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

October 30, 2008

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Mail Stop: OWFN P1-35
Washington, D.C. 20555-0001

In the Matter of) Docket No. 50-391
Tennessee Valley Authority)

WATTS BAR NUCLEAR PLANT (WBN) UNIT 2 - PRESERVICE INSPECTION PROGRAM PLAN AND REQUEST FOR RELIEF NO. WBN-2/PDI-4

Reference 1: TVA letter dated January 29, 2008, "Watts Bar Nuclear Plant (WBN) - Unit 2 - Regulatory Framework for the Completion of Construction and Licensing Activities for Unit 2"

Pursuant to 10 CFR 50.55a (a)(3)(i), TVA is submitting a relief request for the WBN Unit 2 Preservice Inspection (PSI) Program.

Enclosure 1 provides relief request WBN-2/PDI-4, which proposes an alternative to ASME Section XI, paragraph IWA-2232 of the ASME Section XI 2001 Edition through the 2003 Addenda. This request proposes to use Appendix VIII and the Performance Demonstration Initiative (PDI) methodologies for performance of the ultrasonic examination of the reactor pressure vessel shell-to-flange welds in lieu of the requirements of Appendix I and the associated Article 4 of ASME Section V. The proposed alternative provides an acceptable level of quality and safety as required by 10 CFR 50.55a (a)(3)(i).

Enclosure 2 provides an information copy of WBN Unit 2's PSI program. In Reference 1, TVA provided an "Action Required for Licensing" to submit the WBN Unit 2 PSI Program on or before October 30, 2008. The PSI Program Plan identifies the areas subject to inspection, responsibilities, provisions for accessibility and inspectability, examination methods and procedures, frequency of inspections, record keeping and report requirements, evaluation of inspection results, and subsequent disposition of evaluation results. The ASME Boiler and Pressure Vessel Code, Section XI, 2001 Edition through the 2003 Addenda was used to develop the WBN Unit 2 PSI program. The Authorized Nuclear Inservice Inspector has reviewed the WBN Unit 2 PSI program. The quantity of individual items listed in the summary tables for "total population" and "required examination" will be established as part of WBN Unit 2 construction completion.

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Note that this request for relief is similar to the request granted to WBN Unit 1 during the First and Second 10 Year Intervals submitted most recently in a letter from TVA to the NRC dated February 7, 2007, and approved by the NRC in a letter dated February 29, 2008 (ADAMS Accession No. ML080630679). This relief request is numbered as WBN-2/PDI-4 for consistency across the units.

TVA requests NRC approval of relief request WBN-2/PDI-4 by June 2009 to support the PSI schedule.

If you have any questions, please contact me at (423) 365-2351.

Sincerely,

M. Bajestani

Masoud Bajestani
Watts Bar Unit 2 Vice President

Enclosures
cc: See page 3

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Enclosure 1

TENNESSEE VALLEY AUTHORITY
WATTS BAR NUCLEAR PLANT (WBN) UNIT 2
AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME) SECTION XI,
REQUEST FOR RELIEF
WBN-2/PDI-4

TVA requests approval for use of an alternative methodology to that contained in ASME Section XI, paragraph IWA-2232 of the ASME Section XI 2001 Edition through the 2003 Addenda, for the preservice examinations at WBN Unit 2. Specifically, this request is for use of Appendix VIII and Performance Demonstration Initiative (PDI) methodologies for performance of the ultrasonic (UT) examination of reactor pressure vessel (RPV) shell-to-flange welds in lieu of the requirement of Appendix I and the associated Article 4, ASME Section V.

EXECUTIVE SUMMARY:

In accordance with 10 CFR 50.55a(a)(3)(i), TVA is requesting relief from the specific requirement to perform the volumetric examination of the RPV circumferential shell-to-flange weld at WBN Unit 2 in accordance with the requirement of Appendix I of Section XI. In lieu of the requirements of Appendix I and its associated sub-requirements of Article 4 of Section V, WBN Unit 2 will use the techniques, personnel, and equipment qualified to meet the requirements of ASME Section XI Appendix VIII, Supplements 4 and 6 of the 2001 Edition through the 2003 Addenda, as administered by the Electric Power Research Institute's (EPRI) PDI processes. WBN plans to use the proposed alternative for the preservice RPV examinations to be performed prior to commercial operation. This proposed alternative represents the best available methodology in qualification of equipment and personnel performing UT examinations and uses an examination process that will provide the highest practical quality and greatest amount of coverage for the performance of the shell-to-flange weld examinations. As such, the proposed alternative methodology provides an acceptable level of quality and safety. In addition, the approval of this relief will result in a reduction of the cost of performing the examinations by precluding the use of two different sets of examination equipment and will result in lower personnel radiation exposure during future examination by allowing the same methodology for the shell-to-flange weld.

Note that this request for relief is similar to the request granted to WBN Unit 1 during the First and Second 10 Year Intervals submitted most recently in a letter from TVA to the NRC dated February 7, 2007, and approved by the NRC in a letter dated February 29, 2008 (ADAMS Accession No. ML080630679).

SYSTEM/COMPONENT(S) FOR WHICH RELIEF IS REQUESTED:

ASME Code Class 1 RPV Upper Vessel Shell-to-Flange Welds, Table IWB-2500-1 Category B-A, Item Number B1.30.

APPLICABLE CODE EDITION AND ADDENDA FOR THE GIVEN EXAM:

The applicable ASME Section XI code edition and Addenda of Record for WBN Unit 2 PSI is the 2001 Edition through 2003 Addenda with applicable amendments from 10 CFR 50.55a.

CODE REQUIREMENTS FROM WHICH RELIEF IS REQUESTED:

In accordance with ASME Section XI, paragraph IWA-2232, "Ultrasonic examinations shall be conducted in accordance with Appendix I."

Further, in accordance with Appendix I, paragraph I-2110(b), "Ultrasonic examination of reactor vessel-to-flange welds, closure head-to-flange welds, and integral attachment welds shall be conducted in accordance with Article 4 of Section V, except that alternative examination beam angles may be used."

RELIEF REQUESTED:

Pursuant to 10 CFR 50.55a(a)(3)(i), TVA requests relief from performing the designated vessel shell-to-flange weld examination in accordance with the requirements of ASME Section XI, paragraph IWA-2232, Appendix I, and the associated Article 4 of Section V methodology in accordance with paragraph I-2110(b).

BASIS FOR RELIEF:

In accordance with ASME Section XI, Subarticle IWA-2232, TVA is required to perform UT examinations of the RPV upper shell-to-flange welds using Section XI, Appendix I, which in turn requires the use of the nondestructive examination methodologies and processes of ASME Section V, Article 4. In addition, the guidance of RG-1.150, Revision 1, was historically applied. The above-listed weld is the only circumferential shell weld in the RPV that is not examined in accordance with the requirements of ASME Section XI, Appendix VIII, as mandated in 10 CFR 50.55a. This rule change mandated the use of ASME Section XI, Appendix VIII, Supplements 4 and 6, for the conduct of RPV examinations. Recent EPRI PDI coordination meetings between the PDI committee members and the NRC Staff representatives have indicated that the NRC Staff expects licensees to submit requests for relief to use the more technically advanced Appendix VIII/PDI processes for the shell-to-flange weld exams in lieu of the Section XI, Appendix I, and its associated Section V, Article 4 processes.

PROPOSED ALTERNATIVES

TVA proposes to use the procedures, personnel, and equipment qualified to meet the requirements of ASME Section XI Appendix VIII, Supplements 4 and 6, as administered by EPRI's PDI, to conduct the required vessel-to-flange weld examinations.

JUSTIFICATION FOR GRANTING RELIEF:

ASME Section V, Article 4, describes the required techniques to be used for the UT examination of welds in ferretic pressure vessels with wall thicknesses greater than 2 inches. The techniques were first published in ASME Section V in the 1974 Edition, Summer 1975 Addenda. The calibration techniques, recording criteria, and flaw sizing methods are based upon the use of a distance-amplitude-correction curve (DAC) derived from machined reflectors in a basic calibration block. UT examinations performed in accordance with Section V, Article 4, used recording thresholds of 50 percent DAC for the outer 80 percent of the required examination volume and 20 percent DAC from the clad/base metal interface to the inner 20 percent margin of the examination volume. Indications detected in the designated exam volume portions with amplitudes below these thresholds were therefore not required to be recorded. Use of the Appendix VIII/PDI processes would enhance the quality of the examination results reported because the detection sensitivity is more conservative and the procedure requires the examiner to evaluate all indications determined to be flaws regardless of their associated amplitude. The recording thresholds in Section V, Article 4, requirements and in the guidelines of RG-1.150, Revision 1, are generic and do not take into consideration such factors as flaw orientation, which can influence the amplitude of responses.

The EPRI Report NP-6273, "Accuracy of Ultrasonic Flaw Sizing Techniques for Reactor Pressure Vessels," dated March 1989, established that UT examination flaw sizing techniques based on tip diffraction are the most accurate. The qualified prescriptive-based UT examination procedures of ASME Section V, Article 4, have been applied in a controlled process with mockups of RPVs which contained real flaws and the results statistically analyzed according to the screening criteria in Appendix VIII of ASME Section XI. The results show that the procedures in Section V, Article 4, are less effective in detecting flaws than procedures qualified in accordance with Appendix VIII as administered by the PDI processes. Appendix VIII/PDI qualification procedures use the tip diffraction techniques for flaw sizing. The proposed alternative Appendix VIII/PDI UT examination methodology uses analysis tools based upon echo dynamic motion and tip diffraction criteria that has been validated and is considered more accurate than the Section V, Article 4 processes.

UT examination performed in accordance with the Section V, Article 4 processes requires the use of beam angles of 0°, 45°, 60°, and 70° with recording criteria that precipitates equipment changes. Having to perform these process changes is time consuming and results in increased radiation exposure for the examination personnel during post-operational examinations. Complying with the specific ASME Section XI, Appendix I requirements for the RPV circumferential shell-to-flange weld when the data is obtained using a less technically advanced process results in an examination that does not provide a compensating increase in quality and safety for the higher costs and personnel exposures involved.

For future RPV shell-to-flange weld examinations, TVA does not anticipate any less coverage than the required minimum of greater than 90 percent. However, if any such limitations are encountered during the conduct of the examinations, separate individual relief requests will be submitted, as needed.

Procedures, equipment, and personnel qualified through the Appendix VIII, Supplements 4 and 6 PDI programs have shown to have a high probability of detection of flaws and are generally considered superior to the techniques employed earlier for RPV examinations, resulting in increased reliability of RPV inspections. Therefore, the proposed alternative methodologies provide an acceptable level of quality, and safety is provided with the proposed alternative methodologies. Accordingly, approval of this alternative evaluation process is requested pursuant to 10 CFR 50.55a(a)(3)(i).

IMPLEMENTATION SCHEDULE AND DURATION:

Upon approval by the NRC Staff, TVA will implement the provisions of this request for the PSI for WBN Unit 2.

PRECEDENTS

This request for relief is similar to the request granted to WBN Unit 1 during the First and Second 10 Year Intervals submitted most recently in a letter from TVA to the NRC dated February 7, 2007, and approved by the Staff in a letter dated February 29, 2008 (ADAMS Accession No. ML080630679).

Enclosure 2

WBN Unit 2
PSI Program Plan

Preservice Inspection Program Plan

Watts Bar Nuclear Plant Unit 2

Tennessee Valley Authority
1101 Market Street
Chattanooga, TN 37402-2801

Watts Bar Nuclear Plant
P.O. Box 2000
Spring City, TN 37381

Docket Number – 50-391
Construction Permit No. CPPR-92, Issued January 23, 1973
Extension Issued October 24, 2000

Program No: WBN-2 PSI Rev. 1

Effective Date: October 23, 2008

Responsible Organization: Inspection Services Organization

Prepared by: E. Lynn McClain L. McClain 10/15/08

Approved by: Edward Turner 10/20/08

Revision Log

Revision Number	Effective Date	Pages Affected	Description of Revision
0	7-25-08	All	Intial Issue
1	10-23-08	19, 20, 21 & 53-56	Incorporate 10CFR50.55a requirements for Components Containing Alloy 600/82/182. Editorial corrections as marked.

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1.0 SUMMARY

As the owner Tennessee Valley Authority (TVA) had established the original Preservice Inspection (PSI) program at Watts Bar Nuclear Plant (WBN) Unit 2 to perform and document the inspection activities in accordance with Technical Instruction (TI) 50B, ASME Section XI Preservice Inspection Program. The latest working revision of TI-50B, Revision 11 dated September 29, 1989 was placed on "Administrative Hold" and on September 04, 1997 Revision 12 was issued to "Cancel" the document with that being the status of the original PSI program. This document will be reference to establish the present document as needed.

In a letter dated January 29, 2008, Tennessee Valley Authority (TVA) to U.S. Nuclear Regulatory Commission (NRC) and In the Matter of Docket Number 50-391 Tennessee Valley Authority, "WATTS BAR NUCLEAR PLANT (WBN) – UNIT 2 – REGULATORY FRAMEWORK FOR THE COMPLETION OF CONSTRUCTION AND LICENSING ACTIVITIES FOR UNIT 2", it states in Enclosure 1, "TVA Responses to NRC's Request of Information Needed for Licensing Review Reconstitution", item 4.b.iv, is a commitment to provide a revised Preservice Inspection Program.

The Final Safety Analysis Report (FSAR) for WBN-2 is a "red-lined" version to depict/demonstrate how the FSAR will appear at fuel load, as reference in TVA to NRC letter dated February 8, 2008. Based on FSAR Sections 5.2.8, 5.4.4.4 and 6.6, components subject to examination and/or test are components containing water, steam or radioactive waste shall be examined and tested in accordance with ASME Section XI as required by 10CFR50.55a(g), except where specific written relief has been requested. FSAR Section 5.2.8 is for TVA Class A (ASME Code Class 1) and Section 6.6 for TVA Class B (ASME Code Class 2) and C and D (ASME Code Class 3) components.

