Tennessee Valley Authority, Post Office Box 2000, Spring City, Tennessee 37381-2000

February 10, 2014

10 CFR 50.55a

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

Watts Bar Nuclear Plant, Unit 2
NRC Docket No. 50-391

Subject: **WATTS BAR NUCLEAR PLANT (WBN) UNIT 2 - REQUEST TO USE AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME) BOILER AND PRESSURE VESSEL CODE, CODE CASE N-836, "HEAT EXCHANGER TUBE MECHANICAL PLUGGING, CLASS 1 SECTION III, DIVISION 1"**

Pursuant to 10 CFR 50.55a(a)(3)(i), TVA requests approval for the use of the provisions of approved ASME Code Case N-836, "Heat Exchanger Tube Mechanical Plugging, Class 1 Section III, Division 1." The attached Code Case N-836 was approved and effective October 22, 2013, and is now part of Supplement 3 of the 2013 ASME Edition Code Cases. This Code Case will be applied for specific use as part of the construction activities associated with the ASME Section III Division 1 Class 1 Steam Generators in WBN Unit 2.

Code Case N-836 provides explicit authorization for an N Certificate Holder to use mechanical plugs to plug tubes of ASME Section III Division 1 Class 1 heat exchangers that have been in storage for more than 25 years prior to completion of construction. This Code Case was prepared principally for WBN Unit 2 Steam Generators.

Enclosure 1 provides TVA's request for relief to use Code Case N-836. Approval of the use of this relief is requested to be completed in a timeframe to allow the Certificate Holder to complete the Code Case required documentation prior to Reactor Coolant

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System hydrostatic testing to support the completion of WBN Unit 2 construction. ASME Section III construction, fabrication, and installation activities on WBN Unit 2 are in progress with contractors who have the appropriate Code Symbol Stamps to complete the construction of WBN Unit 2. NRC approval is required before June 2014 in order to support the current schedule. Enclosure 2 contains a copy of Code Case N-836.

Enclosure 3 contains the TVA commitment associated with the N-836 Relief Request contained in Enclosure 1.

If you have any questions in this matter, please contact Gordon Arent, Director, WBN Licensing, at (423) 365-2004.

I declare under penalty of perjury that the foregoing is true and correct. Executed on the 10th day of February, 2014.

Respectfully,

R. A. Hruby, Jr.

Raymond A. Hruby, Jr.
General Manager, Technical Services
Watts Bar Unit 2

Enclosures:

1. Watts Bar Nuclear Plant (WBN) Unit 2 - Request for Relief to Use American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Code Case N-836, "Heat Exchanger Tube Mechanical Plugging, Class 1 Section III, Division 1"

2. Code Case N-836, "Heat Exchanger Tube Mechanical Plugging, Class 1 Section III, Division 1"

3. List of Commitments

cc (Enclosures):

U. S. Nuclear Regulatory Commission
Region II
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NRC Resident Inspector Unit 2
Watts Bar Nuclear Plant
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ENCLOSURE 1

WATTS BAR NUCLEAR PLANT (WBN) UNIT 2 - REQUEST FOR RELIEF TO USE AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME) BOILER AND PRESSURE VESSEL CODE, CODE CASE N-836, "HEAT EXCHANGER TUBE MECHANICAL PLUGGING, CLASS 1 SECTION III, DIVISION 1"

Executive Summary:

Pursuant to 10 CFR 50.55a(a)(3)(i), TVA is requesting approval to use the provisions of ASME Code Case N-836, "Heat Exchanger Tube Mechanical Plugging, Class 1 Section III, Division 1." In October 2013, Code Case N-836 was approved by ASME. The attached Code Case N-836 was approved and effective October 22, 2013, and now is a part of Supplement 3 to the 2013 ASME Edition Code Cases. This Code Case will be applied for specific use as part of the construction activities associated with the completion of ASME Section III Division 1 Class 1 Steam Generators in WBN Unit 2.

