix J, Type A tests provide additional assurance that there is no significant leakage through the containment pressure boundary. No additional alternatives are proposed.

CISI-2:

Relief request is to not perform VT-2 visual examination for leakage during Appendix J leak rate testing following repair, replacement, or modification activities. This relief request was subsequently modified by WBN Unit 1 in Reference 2.

Justification for Relief

Paragraph IWE-5210 states that except as noted within Paragraph IWE-5240, the requirements of Article IWA-5000 are not applicable to Class MC or Class CC components. Paragraph IWE-5240 states that the requirements of Paragraph IWA-5240 (corrected from IWA-5246 to IWA-5240 in the 1993 Addendum) for visual examinations are applicable. Paragraph IWA-5240 identifies requirements for performance of VT-2 visual examination. VT-2 visual examinations are conducted to detect evidence of leakage from pressure retaining components, with or without leakage collection systems, during the conduct of a system pressure test. In addition, personnel performing VT-2 visual examinations are required to be qualified in accordance with Subarticle IWA-2300 of ASME Section XI.

Table IWE-2500-1, Examination Category E-P, Item Number E9.10, identifies the examination method of 10 CFR 50, Appendix J and does not specifically identify a VT-2 visual examination. 10 CFR 50, Appendix J provides requirements for testing as well as acceptable leakage criteria. These tests are performed by qualified Appendix J test personnel and utilize calibrated equipment to determine leak rate acceptability. Additionally, 10 CFR 50.55a(b)(2)(ix)(E) requires a general visual examination of the containment each period that would identify structural degradation that may contribute to leakage.

Repairs and replacements, including modifications, to the containment pressure retaining boundary and to integral attachments must be performed in accordance with Article IWA-4000. This article requires, among other things, preparation of a repair and replacement plan; requires repairs and installation of replacements, including performance of nondestructive examinations, to be performed in accordance with the original edition or later editions of the Construction Code or Section III; and requires performance of preservice inspections in accordance with Subsection IWE. Repairs and replacements of pressure retaining MC components and their integral attachments at WBN Plant are performed in accordance with the TVA Repair and Replacement Program. This program specifies the repair methods and nondestructive examinations necessary to ensure that the original quality and construction requirements of the containment vessel are met.

Performance of the Appendix J testing will detect leakage which may exist in the containment pressure retaining boundary. Performance of the general visual examination and compliance with Article IWA-4000 will provide added assurance of the structural integrity of the containment pressure retaining boundary. Performance of a VT-2 visual examination in addition to these requirements would not provide additional assurance of detection of containment pressure boundary leakage. Pressure testing in accordance with 10 CFR 50, Appendix J, provides an adequate level of safety and quality.

Alternative Examination(s)

In those cases where TVA elects not to perform a VT-2 visual examination of repaired or replaced areas during the 10 CFR 50, Appendix J leak rate testing, a VT-1 visual examination will be performed during or following the 10 CFR 50, Appendix J leak rate testing.

CISI-3:

Relief request is to not perform successive examinations of metal containment areas that have been repaired and are acceptable for continued service.

Justification for Relief

Examination results, which detect flaws or areas of degradation which exceed the acceptance criteria of Article IWE-3000, require engineering evaluation, repair, or replacement of the flaw or area of degradation. The purpose of a repair is to restore the component to an acceptable condition for continued service in accordance with the acceptance standards of Article IWE-3000. Paragraph IWA-4150 requires the owner to conduct an evaluation of the suitability of the repair including consideration of the cause of failure.

If a repair has restored the component to an acceptable condition, successive examinations are not warranted. If the repair was not suitable, then the repair does not meet code requirements and the component is not acceptable for continue service. Paragraphs IWB-2420(b), IWC-2420(b), and Paragraph IWD-2420(b) for Class 1, 2, and 3 components, respectively, do not require a repair to be subject to successive examination requirements. Furthermore, if the repair area is subject to accelerated degradation, it would require augmented examination in accordance with Table IWE-2500-1, Examination Category E-C.

In SECY 96-80, "Issuance of Final Amendment to 10 CFR Section 50.55a to Incorporate by Reference the ASME Boiler and Pressure Vessel Code (ASME Code), Section XI, Division 1, Subsection IWE and Subsection IWL," dated April 17, 1996, the response to Subsection IWE comment 3.3 states, "The purpose of IWE-2420(b) is to manage components found to be acceptable for continued service (meaning no repair or replacement at this time) as an Examination Category E-C component ... If the component had been repaired or replaced, then the more frequent examination would not be needed."

The successive examination of repairs in accordance with Paragraph IWE-2420(b) and IWE--2420(c) constitutes a burden without a compensating increase in safety or quality.

The requirement to perform successive examinations of repaired areas has been removed from Paragraphs IWE-2420(b) and IWE-2420(c) in the 1998 Edition of ASME Section XI.

Alternative Examination(s)

Successive examinations in accordance with Paragraphs IWE-2420(b) and IWE-2420(c) will not be required for areas repaired in accordance with Article IWA-4000. Successive examinations will be performed in accordance with Paragraphs IWE-2420(b) and IWE-2420(c) for components whose examination results detect flaws or areas of degradation that exceed the acceptance criteria of IWE-3000 and are found acceptable for continued service without repair based on an engineering evaluation.