This document is being prepared to re-establish the requirements for the Preservice Inspection (PSI) Program Plan at WBN-2, as stated in the previous paragraph. This program plan follows the inspection requirements of 10CFR50.55a(g)(2) which requires that components, including component supports, that are classified as ASME Code Class 1 and 2 must be designed and be provided with access to enable the performance of inservice examination of such components and supports and must meet the preservice examination requirements set forth in Editions and Addenda of Section XI of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code or optional Code Cases listed in NRC Regulatory Guide 1.147 that are incorporated by reference in 10CFR50.55a(b), in effect six month before the date of issuance of the construction permit.

The examination categories and requirements for Class 1 components will be in accordance with subsection IWB of ASME Section XI. The examination categories and requirements for Class 2 and 3 components will be in accordance with subsections IWC and IWD of ASME Section XI to the extent practicable. (Watts Bar design was established prior to the publication of subsection IWC and IWD of Section XI; however, accessible Class 2 and 3 components will be examined in accordance with the guidelines of IWC and IWD of Section XI, as stated in FSAR Sections 6.2.2 and 6.2.5.

During the completion of construction and before startup of WBN-2, the quantity of the individual items listed in the summary tables as "total population" and "required examination" of

IWB, IWC, IWD and IWF will be established as an ongoing process. For components listed in the summary tables where the "total population" and the "required examination" number is not known the number may be noted as "TBD" (To Be Determined) or to establish an amount the WBN Unit 1 total may be used and noted with an asterisk (*) until the actual population of Unit 2 is determined. The "total population" and "required examinations" shall be established and documented in the preservice summary report, which is required to be prepared and submitted prior to commercial service.

Other inspection requirements and/or commitments made by WBN Unit 2 in the regulatory framework letter maybe incorporated or reference in this document as augmented inspection activities. Augmented inspection requirements or commitments, on ASME class components, may be included or referenced in this program plan for mutual effort toward achieving the intent of the inspection activities.

2.0 CODE APPLICABILITY

2.1 The rules of ASME Section XI are a mandatory program of examinations, testing and inspections for evidence of adequate safety to manage deterioration and aging effects.

2.2 TVA as the owner has the responsibilities to develop a PSI Program Plan to establish a baseline of examinations to demonstrate conformance of the requirements to ASME Section XI for Inservice Inspection activities throughout the life of the plant. These responsibilities include, but are not limited to provision of access in the design and arrangement of the plant to conduct the examination and test, development of plans and schedules, including detailed examination and testing procedures for filing with the enforcement and regulatory authorities having jurisdiction at the site, conduct of the program for examination and tests, and recording of the results of the examination and tests, evaluation of the examination and test results, including corrective actions required and the actions taken.

2.3 As stated above, the edition of ASME Section XI is established based on the referenced code edition and addenda of 10CFR 50.55a, that is in effect six month before the date of issuance of the construction permit. 10CFR50.55a Codes and Standards, dated February 27, 2008, specifically 10CFR50.55a (b)(2) which references Section XI through 2003 Addenda. Therefore, the 2001 Edition through the 2003 Addenda of Section XI, Division 1, Inservice Inspection of Nuclear Power Plant Components is incorporated by reference and will be used to develop this program plan and provide the requirements for examination, testing and inspection of completed components and systems, subject to the listed limitations and modifications referenced throughout this document.

2.4 Subsequent editions and addenda of ASME Section XI which are incorporated by reference in 10CFR50.55a may be used, subject to documentation as describe in Regulatory Issue Summary 2004-12 and the applicable related requirements, limitations and modifications.

2.5 The Authorized Nuclear Inservice Inspector(s) (ANII) are assigned to review, verify and certify that the responsibilities and the mandatory requirements of ASME Section XI as written in this document are met.

2.5.1 The Inspector shall review the initial program plan, prior to the start of preservice inspections as well as revisions to the program plan. Also, the Inspector shall submit a report to the program owner documenting the review of the initial program plan and each revision thereafter. The review shall cover the features that are affected by the requirements of Section XI and this document, as applicable. Shop and field preservice examinations are exempt from prior review.

2.5.2 The Inspector shall verify that the required examinations of this document, have been performed and the results recorded. Also, the Inspector shall verify that the nondestructive examination methods used follow the techniques specified and that the examinations are performed in accordance with written qualified procedures and by personnel qualified in accordance with the requirements of ASME Section XI. In addition, the Inspector has the prerogative to require re-qualification of any examiner or procedure when they have reason to believe the requirements are not met.

2.5.3 The Inspector shall perform any additional investigations necessary to verify that all applicable requirements of this program plan have been met.

2.5.4 The Inspector shall certify the examination records after verifying that the requirements of this program plan have been met and that the records are correct.

2.5.5 WBN-2 shall arrange for the Inspector to have access to all parts of the plant as necessary to make the required inspections and that the Inspector shall be notified and kept informed in advance when the components will be ready for inspection.

2.6 Application of this Code and Code of Record begins when the requirements of the Construction Code have been satisfied.

3.0 DESCRIPTION

3.1 SCOPE

This PSI Program Plan identifies the areas subject to inspection, responsibilities, provisions for accessibility and inspectability, examination methods and procedures, frequency of inspections, record keeping and report requirements, evaluation of inspection results and subsequent disposition for results of evaluations.

3.2 JURISDICTION

The jurisdiction of this PSI Program Plan covers the systems that have met all the requirements of the Construction Code, commencing when the construction code requirements have been met, irrespective of physical location. When portions of systems are completed at different times jurisdiction of this division shall cover only those portions for which all of the construction requirements have been met. Prior to installation, an item that has met all requirements of the construction code may be corrected using the rules of either the construction code or this division, as determined by WBN-2.

3.3 RESPONSIBILITY

The responsibilities of maintaining this PSI Program Plan are included in NGDC PP-15.

3.4 APPLICATION

Components identified in this program plan for examination include items such as the reactor vessel, reactor pressure vessel internals (including the core support structure), steam generators, pressurizer, piping systems (including their valves, pumps and heat exchangers) and all respective supports to the components.

3.4.1 The following items are part of the Section XI Preservice Inspection requirements, but are not included in this document:

3.4.1.1 The Repair/Replacement (R/R) Program Plan, when implemented, will be utilized to perform the required activities for ASME Section XI components. The Repair/Replacement Program Plan is in accordance with Watts Bar Procedures and R/R work activities packages, with the following limitations and modifications as outlined in 10CFR50.55a.

1. 10CFR50.55a(b)(2)(xii), Underwater Welding, will be addressed in the Repair/Replacement Programs, if needed.
2. 10CFR50.55a(b)(2)(xiii), Mechanical clamping devices will be addressed in the Repair/Replacement Programs, if needed.
3. 10CFR50.55a(b)(2)(xvii), Reconciliation of Quality Requirements is addressed in the Repair/Replacement Program, if needed.
4. 10CFR50.55a(b)(2)(xxiii), Evaluation of Thermally Cut Surfaces in IWA-4461.2 will be addressed in the Repair/Replacement Program, if needed.
5. 10CFR50.55a(b)(2)(xxv), Mitigation of Defects by Modification will be addressed in the Repair/Replacement Program, if needed.
6. 10CFR50.55a(b)(2)(xxvi), Pressure Testing Class 1, 2,and 3 Mechanical Joints of IWA-4540(c) of the 1998 Edition must be applied and will be addressed in the Repair/Replacement Program as described, if needed.

3.4.1.2 The requirements of Examination Category B-P, C-H and D-B, All Pressure Retaining Components for System Leakage Tests, are not required prior to initial plant startup. A System Pressure Test Program Plan and Schedule will be developed as required to perform the examination for systems and components as outlined in ASME Section XI, Articles IWA-5000, IWB-5000, IWC-5000 and IWD-5000 for all Class 1, 2, and 3 components, with the limitations and modifications as outlined in 10CFR50.55a for the inservice interval requirements.

3.4.1.3 The IWB requirements of Steam Generator Tubing of Examination Category B-Q, regarding the extent and frequency of the examination, is governed by Technical Specification and documented in the Steam

Generator Tubing Program Plan and Schedule as addressed in 10CFR50.55a(b)(2)(iii).

3.4.1.4 The IWF-5000 requirements for preservice examination and tests of snubber is governed by ASME/ANSI OM, Part 4, 1987 with OMa-1988, using the VT-3 visual examination method. As an optional requirements, per 10CFR50.55a(b)(3)(v), Subsection ISTD of the ASME/ANSI OMb 2003 code may be use to provide inspection requirements for examinations and tests of snubbers by making appropriate changes to their technical specifications or licensee-controlled documents. Examinations must be performed using the VT-3 visual examination method.

3.4.1.5 The IWE requirements for Class MC and Metallic Liners of Class CC components are documented in the IWE Program Plan and Schedule. The requirements will be utilized to perform the required examination as addressed by Subsection IWE, with limitations and modifications outlined in 10CFR50.55a(b)(2)(ix) and subparagraphs (A), (B), and (F) through (I).

3.4.1.6 The IWL requirements for Class CC Concrete Components is defined at WBN-2 as a concrete structural slab that is covered by a liner and a concrete floor making it inaccessible for examination and therefore exempt from examination in accordance with IWL-1220. The remaining Shield Building wall is a reinforced concrete structure similar in shape to the steel containment vessel but is not referred to as a concrete containment under pressure. However, the concrete structural slab (containment floor) is subject to the repair/replacement requirements of Article IWL of ASME Section XI.

3.5 CLASSIFICATION AND BOUNDARIES

3.5.1 A list of flow diagrams pertaining to the systems boundaries indicating the TVA Class A, B, C and D or ASME Class 1, 2 and 3 systems, structures and components required to be examined is included in Section 11.

3.5.2 A list of weld and support location drawings based on the flow diagram boundaries and utilized for component identification and location within those boundaries is also included in Section 11.

3.5.3 The rules of IWB shall be applied to those components that are classified ASME Class 1 or TVA Class A.

3.5.4 The rules of IWC shall be applied to those components that are classified ASME Class 2 or TVA Class B.

3.5.5 The rules of IWD shall be applied to those components that are classified ASME Class 3 or TVA Class C or D.

3.5.6 The requirements of IWF shall be applied to component supports classified ASME Class 1, 2 and 3 or TVA Class A, B, C and D as describe above.

3.5.7 Optional construction of a component within a system boundary to a classification higher than the minimum class established in the component Design Specification shall not affect the overall system classification by which the applicable rules are determined.

3.5.8 Where all components within the system boundary or isolable portions of the system boundary are classified to a higher class than required by the group classification criteria, the rules of the higher classification may be applied, provided the rules of the higher classification apply in their entirety.

3.5.9 The portion of piping that penetrates a containment vessel, which is required by Section III to be designed to Class 1 or Class 2 rules for piping and which may differ from the classification of the balance of the piping system, need not affect the overall system classification.

3.5.10 If a system safety criteria permits a system to be nonnuclear safety class and Watts Bar optionally classifies and constructs that system, or portion thereof, to Class 2 or Class 3 requirements, the application of the rules is at the option of Watts Bar.

3.6 ACCESSIBILITY

Provisions for accessibility shall include the following considerations:

3.6.1 Design considerations other than access provisions may be needed for specific components to render preservice/inservice inspections practical, such as surface finish of components subject to crud or corrosion product buildup, material selection to minimize activation in service and shielding from irradiation effects.

3.6.2 Access for the Inspector, examination personnel, and equipment necessary to conduct the examinations shall be provided.

3.6.3 Sufficient space for removal and storage of structural members, shielding and insulation shall be provided.

3.6.5 Installation and support of handling machinery where required to facilitate removal, disassembly and storage of equipment, components and other materials shall be provided.

3.6.4 Performance of examinations alternative to those specified in the event structural defects or indications are revealed that may require such alternative examinations, when necessary.

3.6.5 Necessary operations associated with repair/replacement activities shall be performed.

3.7 REFERENCED STANDARDS AND SPECIFICATIONS

When standards and specifications are referenced, their revision date or indicator shall be as listed in ASME Section XI, 2001 Edition through 2003 Addenda, specifically Table IWA-1600-1.

3.8 EXAMINATION METHODS

ASME Section XI identifies three types of examinations to perform inspections as visual, surface and volumetric. The actual examination method is defined and the techniques used are described in the legend below:

Visual (VT), an examination method used to evaluate an item by observation.

VT - 1 Detection of Surface Conditions
VT - 2 Evidence of Leakage
VT - 3 General Mechanical and Structural Conditions

Surface (Sur), an examination method used to detect the presence of discontinuities on the surface of the material.

PT - Liquid Penetrant
MT - Magnetic Particle
ET - Eddy Current

Note: 10CFR50.55a(b)(2)(xxii), prohibits the use of an ultrasonic examination method for surface examination as allowed by IWA-2220.

Volumetric (Vol), an examination method used to detect the presence of discontinuities throughout the volume of material.

UT - Ultrasonic
RT – Radiography

3.8.1 The examination method or methods to be used on a component are specified in the summary tables in Section 4.0, 5.0, 6.0 and 7.0 for ASME Class 1, 2 and 3 components and/or parts.

3.8.2 When preparation of a surface for nondestructive examination is required, the preparation shall be by a mechanical method. Such surfaces shall be blended into the surrounding area as may be required to perform the examination. The wall thickness shall not be reduced below the minimum thickness required by design.