Code Case N-836 provides explicit authorization for an N Certificate Holder to use mechanical plugs (i.e., expansion plugs) to plug tubes of ASME Section III Division 1 Class 1 heat exchangers in addition to welded plugs currently allowed by ASME Section III. The Code Case explicitly applies to the WBN Unit 2 Steam Generators that have been in storage for more than 25 years prior to completion of construction. The incorporation of this Code Case will allow the responsible N Certificate Holder to complete the construction of the WBN Unit 2 Steam Generators and the associated N-1 Code Data Packages using both mechanical and welded plugs.

I. Systems and Components Affected

This request will be applicable to the WBN Unit 2 Reactor Coolant System Steam Generators designed, fabricated, and constructed in compliance with the rules of the ASME Boiler and Pressure Vessel Code, Section III Division 1.

Specifically, Code Case N-836 addresses the use of mechanical plugs by an N Certificate Holder to complete construction of Class 1 Section III, Division 1 heat exchangers that have been in storage for more than 25 years. The WBN Unit 2 Steam Generators have been partially installed and in storage since 1988.

II. Applicable ASME Code Edition and Addenda

WBN Unit 2 ASME Steam Generators were designed and constructed to meet ASME Section III 1971 Edition through and including the Summer 1971 Addenda, as the component Code of Record.

Code Case N-836 requires that the provisions of Section XI, 2007 Edition with the 2008 Addenda and 2013 Edition, IWA-4713, Heat Exchanger Tube Plugging by Expansion, shall be met, except for IWA-4713.1(a) and IWA-4713.5. Each of these exceptions is addressed below.

IWA-4713.1(a) states, "Plugs shall meet the requirements of IWA-4200." IWA-4200 defines the requirements for items used for ASME XI repair or replacement activities as opposed to ASME III Construction of new components. As the WBN Unit 2 Steam Generators construction

activities are governed by ASME Section III Division 1, Section NB, Code Case N-836 requires that the mechanical plug's pressure-retaining material shall comply with the requirements of Subsection NB. This material shall meet the requirements of SB-166, UNS N06690. These requirements ensure that thermally treated Alloy 690 material is used to plug the Alloy 600 tubes. This material provides increased stress corrosion cracking resistance over Alloy 600 tube plug material.

IWA-4713.5 Records, states:

"The following records, in addition to those required by IWA-6000 (ASME Section XI Records and Reports), shall be maintained by the Owner:

(a) Plugging Procedure Specifications

(b) record of procedure qualification for the plugging method, including the essential variables and results of all tests required by IWA-4713.3

(c) record of performance qualification for each individual, including the PPS number and revision

(d) Certified Material Test Report for installed plugs

(e) location of all plugged tubes

(f) results of post-installation examinations and evaluations

(g) evaluations performed in accordance with IWA-4713.3(a)(4)"

As the WBN Unit 2 Steam Generators construction activities are governed by ASME Section III Division 1, Section NB, Code Case N-836 restates the IWA-4713.5 requirements with distinctions between ASME Section III Division 1 and ASME Section XI as shown in the bold text below:

"The following records, in addition to those required by ***NCA-4134.17****, shall be maintained by* ***the Certificate Holder and transferred to the Owner as required by Section III****:*

(1) plugging procedure specification (PPS)

(2) records of procedure qualification for the plugging method, including the essential variables and results of all tests required by IWA-4713.3

(3) records of performance qualification for each operator, including the PPS, identification, such as number and revision

(4) certified material test reports for the ***pressure-retaining portion of*** *the installed plugs*

(5) ***identification of all plugged tubes as shown in final drawings for the heat exchanger***

(6) results of post installation examinations and evaluations

(7) evaluations performed in accordance with IWA-4713.3(a)(4)"

III. Code Requirement

Code Case N-474-1 was used for the Alloy 690 material for mechanical plugs installed. Per ASME Code Section III, NA-1140 (and NCA-1140), Code Cases, Addenda or later editions of Section III may be used if agreed upon by Owner and the Certificate Holder of the Steam Generator, provided they are approved by the United States Nuclear Regulatory Commission.

The list of applicable ASME Codes and addenda is as follows.

- ASME Boiler and Pressure Vessel Code, Section III, Nuclear Power Plant Components, 1971 Edition with Addenda through 1971 Summer Addenda and applicable code interpretations and rulings.

- ASME Boiler and Pressure Vessel Code, Section III, Rules for Construction of Nuclear Power Plant Components, 1989 Edition (for Mechanical Tube Plugs only).