CISI-4:

Relief request is to not perform torque or tension tests of Class MC bolted connections which have not been disassembled.

Justification for Relief

Table IWE-2500-1, Examination Category E-G, Item Number E8.20, requires bolt torque or tension testing on bolted connections that have not been disassembled and reassembled during the inspection interval. Determination of the torque or tension value would require that the bolting be un-torqued and then re-torqued or re-tensioned. This activity is considered a maintenance activity which potentially affects the sealing characteristics/ability of the penetration and therefore would require a 10 CFR 50, Appendix J, Type B test prior to un-torquing and following re-torquing the bolting. The performance of the Type B test itself proves that the bolt torque or tension remains adequate to provide a leak rate that is within acceptable limits. In addition, exposed surfaces of bolted connections are VT-1 visually examined once each inspection interval in accordance with requirements of Table IWE-2500-1, Examination Category E-G, Item Number E8.10. Appendix J testing and the VT-1 visual examination are adequate to demonstrate that the design function is met.

Overall containment leakage is verified by 10 CFR 50, Appendix J, Type A tests. Although the Type A test does not verify individual bolted connections, it does provide additional assurance that there is no significant leakage through the containment pressure boundary.

Un-torquing and subsequent re-torquing of bolted connections which are verified not to experience unacceptable leakage through 10 CFR 50, Appendix J, Type B testing, results in hardship or unusual difficulty without a compensating increase in the level of safety or quality.

Alternate Examination(s)

The following examinations and tests required by Subsection IWE and 10 CFR 50, Appendix J ensure the structural integrity and the leak-tightness of Class MC pressure retaining bolting; and, therefore, no additional alternative examinations are proposed:

1. Exposed surfaces of bolted connections will be VT-1 visually examined once each inspection interval in accordance with requirements of Table IWE-2500-1, Examination Category E-G, Item Number E8.10,

2. Bolted connections will meet the pressure test requirements of Table IWE-2500-1, Examination Category E-P, Item Number E9.40, and

3. Overall containment leakage will be verified by 10 CFR 50, Appendix J, Type A tests.

CISI-5:

Relief request is to utilize Code Case N-605 in lieu of Subsection IWE for examination requirements of areas requiring augmented examination in accordance with Subsection IWE.

Justification for Relief

Paragraph IWE-1241 requires the augmented examinations of Table IWE-2500-1, Examination Category E-C, be performed on containment surface areas likely to experience accelerated degradation and aging. Subarticle IWE-2500(c)(1) requires that areas subject to augmented examinations that are accessible from both sides be VT-1 visually examined. Subarticle IWE-2500(c)(2) requires that areas subject to augmented examinations that are accessible from only one side be examined for wall thinning using a UT thickness measurement method. Subarticles IWE-2500(c)(3) and IWE-2500(c)(4) require that the minimum thickness within each one-foot square grid of surface area requiring augmented UT thickness measurements be marked such that periodic reexamination of that location can be performed. Thickness readings are point readings. Numerous readings are necessary to identify the minimum thickness within each grid. This only identifies the thinnest area. Periodic examination of the minimum thickness point only monitors that point and may not be the area that is the most susceptible to accelerated degradation.

Code Case N-605 provides a proposed alternative to the one-foot square grid area required by IWE-2500(c)(3). Code Case N-605 requires examination at the grid line intersections. The grid line intersections may not exceed 12 inches and need not be less than 2 inches. For a sample area of 50 square feet, Code Case N-605 requires a minimum of 100 locations be monitored. For a sample area of 50 square feet, Subarticle IWE-2500(c)(3) would require only 50 locations be monitored. In this instance, utilizing Code Case N-605 monitors more locations than required by Subarticle IWE-2500(c)(3). For sample areas greater than 100 square feet, Code Case N-605 requires that sufficient points be monitored to ensure at least 95% confidence level that the thickness of the base metal is reduced by no more than 10% of the nominal plate thickness at 95% of the grid line intersections.

Code Case N-605 requires additional examinations when any measurements reveal wall thickness are reduced by more than 10% of the nominal plate thickness. For all UT thickness measurement areas, should the measurements at a grid line intersection reveal that the base material is reduced by more than 10% of the nominal plate thickness, Code Case N-605 requires the minimum wall thickness within each adjoining grid be determined. This is similar to the examination requirements of Subarticle IWE-2500(c)(4) except that Code Case N-605 focuses resources on areas which have exhibited degradation rather than areas which have not exhibited degradation.

Code Case N-605 also incorporates the requirements of Subarticle IWE-2500(c)(1) for performance of VT-1 visual examinations.

Taking numerous ultrasonic thickness readings within a grid which has not exhibited degradation will result in hardship or unusual difficulty without a compensating increase in the level of safety or quality.

The requirements of Code Case N-605 have been incorporated into the 1998 Edition of ASME Section XI.

Alternative Examination(s)

Code Case N-605 will be used to determine examination requirements for VT-1 visual examinations and UT thickness measurements of areas requiring augmented examination.

IMPLEMENTATION SCHEDULE AND DURATION:

The proposed alternatives shall be utilized for the First 10-Year Containment Inservice Inspection (CISI) Interval Program for WBN Unit 2, beginning on the date of WBN Unit 2 Commercial Operation, which is scheduled for late 2015.