3.8.3 All the above nondestructive examinations will be performed using specific techniques and procedures that are identified in ASME Section XI, or alternative examinations that are demonstrated to be equivalent or superior to those identified. The provision for substitution of these alternative examination methods, combination of methods, or newly developed techniques as outlined in IWA-2240 will utilize the 1997 Addenda of Section XI as stated in 10CFR50.55a(b)(2)(xix).

3.8.4 The extent of exam and examination requirements for volume or area coverage, as required in the summary tables of this document for each component, shall be documented on the applicable examination record and shall identify both the cause and percentage of reduced examination coverage. Reference to Code Case N-460 when the entire examination volume or area cannot be examined due to interference by another component or part geometry

3.9 NONDESTRUCTIVE EXAMINATION PERSONNEL

Personnel performing nondestructive examinations to this program plan shall be qualified and certified using a written practice prepared in accordance with ASME Section XI, as modified by 10CFR50.55a(b)(2)(xiv), (xv), (xvi), (xviii) and (xxiv). The written practice shall control the personnel requirement for nondestructive examination for this document and is outlined with the additional provisions of 10CFR50.55a regarding personnel qualification and certification as noted below.

3.9.1 10CFR50.55a(b)(2)(xiv), Appendix VIII personnel qualification.

3.9.2 10CFR50.55a(b)(2)(xv), Appendix VIII specimen set and qualification requirements.

3.9.3 10CFR50.55a(b)(2)(xvi), Appendix VIII single side ferritic vessel and piping and stainless steel piping examination.

3.9.4 10CFR50.55a(b)(2)(xviii), Certification of NDE personnel.

3.9.5 10CFR50.55a(b)(2)(xxiv), Incorporation of the Performance Demonstration Initiative and Addition of Ultrasonic Examination Criteria.

3.10 INSPECTION INTERVAL

The Preservice Inspection Program is prepared in accordance with Program B of ASME Section XI.

3.11 WELD REFERENCE SYSTEM

A weld reference system, such as N-GP-8 Weld Reference System, will be established during the preservice examinations and will continue to be used during the Inservice Inspection process. This applies to all components inspected in the Class 1, 2 and 3 systems, including piping, vessel and other components, where practical.

3.12 PROGRAM PLAN AND SCHEDULES

The program plan summary tables contained in Sections 4.0, 5.0, 6.0 and 7.0 are by examination category as outlined for ASME Section XI components.

3.12.1 For each examination category, the summary tables identify the item number, component or part, compliance to the Watts Bar Unit-2, examination method, examination figure, extent of exam, acceptance standard, total population and required examinations for each category item, total examination in the category and notes pertaining to the items. It should be noted that the total population and required examinations may change during the preservice examination period due

to changes, modifications and actual walkdowns of the systems but will be document for the summary report for the initial inservice inspection activities.

3.12.2 The program schedule, which is directly related to the summary tables of the program plan, will list the specific identification number of components or parts (welds, bolts, studs or other items) with their, code category and item numbers, method of exam, area to be examined as a minimum and any other essential information.

3.12.3 During the PSI activities a list shall be maintained of the components examined and as a minimum the component or part number, the report number, acceptance and/or evaluation process, percentage of examination volume or area complete, with an explanation of 90% or less coverage, if applicable and reported to the program owner.

3.13 EVALUATION OF RECORDED CONDITIONS

Evaluation shall be made of flaws detected during the examinations as required by ASME Section XI, Articles IWB-3000 for Class 1 components, IWC-3000 for Class 2 components, and IWD-3000 for Class 3 components and IWF-3000 for component supports. Flaws detected shall be sized by bounding rectangle or square the flaw for the purpose of description and dimensioning as described in Section XI, IWA-3300, Flaw Characterization, or IWA-3400, Linear Flaws. All flaws shall be evaluated, after they have been characterized, by comparing the results with the acceptance standard specified in the summary tables.

3.14 RECORDS AND REPORTS

Examination records and reports shall be filed and maintained in a manner that will allow access for future reference. The record keeping and reporting requirements in this program meets the requirements of IWA-6000 of Section XI. These activities are requirements in addition to being implemented by Watts Bar procedures for, Record Control.

3.15 IWB REQUIREMENTS AND EXEMPTIONS

3.15.1 Subsection IWB provides the rules and requirements for Class 1 pressure retaining components and their integral attachments.

3.15.2 Preservice examinations required to be performed and completed in the Class 1 systems are extended to include essentially 100% of the pressure retaining welds in all non-exempt components prior to initial plant startup, except examination category B-P, the VT-3 requirements for the internal surfaces of categories B-L-2 and B-M-2 and category B-O shall be extended to include only the welds in the outer peripheral of the control rod housings.

3.15.3 Component requirements shall be examined as specified listed in the Summary Tables in Section 4.0 of this document. 10CFR50.55a provides the following requirements in lieu of and in addition to the requirements contained within this document:

3.15.3.1 10CFR50.55a(b)(2)(xi), states that licensees may not apply IWB-1220, Components Exempt from Examination, but instead shall apply IWB-1220, 1989 Edition. Reference paragraph 3.15.6.

3.15.3.2 10CFR50.55a(b)(2)(xxi) requires inclusion of Items B3.120 and B3.140 examination requirements of the 1998 Edition be addressed.

3.15.4 Shop and field examinations may serve in lieu of on-site preservice examination provided the following:

3.15.4.1 In the case of the vessels only, the examination are performed after the hydrostatic test required by Section III.

3.15.4.2 Such examinations are conducted under conditions and with equipment and techniques equivalent to those that are expected to be employed for subsequent inservice examinations.

3.15.4.3 The shop and field examination records are or can be documented and identified in a form consistent with those required for records management.

3.15.5 Evaluation of Examination Results shall be in accordance with the Acceptance Standard requirements listed in the Summary Tables of Section 4.0 for IWB Class 1 components.

3.15.6 The following components or parts of components are exempt from the volumetric and surface examination requirements as noted in the 1989 Edition of Section XI as referenced in 10CFR50.55a(b)(2)(xi):

3.15.6.1 Piping of NPS 1 and smaller, except for steam generator tubing;

3.15.6.2 Components and their connections in piping of NPS 1 and smaller;

3.15.6.3 Reactor vessel head connections and associated piping, NPS 2 and smaller, made inaccessible by control rod drive penetrations.

Note: Piping is defined as having a cumulative inlet and cumulative outlet pipe cross-sectional area neither of which exceeds the nominal outside diameter cross-sectional area of the designated size.

3.16 IWC REQUIREMENTS AND EXEMPTIONS

3.16.1 Subsection IWC provides the rules and requirements for Class 2 pressure retaining components and their integral attachments.

3.16.2 The preservice inspection requirements shall apply to those Class 2 components initially selected for examination (except category C-H) and not exempt or

excluded from inservice examination, shall be performed and completed prior to initial plant startup.

3.16.3 Components shall be examined as specified in the Summary Tables for IWC listed in Section 5.0 of this document.

3.16.4 Shop and field examinations may serve in lieu of on-site preservice examination provided the following:

3.16.4.1 In the case of the vessels only, the examination are performed after the hydrostatic test required by Section III.

3.16.4.2 Such examinations are conducted under conditions and with equipment and techniques equivalent to those that are expected to be employed for subsequent inservice examinations.

3.16.4.3 The shop and field examination records are or can be documented and identified in a form consistent with those required for records management.

3.16.5 The following Class 2 components or parts of components are exempt from the volumetric and surface examination requirements.

3.16.5.1 Class 2 components within RHR, ECC and CHR systems or portions of systems.

(a) For systems, except the High Pressure Safety Injection;

(1) Class 2 piping NPS 4 and smaller;

(2) Class 2 vessels, pumps and valves and their connections in piping NPS 4 and smaller;

(b) Class 2 High Pressure Safety Injection portion;

(1) Class 2 piping NPS 1 ½ and smaller;

(2) Class 2 vessels, pumps, and valves and their connections in piping NPS 1 ½ and smaller

(c) Class 2 vessels piping, pumps, valves, other components connections of any size in statically pressurized, passive (i.e. no pumps) portions (i.e., Safety Injection Tanks (SITs) and associated discharge piping);

(d) Class 2 piping and other components of any size beyond the last shutoff valve in opened ended portions of systems that do not contain water during normal plant operating conditions.

3.16.5.2 Class 2 components within systems or portions of systems other than RHR, ECC and CHR systems.

(a) For Class 2 systems, except for the Auxiliary Feedwater System.

(1) Class 2 piping NPS 4 and smaller;

(2) Class 2 vessels, pumps and valves and their connections in piping NPS 4 and smaller;

(b) Class 2 Auxiliary Feedwater Systems.

(1) Class 2 piping NPS 1 ½ and smaller;

(2) Class 2 vessels, pumps, and valves and their connections in piping NPS 1 ½ and smaller

(c) Class 2 vessels piping, pumps, valves, other components connections of any size in systems that operate (when the system function is required) at a pressure equal to or less than 275 psig and at a temperature equal to or less than 200° F (93°C).

(d) Class 2 piping and other components of any size beyond the last shutoff valve in opened portions of systems that do not contain water during normal plant operating conditions.

3.16.5.3 Class 2 components that are inaccessible due to being encased in concrete, buried underground, located inside a penetration, or encapsulated by guard pipe.

3.16.6 Evaluation of examination results shall be in accordance with the acceptance standard requirements listed in the Summary tables of Section 5.0 for IWC Class 2 components.

Note: Piping is defined as having a cumulative inlet and cumulative outlet pipe cross-sectional area neither of which exceeds the nominal outside diameter cross-sectional area of the designated size.

3.17 IWD REQUIREMENTS AND EXEMPTIONS

3.17.1 Subsection IWD provides the rules and requirements for Class 3 pressure retaining components and their integral attachments.

3.17.2 The preservice inspection requirements, with the exception of category D-B, shall be performed and documented completely once prior to initial plant startup and shall apply to pressure retaining components and their integral attachments on Class 3 systems in support of the following functions:

(a) reactor shutdown
(b) emergency core cooling
(c) containment heat removal
(d) atmosphere cleanup
(e) reactor residual heat removal
(f) residual heat removal from spent fuel storage pool

3.17.3 Components required to be examined are specified in the Summary Tables for IWD listed in Section 6.0 of this document.

3.17.4 The following Class 3 components or parts of components are exempted from the VT-1 visual examination requirements.

(a) piping NPS 4 and smaller

(b) vessels, pumps, and valves and their connections in piping NPS 4 and smaller

(c) components that operate at a pressure of 275 psig or less and at a temperature of 200°F or less in systems or portions of systems whose function is not required in support of reactor residual heat removal, containment heat removal and emergency core cooling

(d) welds or portions of welds that are inaccessible due to being encased in concrete, buried underground, located inside a penetration or encapsulated by guard pipe.

3.17.5 Evaluation of examination results shall be in accordance with the acceptance standard requirements listed in the Summary tables of Section 6.0 for IWD Class 3 components.

Note: Piping is defined as having a cumulative inlet and cumulative outlet pipe cross-sectional area neither of which exceeds the nominal outside diameter cross-sectional area of the designated size.

3.18 IWF REQUIREMENTS AND EXEMPTIONS

3.18.1 The requirements for examination of Class 1, 2, 3 and MC component supports of nonexempt components are outlined within this section. The examination requirements shall apply to piping supports and supports for vessels, pumps and valves.

Note: There are no MC supports based on the design as being a free standing steel containment.

3.18.2 An initial preservice examination is to be performed on all component supports, not exempted by this document, once prior to startup. Component supports within

systems that operate at a temperature greater than 200°F during normal operations shall be performed during or following initial system heatup and cooldown.

3.18.2.1 Component supports that have been adjusted in accordance with the acceptance standard for component support or corrected by repair/replacement shall be reexamined unless determine unnecessary by the evaluations.

3.18.3 The preservice visual examination and functional testing requirements of Snubber is governed by ASME/ANSI OM, Part 4, 1987 with OMa-1988, using the VT-3 visual examination method. As an optional requirement, per 10CFR50.55a(b)(3)(v), Subsection ISTD of the ASME/ANSI OMb 2003 code may be use to provides inspection requirements for examinations and tests of snubbers by making appropriate changes to their technical specifications or licensee-controlled documents. Examinations must be performed using the VT-3 visual examination method.

Integral and nonintegral attachments for snubbers, including lugs, pins, bolting and clamps, shall be examined in accordance with the requirements of this document.

3.18.4 Supports exempt from the examination requirements are those connected to piping and other items exempted from volumetric, surface, VT-1 or VT-3 visual examination. In addition, portions of supports that are inaccessible by being encased in concrete, buried underground, or encapsulated by guard pipe are also exempt from the examination requirements.

3.18.5 The support examination boundaries for both integral and nonintegral supports are as follows.

(a) The boundary of an integral support connected to a pressure retaining component is the distance from the pressure retaining component as indicated for Class 1, 2 and 3.

(b) The boundary of an integral support connected to a building structure is the surface of the building structure.

(c) The boundary of a nonintegral support connected to a pressure retaining component is the contact surface between the component and the support.

(d) The boundary of a nonintegral support connected to a building structure is the surface of the building structure.

(e) Where the mechanical connection of a nonintegral support is buried within the component insulation, the support boundary may extend from the surface of the component insulation, provided the support either

carries the weight of the component or serves as a structural restraint in compression.

(g) The examination boundary of an intervening element shall include the attachment portion, which includes welds, bolting, pins, clamps, etc. of the intervening element to pressure retaining components, integral and nonintegral attachments of pressure retaining components, and integral and nonintegral supports. The examination boundary does not include the attachment of the intervening element to the building structure.

(h) All integral and nonintegral connections within the boundary governed by IWF rules and requirements are included.