- ASME Boiler and Pressure Vessel Code, Code Case N-474-1, "Design Stress Intensities and Yield Strength Values for UNS N06690 With a Minimum Specified Yield Strength of 35 ksi, Class 1 Components Section III, Division 1," March 5, 1990.

IV. Reason for Request

This Code Case is submitted to address the Class I heat exchangers mechanical tube plugging by expansion or with a rolled technique under Section III Division 1 of the ASME Code. When there is sufficient degradation of the tube, the preferred method of plugging for Steam Generators in service under ASME Section XI is by mechanical means rather than removing the tube end in the tubesheet and using a welded plug. The Steam Generators at the WBN 2 Site are ASME Class 1 Section III Division 1 heat exchangers and are under the requirements of ASME Section III during the construction phase. Westinghouse put forth a Code Interpretation (III-1-10-20) that was used to install mechanical plugs into the Steam Generators at WBN Unit 2. In addition to meeting the requirements of ASME Section III Division 1 and Code Interpretation III-1-10-20, Westinghouse complied with the qualification process delineated in Section XI, IWA-4713.

It was later identified by the Authorized Inspection Agency that ASME Code Section III Interpretation III-1-10-20 on the use of mechanical plugs, if used as written, may not meet all the requirements of ASME Section XI. The current wording of this Interpretation is such that a Certificate Holder could do less than the current requirements of ASME Section XI, IWA-4713, Heat Exchanger Tube Plugging by Expansion. Further, it was deemed unacceptable by the ASME Section XI Code Committee to install mechanical plugs in an ASME Section III Component that does meet the qualification requirements of the ASME Section XI process. Thus, an ASME Section III Code Case was proposed to be used in place of the interpretation.

Currently TVA WBN Unit 2 Steam Generators have mechanical plugs installed under Code Interpretation III-1-10-20. These Steam Generators require hydrostatic testing and post hydrostatic test non-destructive examination to complete the ASME N-1 Code Data Report and ASME Stamping. Although the N and NPT Certificates involved with the installation of the Mechanical Plugs correctly referenced and used ASME Code Section III Interpretation III-1-10-20 and meet all the current requirements as applicable of ASME Section XI IWA-4713, use of this interpretation puts final ASME Section III Certification of the Steam Generators at

risk. If this Code Case is not approved for implementation at WBN, all WBN Unit 2 Steam Generator mechanical plugs installed under the Code Interpretation will need to be removed and welded plugs installed.

V. Proposed Alternative and Basis for Use

Pursuant to 10 CFR 50.55a(a)(3)(i), TVA is requesting approval for the use of the provisions of ASME Code Case N-836, "Heat Exchanger Tube Mechanical Plugging, Class 1 Section III, Division 1," on the basis that this alternative will provide an acceptable level of quality and safety for the required quality processes to complete the construction of WBN Unit 2 Steam Generators to the rules and requirements of ASME Section III.

Code Case N-836 would permit the use of the ASME Section XI IWA-4713 for the WBN Unit 2 Class 1 ASME III Division 1 Steam Generators to ensure the rigor of IWA-4713 would be required in lieu of Code Section III Interpretation III-1-10-20.

This Code Case shall be identified in the WBN Unit 2 Steam Generator Design Specification and on the Steam Generator N-1 Code Data Report Forms.

The NRC Staff has not yet reviewed this revised Code Case nor approved its generic use by the industry through the usual process of incorporation into Regulatory Guide 1.84 and incorporation into the 10 CFR 50.55a rule paragraphs.

This Code Case will ensure that the Steam Generator mechanical plugs installed by Westinghouse, the Certificate Holder responsible for the construction of the Class 1 ASME Section III Division 1 Steam Generators at WBN Unit 2, are acceptable to permit ASME Section III N-1 Code Data Report completion and ASME Section III stamping.

VI. Duration of Use of the Proposed Alternative

Application of the provisions of this request will commence upon approval of this relief request and will continue until such time as the WBN Unit 2 Steam Generator ASME N-1 Code Data Reports are completed, Steam Generators are ASME stamped, and the Reactor Coolant System N-5 Code Date Package is completed. Should the NRC impose additional requirements, they will be implemented prior to completion of the WBN Unit 2 Steam Generator ASME N-1 Code Data Reports and the Reactor Coolant System ASME N-5 Code Data Report.