3.18.8 Examination of component supports shall include:

(a) mechanical connections to pressure retaining components and building structure. For pipe-clamp-type supports, the mechanical connection to the pressure boundary includes the bolting, pins, and their interface to the clamp, but does not include the component-to-clamp interface.

(b) weld connections to building structure

(c) weld and mechanical connections at intermediate joints in multi-connected integral and nonintegral supports

(d) clearances of guides and stops, alignment of supports, and assembly of support items

(e) hot or cold settings of spring supports and constant load supports

(f) accessible sliding surfaces

3.18.9 The methods of examination shall comply with those listed in Section 7.0 for IWF Summary Tables. Alternative methods of examination meeting the requirements of IWA-2240 may be used.

Examinations that detect conditions that require evaluation may be supplemented by other examination methods and techniques to determine the character of the flaw (that is, size, shape, and orientation). Visual examinations that detect surface flaws that exceed the acceptance criteria may be supplemented by either surface or volumetric examinations.

3.18.10 Evaluation of examination results shall be in accordance with the Acceptance Standard requirements listed in the Summary Table of Section 7.0 for IWF Class 1, 2 and 3 component supports.

3.18.11 All examinations listed in the Summary Table of Section 7.0 shall be performed completely, once, as a preservice examination. These preservice examinations shall be extended to include 100% of all supports not exempted by IWF-1230.

3.18.12 Examinations for systems that operate at a temperature greater than 200°F during normal plant operation shall be performed during or following initial system heatup and cooldown.

3.18.13 Prior to service, the applicable examinations listed in the Summary Table of Section 7.0 shall be performed on component supports that have been adjusted in accordance with IWF-3000 or corrected by various activities.

3.18.14 For systems that operate at a temperature greater than 200°F during normal plant operation, Watts Bar shall perform an additional preservice examination on the affected component supports during or following the subsequent system heatup and cooldown cycle unless determined unnecessary by evaluation.

3.19 CODE CASES

3.19.1 The following Code Case is accepted for use in Regulatory Guide 1.147 and shall be utilized where applicable:

N-460 Alternative Examination Coverage for Class 1 and 2 welds. To be used on all IWB-2500, Class 1 and IWC-2500, Class 2 welds.

3.19.2 The following Code Case is conditionally accepted for use in Regulatory Guide 1.147 and shall be utilized where applicable:

N-648-1 Alternative Requirements for Inner Radius Examinations of Class 1 Reactor Vessel Nozzles.

Conditional use states that, In place of a UT examination, licensees may perform a visual examination with enhanced magnification that has a resolution sensitivity to detect a 1-mil width wire or crack, utilizing the allowable flaw length criteria of Table IWB-3512-1with limiting assumptions on the flaw aspect ratio. The provisions of Table IWB-2500-1, Examination Category B-D, continue to apply except that, in place of examination volumes, the surfaces to be examined are the external surfaces shown in the figures applicable to this table (the external surface is from point M to point N in the figure).

3.19.3 The following Code Cases are incorporated by reference in 10CFR50.55a(g)(6)(ii)(D) and shall be utilized where applicable.

N-722 Additional Examinations for PWR Pressure Retaining Welds in Class 1 Components Fabricated with Alloy 600/82/182 Materials.

N-729-1 Alternative Examination Requirements for PWR Reactor Vessel Upper Heads with Nozzles having Pressure Retaining Partial Penetration Welds.

This Code Case shall be use subject to the conditions specified in paragraphs 10CFR50.55a(g)(6)(ii)(D)(2) through (6) in the Code of Federal Regulations.

3.20 CODE RELIEF

During the preservice inspections it may be determined that certain examination or inspection requirements are not practical to perform as outlined in Section XI. Code relief may be requested by following the circumstances as listed below for an alternative or for impractical examinations. An index of requests for relief its subject, status and comments are listed in section 9.0 as they are established.

3.20.1 10CFR50.55a(a)(3) states " Proposed alternatives to the requirements of paragraphs (c), (d), (e), (f), (g), and (h) of this section or portions thereof may be used when authorized by the Director of the Office of Nuclear Reactor Regulation. The applicant shall demonstrate that:

(i) The proposed alternatives would provide an acceptable level of quality and safety, or

(ii) Compliance with the specified requirements of this section would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety."

3.20.2 10CFR50.55a(g)(5) (iii) If the licensee has determined that conformance with certain code requirements is impractical for its facility, the licensee shall notify the Commission and submit information to support the determinations.

3.20.3 10CFR50.55a(g)(5)(iv) states "Where an examination requirement by code or addenda is determined to be impractical by the licensee and is not included in the revised inservice inspection program plan as permitted by paragraph 10CFR50.55a(g)(4), the basis for the determination much be demonstrated to the satisfaction of the commission not later than 12 month after the expiration of each subsequent 120 month period of operation during which the examination is determined to be impractical."

3.21 AUGMENTED COMPONENTS

This program includes an augmented examination section for items required to be examined as identified below. The types of commitments not required by ASME Section XI and are committed to be inspected or examined. The Summary Tables for the commitments by Watts Bar is located in Section 8.0.

3.21.1 Examination requirements other than ASME Section XI of IWB, IWC, IWD and IWF on Class 1, 2 or 3 components in accordance with Safety Analysis Report (SAR) or 10CFR50.55a.

3.21.2 USNRC Notices, Bulletins, or Generic Letters shall be followed as committed to by Watts Bar.

3.21.3 INPO or other industry operating experiences shall be followed as committed to by Watts Bar.

3.21.4 Westinghouse bulletins or notices shall be followed as committed to by Watts Bar.

SECTION 4.0

IWB SUMMARY TABLES

For

ASME CLASS 1

CATEGORIES

B-A Pressure Retaining Welds in Reactor Vessel

B-B Pressure Retaining Welds in Vessels Other Than Reactor Vessels

B-D Full Penetration Welded Nozzles in Vessels

B-F Pressure Retaining Dissimilar Metal Welds in Vessel Nozzles

B-G-1 Pressure Retaining Bolting, Greater Than 2 Inches in Diameter

B-G-2 Pressure Retaining Bolting, 2 Inches and Less in Diameter

B-J Pressure Retaining Welds in Piping

B-K Welded Attachments for Vessels, Piping, Pumps and Valves

B-L-1 Pressure Retaining Welds in Pump Casings

B-L-2 Pump Casings – (NA reference 3.15.2)

B-M-1 Pressure Retaining Welds in Valve Bodies

B-M-2 Valve Bodies – (NA reference 3.15.2)

B-N-1 Interior of Reactor Vessel

B-N-2 Welded Core Support Structures and Interior Attachments to Reactor Vessels

B-N-3 Removable Core Support Structures

B-O Pressure Retaining Welds in Control Rod Housings

ASME Section XI items that do not apply to Watts Bar Unit 2 within this Program Plan will be identified with, "NA to Unit-2", this documents the item does not apply and will not be referenced further within the program plan, schedule or summary reports.

Examination Category B-A, Pressure Retaining Welds in Reactor Vessel
Inspection Program B

Item No.	Component Examined	Component Compliance	Exam Method	Examination Requirements Fig. No.	Extent of Exam	Acceptance Standard	Total Population	Required Examination
B1.10	Shell Welds							
B1.11	Circumferential	Applicable	Vol.	IWB-2500-1	All Welds (2)	IWB-3510	4	4
B1.12	Longitudinal	NA to UNIT-2	-	-	-	-		
B1.20	Head Welds							
B1.21	Circumferential	Applicable	Vol.	IWB-2500-3	Accessible length of weld	IWB-3510	2	2
B1.22	Meridional	Applicable	Vol.	IWB-2500-3	Accessible length of all welds	IWB-3510	6	6
B1.30	Shell to Flange	Applicable	Vol.	IWB-2500-4	Weld (2)	IWB-3510	1	1
B1.40	Head to Flange	Applicable	Vol. & Suf.	IWB-2500-5	Weld (2)	IWB-3510	1	1
B1.50	Repair Welds (1)							
B1.51	Beltline region	NA to UNIT-2	-	-	-	-		
Totals	**Examination Category B-A**						**14**	**14**

NOTES:
(1) NA to Unit-2
(2) Includes essentially 100% of the weld length.
(3) NA to Unit-2 Preservice activities
(4) NA to Unit-2 Preservice activities
(5) NA to Unit-2 Preservice activities

Examination Category B-B, Pressure Retaining Welds in Vessels Other Than Reactor Vessels
Inspection Program B

Item No.	Component Examined	Component Compliance	Exam Method	Examination Requirements Fig. No.	Extent of Exam	Acceptance Standard	Total Population	Required Examination
	Pressurizer							
B2.10	Shell to Head							
B2.11	Circumferential	Applicable	Vol.	IWB-2500-1	Both Welds (4)	IWB-3510	2	2
B2.12	Longitudinal	Applicable	Vol.	IWB-2500-2	1ft of all weld (2)	IWB-3510	2	2
B2.20	Head Welds							
B2.21	Circumferential	NA to UNIT-2	-	-	-	-		
B2.22	Meridional	NA to UNIT-2	-	-	-	-		
	Steam Generators (Primary side)							
B2.30	Head Welds							
B2.31	Circumferential	NA to UNIT-2	-	-	-	-		
B2.32	Meridional	NA to UNIT-2	-	-	-	-		
B2.40	Tubesheet to Head Weld	Applicable	Vol.	IWB-2500-6	Weld (4)	IWB-3510	4	4
	Heat Exchanger (Primary side) - Head							
B2.50	Head Welds							
B2.51	Circumferential	NA to UNIT-2	-	-	-	-	-	-
B2.52	Meridional	NA to UNIT-2	-	-	-	-	-	-
	Heat Exchanger (Primary side) - Shell							
B2.60	Tubesheet to Head Welds	NA to UNIT-2	-	-	-	-	-	-
B2.70	Longitudinal Welds	NA to UNIT-2	-	-	-	-	-	-
B2.80	Tubesheet to Shell Welds	NA to UNIT-2	-	-	-	-	-	-
Totals	**Examination Category B-B**						**8**	**8**

NOTES:
(1) NA to Unit-2 Preservice activities
(2) The weld selected for examination is that weld intersecting the circumferential weld.
(3) NA to Unit-2 Preservice activities
(4) Includes essentially 100% of the weld length

Examination Category B-D, Full Penetration Welded Nozzles in Vessels
Inspection Program B

Item No. (8)	Component Examined	Component Compliance	Exam Method	Examination Requirements Fig. No.	Extent of Exam	Acceptance Standard	Total Population	Required Examination
	Reactor Vessel							
B3.90	Nozzle to Vessel Welds	Applicable	Vol.	IWB-2500-7 (a) through (c)	All Nozzles (1)	IWB-3512	8	8
B3.100	Nozzle Inside Radius Section	Applicable	EVT-1 (9)	(4)	All Nozzles (1)	IWB-3512	8	8
	Pressurizer							
B3.110	Nozzle to Vessel Welds	Applicable	Vol.	IWB-2500-7 (a) through (c)	All Nozzles (1)	IWB-3512	6	6
B3.120 (6)	Nozzle Inside Radius Section	Applicable	Vol.	(4)	All Nozzles (1)	IWB-3512	6	6
	Steam Generators (Primary side)							
B3.130	Nozzle to Vessel Welds	NA to UNIT-2	-		-	-		
B3.140 (6)	Nozzle Inside Radius Section	Applicable	Vol. (7)	(4)	All Nozzles (1)	IWB-3512	8	8
	Heat Exchanger (Primary side) - Head							
B3.150	Nozzle to Vessel Welds	NA to UNIT-2	-	-	-	-		
B3.160	Nozzle Inside Radius Section	NA to UNIT-2	-	-	-	-		
Totals	**Examination Category B-D**						**36**	**36**

NOTES:
(1) Includes nozzles with full penetration welds to vessel shell (or head) and integrally cast nozzles, but excludes manways and handholes either welded to or integrally cast in vessel.
(2) NA to Unit-2 Preservice activities
(3) NA to Unit-2 Preservice activities
(4) The examination volumes shall apply to the applicable Figure shown in Figs. IWB-2500-7(a) through (d).
(5) NA to Unit-2 Preservice activities
(6) 10CRF50.55a(b)(2)(xxi)(A) Table IWB-2500-1 Items B3.120 and B3.140 (Inspection Program B) in the 1998 Edition must be applied when using the 2001 Edition, 2003 Addenda.
(7) A visual examination with enhanced magnification that has a resolution sensitivity to detect a 1-mil width wire or crack, utilizing the allowable flaw length criteria in Table IWB-3512-1, may be performed in place of an ultrasonic examination.
(8) Category Items B3.10 – B3.80 are based on Inspection Program A and do not apply to Unit-2.
(9) Code Case N-648-1, with conditional approval, see paragraph 3.19.2 for details of exam area and other information.

Examination Category B-F, Pressure Retaining Dissimilar Metal Welds in Vessel Nozzles
Inspection Program B

Item No.	Component Examined	Component Compliance	Exam Method	Examination Requirements Fig. No.	Extent of Exam	Acceptance Standard	Total Population	Required Examination
	Reactor Vessel							
B5.10	NPS 4 or Larger-Nozzle-to-Safe End Butt Welds	Applicable	Vol. & Sur	IWB-2500-8	All Welds	IWB-3514	8	8
B5.20	Less Than NPS 4-Nozzle-to-Safe End Butt Welds	NA to UNIT-2	-	-	-	-		
B5.30	Nozzle-to-Safe End Socket Welds	NA to UNIT-2	-	-	-	-		
	Pressurizer							
B5.40	NPS 4 or Larger-Nozzle-to-Safe End Butt Welds	Applicable	Vol. & Sur	IWB-2500-8	All Welds	IWB-3514	6	6
B5.50	Less Than NPS 4-Nozzle-to-Safe End Butt Welds	NA to UNIT-2	-	-	-	-		
B5.60	Nozzle-to-Safe End Socket Welds	NA to UNIT-2	-	-	-	-		
	Steam Generators							
B5.70	NPS 4 or Larger-Nozzle-to-Safe End Butt Welds	Applicable	Vol. & Sur	IWB-2500-8	All Welds	IWB-3514	8	8
B5.80	Less Than NPS 4-Nozzle-to-Safe End Butt Welds	NA to UNIT-2	-	-	-	-		
B5.90	Nozzle-to-Safe End Socket Welds	NA to UNIT-2	-	-	-	-		
	Heat Exchangers							
B5.100	NPS 4 or Larger-Nozzle-to-Safe End Butt Welds	NA to UNIT-2	-	-	-	-		
B5.110	Less Than NPS 4-Nozzle-to-Safe End Butt Welds	NA to UNIT-2	-	-	-	-		
B5.120	Nozzle-to-Safe End Socket Welds	NA to UNIT-2	-	-	-	-		
Totals	**Examination Category B-F**						22	22

Note:
(1) NA to Unit-2 Preservice activities
(2) NA to Unit-2 Preservice activities

Examination Category B-G-1, Pressure Retaining Bolting, Greater than 2 in. in Diameter
Inspection Program B

Item No.	Component Examined	Component Compliance	Exam Method	Examination Requirements Fig. No.	Extent of Exam	Acceptance Standard	Total Population	Required Examination
	Reactor Vessel							
B6.10	Closure Head Nuts	Applicable	VT-1	Surfaces	All Nuts	IWB-3517	54	54
B6.20	Closure Studs (1)(7)	Applicable	Vol.	IWB-2500-12	All Studs	IWB-3515	54	54
B6.40	Threads in Flange (2)(6)	Applicable	Vol.	IWB-2500-12	Flange Surface	IWB-3515	54	54
B6.50	Closure Washers, Bushings (2)	Applicable	VT-1	Surfaces	All Washers	IWB-3517	54	54
	Pressurizer							
B6.60	Bolts and Studs	NA to UNIT-2	-	-	-	-	-	-
B6.70	Flange Surface, when connection disassembled	NA to UNIT-2	-	-	-	-	-	-
B6.80	Nuts, Bushings, and Washers	NA to UNIT-2	-	-	-	-	-	-
	Steam Generators							
B6.90	Bolts and Studs	NA to UNIT-2	-	-	-	-	-	-
B6.100	Flange Surface, when connection disassembled	NA to UNIT-2	-	-	-	-	-	-
B6.110	Nuts, Bushings, and Washers	NA to UNIT-2	-	-	-	-	-	-
	Heat Exchangers							
B6.120	Bolts and Studs	NA to UNIT-2	-	-	-	-	-	-
B6.130	Flange Surface, when connection disassembled	NA to UNIT-2	-	-	-	-	-	-
B6.140	Nuts, Bushings, and Washers	NA to UNIT-2	-	-	-	-	-	-

Notes; at end of this section.

Examination Category B-G-1, Pressure Retaining Bolting, Greater than 2 in. in Diameter
Inspection Program B

Item No.	Component Examined	Component Compliance	Exam Method	Examination Requirements Fig. No.	Extent of Exam	Acceptance Standard	Total Population	Required Examination
	Piping							
B6.150	Bolts and Studs	NA to UNIT-2	-	-	-	-	-	-
B6.160	Flange Surface, when connection disassembled	NA to UNIT-2	-	-	-	-	-	-
B6.170	Nuts, Bushings, and Washers	NA to UNIT-2	-	-	-	-	-	-
	Pumps							
B6.180	Bolts and Studs (1) (7)	Applicable	Vol.	IWB-2500-12	Studs	IWB-3515	96	96
B6.190	Flange Surface, when connection disassembled (2) (4) (6)	Applicable	VT-1	Surfaces	Flange Surfaces	IWB-3517	4	4
B6.200	Nuts, Bushings and Washers	NA to Unit-2	-	-	-	-		
	Valves							
B6.210	Bolts and Studs	NA to Unit-2	-	-	-	-	-	-
B6.220	Flange Surface, when connection disassembled	NA to Unit-2	-	-	-	-	-	-
B6.230	Nuts, Bushings, and Washers	NA to Unit-2	-	-	-	-	-	-
Totals	**Examination Category B-G-1**						**316**	**316**

NOTES:
(1) Bolting may be examined: (a) in place under tension; (b) when the connection is disassembled; (c) when the bolting is removed.
(2) Threads in base material of flanges surface are required to be examined only when the connections are disassembled.
(3) NA to Unit-2 Preservice activities
(4) Visual examination of bolted connections, VT-1 of the flange surface, nuts and washers, for pumps is required only when the component is examined under Examination Category B-L-2. This is for one pump in a group of pumps performing similar functions in a system and is required only when disassembly for maintenance, repair, or volumetric examination, as stated in B-L-2. (See note 2 in summary table for category B-L-2)
(5) NA to Unit-2 Preservice activities
(6) Examination includes 1 in. annular surface of flange surrounding each stud.
(7) When bolts or studs are removed for examination, surface examination meeting the acceptance standards of IWB-3515 may be substituted for volumetric examination.

Examination Category B-G-2, Pressure Retaining Bolting, 2in. and Less in Diameter
Inspection Program B

Item No.	Component Examined	Component Compliance	Exam Method	Examination Requirements or Fig. No.	Extent of Exam	Acceptance Standard	Total Population	Required Examination
	Reactor Vessel							
B7.10	Bolt, Studs, and Nuts	NA to Unit-2	-	-	-	-	-	-
	Pressurizer							
B7.20	Bolt, Studs, and Nuts (1) (2)	Applicable	VT-1	Surface	All Studs, and Nuts	IWB-3517	16	16
	Steam Generators							
B7.30	Bolt, Studs, and Nuts (1) (2)	Applicable	VT-1	Surface	All Studs, and Nuts	IWB-3517	128	128
	Heat Exchangers							
B7.40	Bolt, Studs, and Nuts	NA to Unit-2	-	-	-	-		
	Piping							
B7.50	Bolt, Studs, and Nuts (1)	Applicable	VT-1	Surface	All Bolt, Studs, and Nuts	IWB-3517	TBD	TBD
	Pumps							
B7.60	Bolt, Studs, and Nuts (1) (2)	Applicable	VT-1	Surface	All Studs, and Nuts	IWB-3517	TBD	TBD
	Valves							
B7.70	Bolt, Studs, and Nuts (1) (2)	Applicable	VT-1	Surface	All Studs, and Nuts	IWB-3517	TBD	TBD
	CRD Housing (only when disassembled)							
B7.80 (4)	Bolt, Studs, and Nuts (1) (4)	Applicable	VT-1	Surface	All Studs	IWB-3517	TBD	TBD
Totals	**Examination Category B-G-2**						TBD	TBD

NOTES:
(1) Bolting is required to be examined only when a connection is disassembled or bolting is removed.
(2) For vessels, pumps, or valves, examination of bolting is required only when the component is examined under Examination Category B-B, B-L-2, or B-M-2. Examination of bolted connection is required only once during the interval. (See note 2 in summary table for category B-L-2 and B-M-2.)
(3) NA to Unit-2 Preservice activities
(4) The provisions of Examination Category B-G-2, Item B7.80, that are in the 1995 Edition are applicable, reference 10CFR50.55a(b)(2)(xxi)(B), only to reused bolting.
TBD = To be determined

Examination Category B-J, Pressure Retaining Welds in Piping
Inspection Program B

Item No.	Component Examined	Component Compliance	Exam Method	Examination Requirements Fig. No.	Extent of Exam	Acceptance Standard	Total Population	Required Examination
B9.10	NPS 4 or Larger							
B9.11	Circumferential Welds	Applicable	Vol. & Sur	IWB-2500-8	Welds (1) (4) (5) (6) (7)	IWB-3514	TBD	TBD
B9.20	Less Than NPS 4							
B9.21	Circumferential Welds other than PWR High Pressure Safely Injection Systems	Applicable	Sur.	IWB-2500-8	Welds (1) (4) (5)	IWB-3514	TBD	TBD
B9.22	Circumferential Welds of PWR High Pressure Safely Injection System	Applicable	Vol.	IWB-2500-8	Welds (2) (4) (6) (7)	IWB-3514	TBD	TBD
B9.30	Branch Pipe Connection Welds							
B9.31	NPS 4 or Larger	Applicable	Vol. & Sur	IWB-2500-9, 10 & 11	Welds (1) (4) (5) (6) (7)	IWB-3514	TBD	TBD
B9.32	Less Than NPS 4	Applicable	Sur.	IWB-2500-9, 10 & 11	Welds (1) (4) (5)	IWB-3514	TBD	TBD
B9.40	Socket Welds	Applicable	Sur.	IWB-2500-8	Welds (1) & (4)	IWB-3514	TBD	TBD
Totals	**Examination Category B-J**						TBD	TBD

Notes:
(1) Examinations shall include the following:
  (a) All terminal ends in each pipe or branch run connected to vessels.
  (b) All terminal ends and joints in each pipe or branch run connected to other components where the stress levels exceed either of the following limits under loads associated with specific seismic events and operational conditions:
    (1) primary plus secondary stress intensity range of 2.4Sm for ferritic steel and austenitic steel
    (2) cumulative usage factor U of 0.4
  (c) All dissimilar metal welds not covered under Category B-F.
  (d) Additional piping welds so that the total number of circumferential butt welds (or branch connection or socket welds) selected for examination equals 25% of the circumferential butt welds (or branch connection or socket welds) in the reactor coolant piping system. This total does not include welds exempted by IWB-1220 or welds in Item No. B9.22. These additional welds may be located in one loop (one loop is defined for both PWR and BWR plants in the 1977 Edition).
(2) A 10% sample of PWR high pressure safety injection system circumferential welds in piping ≥ NPS 1 1/2 (DN 40) and < NPS 4 (DN100) shall be selected for examination. This sample shall be selected from locations determined by the Owner as most likely to be subject to thermal fatigue. Thermal fatigue may be caused by conditions such as valve leakage or turbulence effects.
(3) NA to Unit-2 Preservice activities
(4) Includes essentially 100% of weld length.
(5) For circumferential welds with intersecting longitudinal welds, surface examination of the longitudinal piping welds is required for those portions of the welds within the examination boundaries of intersecting Examination Category B-F and B-J circumferential welds.
(6) For circumferential welds with intersecting longitudinal welds, volumetric examination of the longitudinal piping welds is required for those portions of the welds within the examination boundaries of intersecting Examination Category B-F and B-J circumferential welds. The following requirements shall also be met:
  (a) When longitudinal welds are specified and locations are known, examination requirements shall be met for both transverse and parallel flaws at the intersection of the welds and for that length of longitudinal weld within the circumferential weld examination volume.
  (b) When longitudinal welds are specified but locations are unknown, or the existence of longitudinal welds is uncertain, the examination requirements shall be met for both transverse and parallel flaws within the entire examination volume of intersecting circumferential welds.
(7) For welds in carbon or low alloy steels, only those welds showing reportable preservice transverse indications need to be examined by the ultrasonic method for reflectors transverse to the weld length direction except that circumferential welds with intersecting longitudinal welds shall meet Note (5).
TBD = To be determined

Examination Category B-K, Welded Attachments for Vessels, Piping, Pumps and Valves
Inspection Program B

Item No.	Component Examined	Component Compliance	Exam Method	Examination Requirements Fig. No.	Extent of Exam	Acceptance Standard	Total Population	Required Examination
	Pressure Vessels							
B10.10	Welded Attachments (1)	Applicable	Surface (7)	IWB-2500-13, 14 and 15	Each welded attachment (2)(6)	IWB-3516	TBD	TBD
	Piping							
B10.20	Welded Attachments (1)	Applicable	Surface	IWB-2500-13, 14 and 15	Each welded attachment (2)(6)	IWB-3516	TBD	TBD
	Pumps							
B10.30	Welded Attachments (1)	Applicable	Surface	IWB-2500-13, 14 and 15	Each welded attachment (2)(6)	IWB-3516	TBD	TBD
	Valves							
B10.40	Welded Attachments (1)	Applicable	Surface	IWB-2500-13, 14 and 15	Each welded attachment (2)(6)	IWB-3516	TBD	TBD
Totals	**Examination Category B-K**						TBD	TBD

NOTES:
(1) Weld buildup on nozzles that is in compression under normal conditions and provides only component support is excluded from examination. Examination is limited to those welded attachments that meet the following conditions:
(a) the attachment is on the outside surface of the pressure retaining component;
(b) the attachment provides component support as defined in NF-1110;
(c) the attachment weld joins the attachment either directly to the surface of the component or to an integrally cast or forged attachment to the component, and
(d) the attachment weld is full penetration fillet, or partial penetration, continuous or intermittent.
(2) The extent of the examination includes essentially 100% of the length of the attachment weld at each attachment subject to examination.
(3) NA to Unit-2 Preservice activities
(4) NA to Unit-2 Preservice activities
(5) NA to Unit-2 Preservice activities
(6) Examination is required whenever component support member deformation, e.g., broken, bent, or pulled out parts, is identified during operation, refueling, maintenance, examination, or testing.
(7) For the configurations shown in Figs. IWB-2500-13 and IWB-2500-14, a surface examination from an accessible side of the attachment weld shall be performed. Alternatively, for the configuration shown in Fig. IWB-2500-14, a volumetric examination of volume A-B-C-D from an accessible side of the attachment weld may be performed in lieu of the surface examination of surfaces A-B or C-D.
TBD = To be determined

Examination Category B-L-1, Pressure Retaining Welds in Pump Casings; B-M-1, Pressure Retaining Welds in Valve Bodies; B-L-2, Pump Casings; B-M-2, Valve Bodies
Inspection Program B