VII. Industry Precedents

Although this would be the first use in ASME Code Section III, the same Westinghouse "Ribbed" plugs that are installed or will be installed in the WBN Unit 2 Steam Generators are installed in many Steam Generators at operating plants. This Westinghouse Alloy 690 "ribbed" mechanical plug is a proven design that meets required Steam Generator operational conditions, and there has not been any observed failures of these plugs in over three decades in the current U.S. and international nuclear plant operating fleet.

VIII. References

1. ASME Boiler and Pressure Vessel Code, Section III, "Rules for Construction of Nuclear Power Plant Components," 1971 Edition plus Summer 1973 Addenda and applicable code interpretations and rulings.

2. ASME Boiler and Pressure Vessel Code, Section III, "Rules for Construction of Nuclear Power Plant Components," 1989 Edition (for Mechanical Tube Plugs only).

3. ASME Inquiry and Interpretation III-1-10-20, "BPV Section III, Subsection NA/NCA and NB/NC/ND-4000 Fabrication (1971 Edition to 2007 Edition, through 2009 Addenda)," May 11, 2010.

4. ASME Boiler and Pressure Vessel Code, Code Case N-474-1, "Design Stress Intensities and Yield Strength Values for UNS N06690 With a Minimum Specified Yield Strength of 35 ksi, Class Z Components Section III, Division 1," March 5, 1990.

5. Westinghouse Design Specification G-679059 Rev. 9, Model D3 Steam Generator.

6. Westinghouse Design Specification 425A33, Revision 1, Ribbed Mechanical Tube Plug for Watts Bar Unit 2, Revision 1, July 2010.

ENCLOSURE 2

Code Case N-836, "Heat Exchanger Tube Mechanical Plugging, Class 1 Section III, Division 1"

Approval Date: October 22, 2013

Code Cases will remain available for use until annulled by the applicable Standards Committee.

Case N-836
Heat Exchanger Tube Mechanical Plugging, Class 1
Section III, Division 1

Inquiry: For heat exchangers that have been in storage for more than 25 yr, prior to completion of construction, may mechanical plugs be used to plug tubes?

Reply: It is the opinion of the Committee that mechanical plugs may be used by an N Certificate Holder to plug tubes of such heat exchangers prior to completion of construction, provided the following requirements are met:

(a) The provisions of Section XI, 2007 Edition with the 2008 Addenda and 2013 Edition, IWA-4713 shall be met, except for IWA-4713.1(a) and IWA-4713.5. All other provisions of Section XI are not applicable.

(b) The mechanical plug's pressure-retaining material shall comply with the requirements of Subsection NB. This material shall meet the requirements of SB-166, UNS N06690.

(c) The following records, in addition to those required by NCA-4134.17, shall be maintained by the Certificate Holder and transferred to the Owner as required by Section III:

(1) plugging procedure specification (PPS)

(2) records of procedure qualification for the plugging method, including the essential variables and results of all tests required by IWA-4713.3

(3) records of performance qualification for each operator, including the PPS, identification, such as number and revision

(4) certified material test reports for the pressure-retaining portion of the installed plugs

(5) identification of all plugged tubes as shown in final drawings for the heat exchanger

(6) results of postinstallation examinations and evaluations

(7) evaluations performed in accordance with IWA-4713.3(a)(4)

(d) The mechanical plugs shall not be removed after the pressure test.

(e) This Case shall be identified in the Design Specification and on the applicable Data Report Form.

ENCLOSURE 3
List of Commitments

1. Application of the provisions of this request will commence upon approval of this relief request and site approval of implementing instructions and will continue until such time as the WBN Unit 2 Steam Generator N-1 Code Data Report and Reactor Coolant System N-5 Code Data Report are completed and signed by the responsible Certificate Holder, or the use of the Code Case is no longer necessary, nor allowed, in accordance with the provisions of the Code Case. Should the NRC impose additional requirements, they will be implemented prior to completion of the Reactor Coolant System N-5 Code Data Report.