Item No.	Component Examined	Component Compliance	Exam Method	Examination Requirements Fig. No.	Extent of Exam	Acceptance Standard	Total Population	Required Examination
	Pumps							
B12.10	Pump casing welds, B-L-1 (4)	Applicable	VT-1	IWB-2500-16	All welds	IWB-3518	TBD	TBD
B12.20	Pump casing, B-L-2	(2)	-	-	-	-		
	Valves							
B12.30	Valves, less than NPS 4 valve body welds, B-M-1 (4)	Applicable	Surface	IWB-2500-17	All welds	IWB-3518	TBD	TBD
B12.40	Valves, NPS 4 or larger valve body welds, B-M-1 (4)	Applicable	Volumetric	IWB-2500-17	All welds	IWB-3518	TBD	TBD
B12.50	Valve body, exceeding NPS 4, B-M-2	(2)	-	-	-	-		
Totals	**Examination Category B-L-1**						TBD	TBD
	Examination Category B-M-1						TBD	TBD

NOTES:
(1) NA to Unit-2 Preservice activities
(2) NA to Unit-2 Preservice activities, reference IWB-2200
(3) NA to Unit-2 Preservice activities
(4) Includes essentially 100% of weld length.
TBD = To be determined

Examination Category B-N-1, Interior of Reactor Vessel;
B-N-2, Welded Core Support Structures and Interior Attachments to Reactor Vessels B-N-3, Removable Core Support Structures
Inspection Program B

Item No.	Component Examined	Component Compliance	Exam Method	Examination Requirements Fig. No.	Extent & Frequency of Exam	Acceptance Standard	Total Population	Required Examination
	Reactor Vessel							
B13.10	Vessel Interior B-N-1 (1)	Applicable	VT-3	Accessible Areas	Each Inspection Period	IWB-3520.2	1	1
	Reactor Vessel (BWR)							
B13.20	Interior attachments within beltline region B-N-2	NA to Unit-2	-	-	-	-	-	-
B13.30	Interior attachments beyond the beltline region B-N-2	NA to Unit-2	-	-	-	-	-	-
B13.40	Core Support Structure B-N-2	NA to Unit-2	-	-	-	-	-	-
	Reactor Vessel (PWR)							
B13.50	Interior attachments within beltline region B-N-2	NA to Unit-2	-	-	-	-	-	-
B13.60	Interior attachments beyond the beltline region B-N-2	Applicable	VT-3	Accessible Welds	Welds	IWB-3520.2	6	6
B13.70	Core Support Structure B-N-3 (2)	Applicable	VT-3	Accessible Surfaces	Surfaces	IWB-3520.2	1	1
	Examination Category B-N-1						**1**	**1**
	Examination Category B-N-2						**6**	**6**
Totals	**Examination Category B-N-3**						**1**	**1**

NOTES:
(1) Areas to be examined shall include the spaces above and below the reactor core that are made accessible for examination by removal of components during normal refueling outages.
(2) The structure shall be removed from the reactor vessel for examination.
(3) NA to Unit-2 Preservice activities
TBD = To be determined

Examination Category B-O, Pressure Retaining Welds in Control Rod Housings
Inspection Program B

Item No.	Component Examined	Component Compliance	Exam Method	Examination Requirements Fig. No.	Extent of Exam	Acceptance Standard	Total Population	Required Examination
B14.10	Reactor Vessel Welds in CRD Housing (1)	Applicable	Volumetric or Surface	IWB-2500-18	100% Peripheral CRD Housing	IWB-3523	20	20
Totals	**Examination Category B-O**						**20**	**20**

Note:
(1) 78 CDR Housings Total

SECTION 5.0

IWC SUMMARY TABLES

For

ASME CLASS 2

INDEX

CATEGORY

C-A, Pressure Retaining Welds in Pressure Vessels

C-B, Pressure Retaining Nozzle Welds in Vessels

C-C, Welded Attachments for Vessels, Piping, Pumps, and Valves

C-D, Pressure Retaining Bolting Greater than 2 Inch in Diameter

C-F-1 Pressure Retaining Welds in Austenitic Stainless Steel or High Alloy Piping

C-F-2 Pressure Retaining Welds in Carbon or Low Alloy Steel Piping

C-G, Pressure Retaining Welds in Pumps and Valves

ASME Section XI items that do not apply to Watts Bar Unit 2 within this Program Plan will be identified with, "NA to Unit-2", this documents the item does not apply and will not be referenced further within the program plan, schedule or summary reports.

Examination Category C-A, Pressure Retaining Welds in Pressure Vessels
Inspection Program B

Item No.	Component Examined	Component Compliance	Exam Method	Examination Requirements Fig. No.	Extent and Frequency of Exam	Acceptance Standard	Total Population	Required Examination
C1.10	Shell Circumferential Welds (1) (3) (4)	Applicable	Volumetric (5)	IWC-2500-1	Welds at gross structural discontinuity (2)	IWC-3510	5*	TBD
C1.20	Head Circumferential Welds (1) (3) (4)	Applicable	Volumetric (5)	IWC-2500-1	Welds at gross structural discontinuity (2)	IWC-3510	15*	TBD
C1.30	Tubesheet-to-Shell Weld (1) (3) (4)	Applicable	Volumetric (5)	IWC-2500-2	Welds at gross structural discontinuity (2)	IWC-3510	4*	TBD
Totals	**Examination Category C-A**							

NOTES:
(1) Includes essentially 100% of the weld length.
(2) Gross structural discontinuity is defined in NB-3213.2. Examples are junctions between shells of different thicknesses, cylindrical shell-to-conical shell junctions, shell (or head)-to-flange welds, and head-to-shell welds.
(3) In the case of multiple vessels of similar design, size, and service (such as steam generators, heat exchangers), the required examinations may be limited to one vessel or distributed among the vessels.
(4) The vessel areas selected for the initial examination shall be reexamined in the same sequence over the service lifetime of the component, to the extent practical.
(5) For welds in vessels with nominal wall thickness of 0.2 in. or less, a surface examination may be applied in lieu of a volumetric examination. The examination shall include the weld and 0.5 in. on either side of the weld. The acceptance standard for the examination shall be those specified for piping in IWC-3514.
* Based on Unit 1
TBD = To Be Determined

Examination Category C-B, Pressure Retaining Nozzle Welds in Vessels
Inspection Program B

Item No.	Component Examined	Component Compliance	Exam Method	Examination Requirements Fig. No.	Extent and Frequency of Exam	Acceptance Standard	Total Population	Required Examination
C2.10	Nozzles in Vessels ≤ 1/2 in. nominal Thickness (1) (2) (3)(4)							
C2.11	Nozzle-to-Shell (nozzle-to-head) Weld	Applicable	Surface	IWC-2500-3	(6)	IWC-3511	0*	TBD
C2.20	Nozzles Without Reinforcing Plate in Vessels > ½ in. Nominal Thickness (1) (2) (3) (4)							
C2.21	Nozzle-to Shell Weld (nozzle-to-head)	Applicable	Surface and Volumetric	IWC-2500-4 (a),(b)or(d)	(6)	IWC-3511	14*	TBD
C2.22	Nozzle Inside Radius Section	Applicable	Volumetric	IWC-2500-4 (a),(b)or(d)	(6)	IWC-3511	8*	TBD
C2.30	Nozzles With Reinforcing Plate in Vessels > ½ in. Nominal Thickness (1) (2) (3) (4)							
C2.31	Reinforcing Plate Welds to Nozzle and Vessel	Applicable	Surface	IWC-2500-4(c)	(6)	IWC-3511	4*	TBD
C2.32	Nozzle-to Shell Weld (nozzle-to-head) when inside of vessel is accessible	Applicable	Volumetric	IWC-2500-4(c)	(6)	IWC-3511	4*	TBD
C2.33	Nozzle-to Shell Weld (nozzle-to-head) when inside of vessel is inaccessible	Applicable	Visual, VT-2	(5)	(6)	No Leakage	0*	TBD
Totals	**Examination Category C-B**							

NOTES:
(1) Includes nozzles welded to or integrally cast in vessels that connect to piping runs (manways and handholes are excluded).
(2) Includes only those piping runs selected for examination under Examination Category C-F.
(3) The nozzles selected initially for examination shall be reexamined in the same sequence over the service lifetime of the component, to the extent practical.
(4) In the case of multiple vessels of similar design, size, and service (such as steam generators, heat exchangers), the required examinations may be limited to one vessel or distributed among the vessels.
(5) The telltale hole in the reinforcing plate shall be examined for evidence of leakage while vessel is undergoing the system leakage test as required by examination category C-H
(6) Nozzles at terminal ends (1) of piping run (2).

* Based on Unit 1
TBD = To be determined

Examination Category C-C, Welded Attachments for Vessels, Piping, Pumps, and Valves
Inspection Program B

Item No.	Component Examined	Component Compliance	Exam Method	Examination Requirements Fig. No.	Extent and Frequency of Exam	Acceptance Standard	Total Population	Required Examination
	Pressure Vessels (1) (3)							
C3.10	Welded Attachments	Applicable	Surface	IWC-2500-5	(2)(4)(6)	IWC-3512	22*	TBD
	Piping (1) (3)							
C3.20	Welded Attachments	Applicable	Surface	IWC-2500-5	(2)(4)(6)	IWC-3512	83*	TBD
	Pumps (1) (3)							
C3.30	Welded Attachments	Applicable	Surface	IWC-2500-5	(2)(4)(6)	IWC-3512	14*	TBD
	Valves							
C3.40	Welded Attachments	NA to Unit 2*	-	-	-	-	0*	TBD
Totals	**Examination Category C-C**							

NOTES:
(1) Examination is limited to those welded attachments that meet the following conditions:
(a) the attachment is on the outside surface of the pressure retaining component;
(b) the attachment provides component support as defined in NF-1110;
(c) the attachment weld joins the attachment either directly to the surface of the component or to an integrally cast or forged attachment to the component; and
(d) the attachment weld is full penetration, fillet, or partial penetration, continuous, or intermittent.
(2) The extent of the examination includes essentially 100% of the length of the attachment weld at each attachment subject to examination.
(3) Selected samples of welded attachments shall be examined each inspection interval.
(4) 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.
(5) For piping, pumps, and valves, a sample of 10% of the welded attachments associated with the component supports selected for examination under IWF-2510 shall be examined.
(6) Examination is required whenever component support member deformation, e.g., broken, bent, or pulled out parts, is identified during operation, refueling, maintenance, examination, or testing.

* Based on Unit 1

TBD = To be determined

Examination Category C-D, Pressure Retaining Bolting Greater than 2 in. in Diameter
Inspection Program B

Item No.	Component Examined	Component Compliance	Exam Method	Examination Requirements Fig. No.	Extent and Frequency of Exam	Acceptance Standard	Total Population	Required Examination
	Pressure Vessels (1) (2)							
C4.10	Bolts and Studs	Applicable	Volumetric (5)	IWC-2500-6	All bolts or studs at the bolted connection (4)	IWC-3513 (5)	1* (16 bolts)	TBD
	Piping (3)							
C4.20	Bolts and Studs	NA to Unit 2	-	-	-	-	0*	TBD
	Pumps							
C4.30	Bolts and Studs	NA to Unit 2	-	-	-	-	0*	TBD
	Valves							
C4.10	Bolts and Studs	NA to Unit 2	-	-	-	-	0*	TBD
Totals	**Examination Category C-D**							

NOTES:
(1) The examination may be performed on bolting in place under load or upon disassembly of the connection.
(2) The examination of bolting for vessels, pumps, or valves may be conducted on one vessel, one pump, or one valve among a group of vessels, pumps, or valves that are similar in design, size, function, and service. In addition, when the component to be examined contains a group of bolted connections of similar design and size (such as flanged connections or manway covers), the examination may be conducted on one bolted connection among the group.
(3) The examination of flange bolting in piping systems may be limited to one bolted connection among a group of bolted connections that are similar in design, size, function, and service.
(4) The areas selected for the initial examination shall be reexamined in the same sequence over the service lifetime of the component, to the extent practical.
(5) When bolts or studs are removed for examination, surface examination meeting the acceptance standards of IWB-3515 may be substituted for volumetric examination.
* Based on Unit 1
TBD = To be determined

Examination Category C-F-1, Pressure Retaining Welds in Austenitic Stainless Steel or High Alloy Piping
Inspection Program B

Item No.	Component Examined	Component Compliance	Exam Method	Examination Requirements Fig. No.	Extent and Frequency of Exam	Acceptance Standard	Total Population	Required Examination
C5.10	Piping Welds ≥ 3/8 in. Nominal Wall Thickness for Piping > NPS 4							
C5.11	Circumferential Welds	Applicable	Vol. & Sur.	IWC-2500-7	100% of each weld requiring exam (2)(4)(5)(6)	IWC-3514	833*	TBD
C5.20	Piping Welds > 1/5 in. nominal Wall Thickness for Piping ≥ 2 and ≤ 4NPS 4							
C5.21	Circumferential Welds (1)	Applicable	Vol. & Sur.	IWC-2500-7	100% of each weld requiring exam (2)(4)(5)(6)	IWC-3514	677*	TBD
C5.30	Socket Welds	Applicable	Sur.	IWC-2500-7	100% of each weld requiring exam (2)(4)(5)(6)	IWC-3514	603*	TBD
C5.40	Pipe Branch Connections of Branch Piping ≥ NPS 2							
C5.41	Circumferential Weld	Applicable	Sur.	IWC-2500-9,10,11,12&13	100% of each weld requiring exam (2)(4)(5)	IWC-3514	21*	TBD
Totals	**Examination Category C-F-1**							

Examination Category C-F-1, Pressure Retaining Welds in Austenitic Stainless Steel or High Alloy Piping
Inspection Program B

NOTES:

(1) Requirements for examination of welds in piping ≤ NPS 4 (DN 100) apply to PWR high pressure safety injection and auxiliary feedwater systems in accordance with the exemption criteria of IWC-1220.

(2) The welds selected for examination shall include 7.5%, but not less than 28 welds, of all dissimilar metal, austenitic stainless steel or high alloy welds not exempted by IWC-1220. (Some welds not exempted by IWC-1220 are not required to be nondestructively examined per Examination Category C-F-1. These welds, however, shall be included in the total weld count to which the 7.5% sampling rate is applied.) The examinations shall be distributed as follows:

(a) the examinations shall be distributed among the Class 2 systems prorated, to the degree practicable, on the number of nonexempt dissimilar metal, austenitic stainless steel, or high alloy welds in each system (i.e., if a system contains 30% of the nonexempt welds, then 30% of the nondestructive examinations required by Examination Category C-F-1 should be performed on that system);

(b) within a system, the examinations shall be distributed among terminal ends, dissimilar metal welds, and structural discontinuities [See Note (3)] prorated, to the degree practicable, on the number of nonexempt terminal ends, dissimilar metal welds, and structural discontinuities in that system; and

(c) within each system, examinations shall be distributed between line sizes prorated to the degree practicable.

(3) Structural discontinuities include pipe weld joints to vessel nozzles, valve bodies, pump casings, pipe fittings (such as elbows, tees, reducers, flanges, etc., conforming to ANSI B16.9), and pipe branch connections and fittings.

(4) The welds selected for examination shall be reexamined in the same sequence, during subsequent inspection intervals over the service lifetime of the piping component, to the extent practical.

(5) For circumferential welds with intersecting longitudinal welds, surface examination of the longitudinal piping welds is required for those portions of the welds within the examination boundaries of intersecting circumferential welds.

(6) For circumferential welds with intersecting longitudinal welds, volumetric examination of the longitudinal piping welds is required for those portions of the welds within the examination boundaries of intersecting circumferential welds. The following requirements shall also be met:

(a) When longitudinal welds are specified and locations are known, examination requirements shall be met for both transverse and parallel flaws at the intersection of the welds and for that length of longitudinal weld within the circumferential weld examination volume.

(b) When longitudinal welds are specified but locations are unknown, or the existence of longitudinal welds is uncertain, the examination requirements shall be met for both transverse and parallel flaws within the entire examination volume of intersecting circumferential welds.

* Based on Unit 1

TBD = To be determined

Examination Category C-F-2, Pressure Retaining Welds in Carbon or Low Alloy Steel Piping
Inspection Program B

Item No.	Component Examined	Component Compliance	Exam Method	Examination Requirements Fig. No.	Extent and Frequency of Exam	Acceptance Standard	Total Population	Required Examination
C5.50	Piping Welds ≥ 3/8 in. Nominal Wall Thickness for Piping > NPS 4							
C5.51	Circumferential Welds (1)(4)	Applicable	Vol. & Sur.	IWC-2500-7	100% of each weld requiring exam (2)(5)(6)(7)	IWC-3514	425*	TBD
C5.60	Piping Welds > 1/5 in. nominal Wall Thickness for Piping ≥ 2 and ≤ 4NPS 4							
C5.61	Circumferential Welds (1)(4)	Applicable	Vol. & Sur.	IWC-2500-7	100% of each weld requiring exam (2)(5)(6)(7)	IWC-3514	159*	TBD
C5.70	Socket Welds	NA to Unit 2	-	-	-	-		
C5.80	Pipe Branch Connections of Branch Piping ≥ NPS 2							
C5.81	Circumferential Weld (1)(4)	NA to Unit 2	-	-	-	-		
Totals	**Examination Category C-F-2**							

Examination Category C-F-2, Pressure Retaining Welds in Carbon or Low Alloy Steel Piping
Inspection Program B

NOTES:
(1) Requirements for examination of welds in piping ≤NPS 4 (DN 100) apply to PWR high pressure safety injection and auxiliary feedwater systems in accordance with the exemption criteria of IWC-1220.

(2) The welds selected for examination shall include 7.5%, but not less than 28 welds, of all carbon and low alloy steel welds not exempted by IWC-1220. (Some welds not exempted by IWC-1220 are not required to be nondestructively examined per Examination Category C-F-2. These welds, however, shall be included in the total weld count to which the 7.5% sampling rate is applied.) The examinations shall be distributed as follows:

(a) the examinations shall be distributed among the Class 2 systems prorated, to the degree practicable, on the number of nonexempt carbon and low alloy steel welds in each system (i.e., if a system contains 30% of the nonexempt welds, then 30% of the nondestructive examinations required by Examination Category C-F-2 should be performed on that system);

(b) within a system, the examinations shall be distributed among terminal ends and structural discontinuities [see Note (3)] prorated, to the degree practicable, on the number of nonexempt terminal ends and structural discontinuities in that system; and

(c) within each system, examinations shall be distributed between line sizes prorated to the degree practicable.

(3) Structural discontinuities include pipe weld joints to vessel nozzles, valve bodies, pump casings, pipe fittings (such as elbows, tees, reducers, flanges, etc., conforming to ANSI B16.9), and pipe branch connections and fittings.

(4) The welds selected for examination shall be reexamined in the same sequence, during subsequent inspection intervals over the service lifetime of the piping component, to the extent practical.

(5) Only those welds showing reportable preservice transverse indications need to be examined by the ultrasonic method for reflectors transverse to the weld length direction, except that circumferential welds with intersecting longitudinal weld shall meet Note (7).

(6) For circumferential welds with intersecting longitudinal welds, surface examination of the longitudinal piping welds is required for those portions of the welds within the examination boundaries of intersecting circumferential welds.

(7) For circumferential welds with intersecting longitudinal welds, volumetric examination of the longitudinal piping welds is required for those portions of the welds within the examination boundaries of intersecting circumferential welds. The following requirements shall also be met:

(a) When longitudinal welds are specified and locations are known, examination requirements shall be met for both transverse and parallel flaws at the intersection of the welds and for that length of longitudinal weld within the circumferential weld examination volume.

(b) When longitudinal welds are specified but locations are unknown, or the existence of longitudinal welds is uncertain, the examination requirements shall be met for both transverse and parallel flaws within the entire examination volume of intersecting circumferential welds.

* Based on Unit 1

TBD = To be determined

Examination Category C-G, Pressure Retaining Welds in Pumps and Valves
Inspection Program B

Item No.	Component Examined	Component Compliance	Exam Method	Examination Requirements Fig. No.	Extent and Frequency of Exam	Acceptance Standard	Total Population	Required Examination
	Pumps							
C6.10	Pumps Casing Welds	NA to Unit 2	-	-	-	-		
	Valves (1)(2)(3)							
C6.20	Valve Body Welds	Applicable	Surface	IWC-2500-8	(4)	IWC-3515	30*	TBD
Totals	**Examination Category C-G**							

NOTES:
(1) In case of multiple pumps or valves of similar design, size, function, and service in a system, required weld examinations may be limited to all the welds in one pump or one valve in the same group or distributed among any of the pumps or valves of that same group.
(2) The examination may be performed from either the inside or outside surface of the component.
(3) The pumps and valves initially selected for examination shall be reexamined in the same sequence over the service lifetime of the component, to the extent practical.
(4) 100% welds in all components in each piping run examined under Examination Category C-F, each inspection interval.
* Based on Unit 1
TBD = To be determined

SECTION 6.0

IWD SUMMARY TABLES

for

ASME CLASS 3

INDEX

CATEGORY D-A, Welded Attachments for Vessels, Piping, Pumps and Valves

ASME Section XI items that do not apply to Watts Bar Unit 2 within this Program Plan will be identified with, "NA to Unit-2", this documents the item does not apply and will not be referenced further within the program plan, schedule or summary reports.

Examination Category D-A, Welded Attachments for Vessels, Piping, Pumps and Valves
Inspection Program B

Item No.	Component Examined	Component Compliance	Exam Method	Examination Requirements Fig. No.	Extent and Frequency of Exam	Acceptance Standard	Total Population	Required Examination
	Pressure Vessels (1)							
D1.10	Welded Attachments	Applicable	VT-1	IWD-2500-1	(2) (4)(5)	IWD-3000	18*	TBD
	Piping (1)							
D1.20	Welded Attachments	Applicable	VT-1	IWD-2500-1	(2) (4)(5)	IWD-3000	255*	TBD
	Pumps (1)							
D1.30	Welded Attachments	NA to Unit-2	-	-	-	-		
	Valves (1)							
D1.40	Welded Attachments	NA to Unit-2	-	-	-	-		
Totals	**Examination Category D-A**							

NOTES:
(1) Examination is limited to those welded attachments that meet the following conditions:
(a) the attachment is on the outside surface of the pressure retaining component;
(b) the attachment provides component support as defined in NF-1110;
(c) the attachment weld joins the attachment either directly to the surface of the component or to an integrally cast or forged attachment to the component; and
(d) the attachment weld is full penetration, fillet, or partial penetration, continuous, or intermittent.
(2) The extent of the examination includes essentially 100% of the length of the attachment weld at each attachment subject to examination.
(3) N/A to WBN-2 Preservice Examination
(4) Examination is required whenever component support member deformation, e.g., broken, bent, or pulled out parts, is identified during operation, refueling, maintenance, examination, or testing.
(5) 100% of required area of each welded attachments, each inspection interval or each occurrence identified in note (4).
* Based on Unit 1
TBD = To be determined

SECTION 7.0

IWF SUMMARY TABLE

For

ASME CLASS 1, 2, 3 & MC

INDEX

CATEGORY F-A, Supports

ASME Section XI items that do not apply to Watts Bar Unit 2 within this Program Plan will be identified with, "NA to Unit-2", this documents the item does not apply and will not be referenced further within the program plan, schedule or summary reports.

Examination Category F-A, Supports
Inspection Program B

Item No.	Support Types Examined	Component Compliance	Exam Method	Examination Requirements Fig. No.	Extent of Exam	Acceptance Standard	Total Population	Required Examination
F1.10	Class 1 Piping Supports (1) (2)	Applicable	VT-3	IWF-1300-1	(5)	IWF-3410	TBD	TBD
F1.20	Class 2 Piping Supports (1) (2)	Applicable	VT-3	IWF-1300-1	(5)	IWF-3410	TBD	TBD
F1.30	Class 3 Piping Supports (1) (2)	Applicable	VT-3	IWF-1300-1	(5)	IWF-3410	TBD	TBD
F1.40	Supports Other Than Piping supports (1) Class 1, 2 and 3	Applicable	VT-3	IWF-1300-1	(5)	IWF-3410	TBD	TBD
F1.40	MC Supports	NA to Unit-2	-	-	-	-	-	-
Totals	**Examination Category F-A**							

NOTES:
(1) Item numbers shall be categorized to identify support types by component support function (e.g., A = supports such as one directional rod hangers; B = supports such as multi-directional restraints; and C = supports that allow thermal movement, such as springs). Reference tables below for each type. This is established for future activities.

(2) The totals shall be comprised of supports from each system (such as Main Steam, Feedwater, or RHR), proportional to the total number of non-exempt supports of each type and function within each system. Reference tables below for each system. This is established for future activities.

(3) N/A to WBN-2 Preservice Inspection.

(4) N/A to WBN-2 Preservice Inspection.

(5) 100% of all supports not exempted

TBD = To be determined

CLASS 1 NON-EXEMPT PIPING SUPPORT DISTRIBUTION BY TYPE

Examination Category	Item Number	Type & Description	Exam Method	Total Number
F-A, Supports Class 1 Piping	F1.10A	Type A Supports (one directional restraints)	Visual, VT-3	TBD
	F1.10B	Type B Supports (multidirectional restraints)	Visual, VT-3	TBD
	F1.10C	Type C Supports (thermal movement, i.e. variable or constant springs)	Visual, VT-3	TBD
	F1.10D	Type D Supports (Snubber Types)	Visual, VT-3	TBD
			Totals	TBD

CLASS 1 NON-EXEMPT PIPING SUPPORT DISTRIBUTION BY SYSTEM & TYPE

Sys	Type A			Type B			Type C			Type D			Totals	
	Total	%	Req.	Total	%	Req.	Total	%	Req.	Total	%	Req.		
CVCS		100			100			100			100			
RCS		100			100			100			100			
RHR		100			100			100			100			
RHRS		100			100			100			100			
SIS		100			100			100			100			
													TBD	TBD

TBD = To Be Determined

CLASS 2 NON-EXEMPT PIPING SUPPORT DISTRIBUTION BY TYPE

Examination Category	Item Number	Type & Description	Exam Method	Total Number
F-A, Supports Class 2 Piping	F1.20A	Type A Supports (one directional restraints)	Visual, VT-3	TBD
	F1.20B	Type B Supports (multidirectional restraints)	Visual, VT-3	TBD
	F1.20C	Type C Supports (thermal movement, i.e. variable or constant springs)	Visual, VT-3	TBD
	F1.20D	Type D Supports (Snubber Types)	Visual, VT-3	TBD
			Totals	TBD

CLASS 2 NON-EXEMPT PIPING SUPPORT DISTRIBUTION BY SYSTEM & TYPE

Sys	Type A			Type B			Type C			Type D			Totals	
	Total	%	Req.	Total	%	Req.	Total	%	Req.	Total	%	Req.		
AFWS		100			100			100			100			
CSS		100			100			100			100			
CVCS		100			100			100			100			
FWS		100			100			100			100			
MSS		100			100			100			100			
RHRS		100			100			100			100			
SIS		100			100			100			100			
													TBD	TBD

TBD = To Be Determined

CLASS 3 NON-EXEMPT PIPING SUPPORT DISTRIBUTION BY TYPE

Examination Category	Item Number	Type & Description	Exam Method	Total Number
F-A, Supports Class 3 Piping	F1.30A	Type A Supports (one directional restraints)	Visual, VT-3	TBD
	F1.30B	Type B Supports (multidirectional restraints)	Visual, VT-3	TBD
	F1.30C	Type C Supports (thermal movement, i.e. variable or constant springs)	Visual, VT-3	TBD
	F1.30D	Type D Supports (Snubber Types)	Visual, VT-3	TBD
			Totals	TBD

CLASS 3 NON-EXEMPT PIPING SUPPORT DISTRIBUTION BY SYSTEM & TYPE

Sys	Type A			Type B			Type C			Type D			Totals	
	Total	%	Req.	Total	%	Req.	Total	%	Req.	Total	%	Req.		
AFWS		100			100			100			100			
CCS		100			100			100			100			
ERCWS		100			100			100			100			
FPCS		100			100			100			100			
HPFPS		100			100			100			100			
													TBD	TBD

TBD = To Be Determined

CLASS 1, 2 & 3 NON-EXEMPT SUPPORTS DISTRIBUTION BY TYPE

Examination Category	Item Number	Type & Description	Exam Method	Total Number
F-A, Supports Class 1, 2 & 3 Components	F1.40A	Type A Supports (one directional restraints)	Visual, VT-3	TBD
	F1.40B	Type B Supports (multidirectional restraints)	Visual, VT-3	TBD
	F1.40C	Type C Supports (thermal movement, i.e. variable or constant springs)	Visual, VT-3	TBD
	F1.40D	Type D Supports (Snubber Types)	Visual, VT-3	TBD
			Totals	TBD

CLASS 1, 2 & 3 NON-EXEMPT SUPPORTS DISTRIBUTION BY SYSTEM & TYPE

Sys	Type A			Type B			Type C			Type D			Totals	
	Total	%	Req.	Total	%	Req.	Total	%	Req.	Total	%	Req.		
TBD		100			100			100			100			
													TBD	TBD

TBD = To Be Determined

SECTION 8.0

AUGMENTED EXAMINATION

REGULATORY TYPE

Code Case N-722	**Additional Examinations for PWR Pressure Retaining Welds in Class 1 Components Fabricated with Alloy 600/82/182 Materials.**
Code Case N-729-1	**Alternative Examination Requirements For PWR Reactor Vessel Upper Heads With Nozzles having Pressure Retaining Partial Penetration Welds.**
	This Code Case shall be use subject to the conditions specified in paragraphs 10CFR50.55a(g)(6)(ii)(D)(2) through (6) in the Code of Federal Regulations.

The above Code Cases are intended to replace the following NRC Bulletins that are address in the Watts Bar Unit 2 activities:

NRC Bulletin 2001-01	Circumferential Cracking of Reactor Pressure Vessel Head Penetration Nozzles
NRC Bulletin 2002-01	Reactor Pressure Vessel Head Degradation and Reactor Coolant Pressure Boundary Integrity
NRC Bulletin 2002-02	Reactor Pressure Vessel Head and Vessel Head Penetration Nozzle Inspection Program
NRC Bulletin 2003-02	Leakage from Reactor Pressure Vessel Lower Head Penetrations and Reactor Coolant Pressure Boundary Integrity
NRC Bulletin 2004-01	Inspection of Alloy 82/182/600 Materials used in the Fabrication of Pressurizer Penetrations and Steam Space Piping Connections at Pressurizer Water Reactors

The Code Case items that do not apply to Watts Bar Unit 2 will be identified with, "NA to Unit-2", this documents the item does not apply and will not be referenced further within the program plan, schedule or summary reports.

Examination Category A-E, Augmented Examination
Class 1 PWR Components Containing Alloy 600/82/182 (1)(2)

Item No.	Component Examined	Component Compliance	Exam Method (3)(4)(5)	Examination Requirements Fig. No.	Extent of Exam	Acceptance Standard	Total Population	Required Examination
CC N-722	**Additional Examinations for PWR Pressure Retaining Welds in Class 1 components Fabricated With Alloy 600/82/182 Materials**							
Reactor Vessel								
B15.80	RPV bottom mounted instrument penetrations	Applicable	Visual, VE	All penetrations	100%	IWB-3522	58	58
B15.90	Hot leg nozzle-to-pipe connections	Applicable	Visual, VE	All connections	100%	IWB-3522	4	4
B15.95	Cold leg nozzle-to-pipe connections	Applicable	Visual, VE	All connections	100%	IWB-3522	4	4
B15.100	Instrument connections	Applicable	Visual, VE	All connections	100%	IWB-3522	3	3
Steam Generators								
B15.110	Hot leg nozzle-to-pipe connections	Applicable	Visual, VE	All connections	100%	IWB-3522	4	4
B15.115	Cold leg nozzle-to-pipe connections	Applicable	Visual, VE	All connections	100%	IWB-3522	4	4
B15.120	Bottom channel head drain tube penetration	N/A to Unit 2	-	-	-	-	-	-
B15.130	Primary side hot leg instrumentation connections	N/A to Unit 2	-	-	-	-	-	-
B15.135	Primary side cold leg instrumentation connections	N/A to Unit 2	-	-	-	-	-	-

Examination Category A-E, Augmented Examination
Class 1 PWR Components Containing Alloy 600/82/182 (1)(2)

Item No.	Component Examined	Component Compliance	Exam Method (3)(4)(5)	Examination Requirements Fig. No.	Extent of Exam	Acceptance Standard	Total Population	Required Examination
Pressurizer								
B15.140	Heater penetrations	Applicable	Visual, VE	All penetrations	100%	IWB-3522	78	78
B15.150	Spray nozzle-to-pipe connection	Applicable	Visual, VE	All connections	100%	IWB-3522	1	1
B15.160	Safety and Relief nozzle-to-pipe connection	Applicable	Visual, VE	All connections	100%	IWB-3522	4	4
B15.170	Surge nozzle-to-pipe connection	Applicable	Visual, VE	All connections	100%	IWB-3522	1	1
B15.180	Instrument connections	N/A to Unit 2	-	-	-	-	-	-
B15.190	Drain nozzle-to-pipe connection	N/A to Unit 2	-	-	-	-	-	-
Piping								
B15.200	Hot leg instrumentation connection	N/A to Unit 2	-	-	-	-	-	-
B15.205	Cold leg instrumentation connection	N/A to Unit 2	-	-	-	-	-	-
B15.210	Hot leg full penetration welds	N/A to Unit 2	-	-	-	-	-	-
B15.215	Cold leg full penetration welds	N/A to Unit 2	-	-	-	-	-	-

NOTES:
(1) Alloy 600/82/182 are equivalent to UNS N06600 (SB-163, SB-166, SB-167, SB-168 and SB-564), UNS N06082 (SFA 5.14 ERNiCr-3) and UNS W86182 (SFA 5.11 ENiCrFe-3).
(2) The reactor vessel closure head is not addressed in this Case.
(3) The Visual Examination (VE) performed on Alloy 600/82/182 components for evidence of pressure boundary leakage and corrosion on adjacent ferritic steel components shall consist of the following:
(a) A direct VE of the bare-metal surface performed with the insulation removed. Alternatively, the VE may be performed with insulation in place using remote visual inspection equipment that provides resolution of the component metal surface equivalent to a bare-metal direct VE.
(b) The VE may be performed when the system or component is depressurized.
(c) The direct VE shall be performed at a distance not greater than 4 ft (1.2 m) from the component and with a demonstrated illumination level sufficient to allow resolution of lower case characters having a height of not greater than 0.105 in (2.7 mm).
(4) Personnel performing the VE shall be qualified as VT-2 visual examiners and shall have completed a minimum of four (4) hours of additional training in detection of borated water leakage from Alloy 600/82/182 components and the resulting boric acid corrosion of adjacent ferritic steel components.
(5) An ultrasonic examination, performed from the component inside or outside surface in accordance with the requirements of Table IWB-2500-1 and Appendix VIII (1995 Edition with the 1996 Addenda or later) shall be acceptable in lieu of the VE requirement of this table.
(6) NA to WBN-2 Preservice
(7) NA to WBN-2 Preservice.

Examination Category A-E, Augmented Examination
Class 1 PWR Reactor Vessel Upper Head

Item No.	Component Examined	Component Compliance	Exam Method	Examination Requirements Fig. No.	Extent of Exam	Acceptance Standard	Total Population	Required Examination
CC N-729-1	**Alternative Examinations Requirements for PWR Reactor Vessel Heads with Nozzles Having Pressure Retaining Partial Penetration Welds**							
B4.10	Head with UNS N06600 nozzles and N06082 or W86182 partial penetration welds	Applicable	Visual, VE (1)(2)	Fig. 1	100% (3)	3110	83	83
B4.20	UNS N06600 nozzles and N06082 or W86182 partial penetration welds	Applicable	Vol. & Sur.	Fig. 2 (5)	100% (7)(10)	3130 3140	83	83
B4.30	Head with nozzles and partial penetration welds of PWSCC resistant materials	N/A to Unit 2	-	-	-	-	-	-
B4.40	Nozzles and partial penetration welds of PWSCC resistant materials in heads	N/A to Unit 2	-	-	-	-	-	-

Notes:
(1) The VE shall consist of the following:
a) A direct examination of the bare-metal surface of the entire outer surface of the head, including essentially 100% of the intersection of each nozzle with the head. If welded or bolted obstructions are present (i.e., mirror insulation, insulation support feet, shroud support ring/lug), the examination shall include ≥95% of the area in the region of the nozzles as defined in Fig. 1 and the head surface uphill and downhill of any such obstructions. The examination may be performed with insulation in place using remote equipment that provides resolution of the component metal surface equivalent to a bare-metal direct examination.
(b) The examination may be performed with the system depressurized.
(c) The examination shall be performed with an illumination level and a sufficient distance to allow resolution of lower case characters not greater than 0.105 in. (2.7 mm) in height.
(2) Personnel performing the VE shall be qualified as a VT-2 visual examiner and shall have completed at least four (4) hr of additional training in detection of borated water leakage from UNS N06600, UNS N06082 or UNS W86182 components and the resulting boric acid corrosion of adjacent ferritic steel components.
(3) Examination may be performed with the system depressurized.
(4) NA for WBN-2 Preservice
(5) If the examination area or volume requirements of Fig. 2 cannot be met, the alternative requirements of Appendix I shall be used and the evaluation shall be submitted to the regulatory authority having jurisdiction at the plant site.
(6) NA to WBN-2 Preservice
(7) If not previously performed, baseline volumetric and surface examinations shall be performed.
(a) for plants with EDY >12, at the next refueling outage,
(b) for plants with EDY ≥8 and EDY ≤12, no later than the second refueling outage, or,
(c) for plants with EDY <8, no later than February 10, 2008.
(8) NA for WBN-2 Preservice
(9) NA per 10CFR50.55a
(10) Includes essentially 100% of surface or volume.

SECTION 9.0

REQUESTS FOR RELIEF

INDEX

RFR Number	Subject	10CFR50.55a	Status	Comments
WBN-2/PDI-4	Alternative Examination for RPV Shell-to -Flange	10CFR50.55a(a)(3)(i)	Submitted	

TENNESSEE VALLEY AUTHORITY
WATTS BAR NUCLEAR PLANT (WBN) UNIT 2

AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME) SECTION XI,

REQUEST FOR RELIEF

WBN-2/PDI-4

TVA requests approval for an alternative to ASME Section XI, paragraph IWA-2232 of the ASME Section XI 2001 Edition through the 2003 Addenda, for the Preservice Examinations at Watts Bar Unit 2. Specifically, for use of Appendix VIII and Performance Demonstration Initiative (PDI) methodologies for performance of the ultrasonic examination of reactor pressure vessel shell-to-flange welds in lieu of the requirement of Appendix I and the associated Article 4, ASME Section V

EXECUTIVE SUMMARY:

In accordance with 10 CFR 50.55a(a)(3)(i), TVA is requesting relief from the specific requirements of performing the volumetric examination of the reactor pressure vessel (RPV) circumferential shell-to-flange weld at Watts Bar Unit 2 in accordance with the requirement of Appendix I of Section XI. In lieu of the requirements of Appendix I and its associated sub-requirements of Article 4 of Section V, Watts Bar Unit 2 will use the techniques, personnel, and equipment qualified to meet the requirements of ASME Section XI Appendix VIII, Supplements 4 and 6 of the 2001 Edition through the 2003 Addenda, as administered by the Electric Power Research Institute's (EPRI) Performance Demonstration Initiative (PDI) processes. Watts Bar plans to use the proposed alternative for the Preservice RPV examinations to be performed prior to commercial operations. This proposed alternative represents the best available methodology in qualification of equipment and personnel performing ultrasonic examinations and uses an examination process that has provided and will provide the highest practical quality and greatest amount of coverage for the performance of the shell-to-flange weld examinations. As such, the proposed alternative methodology provides an acceptable level of quality and safety. In addition, the approval of this relief results in savings in the cost of performing the examinations, with not having to incorporate the use of two different sets of examination equipment, and also in future examination will results in lower personnel radiation exposure from not having to use a different methodology for the shell-to-flange weld.

Note that this request for relief is similar to the request granted to Watts Bar Unit 1 during the First and Second 10 Year Intervals submitted most recently in a letter from TVA to the NRC, dated February 7, 2007 and approved by the Staff in a letter dated February 28, 2008 (Ref. ML080630679).

SYSTEM/COMPONENT(S) FOR WHICH RELIEF IS REQUESTED:

ASME Code Class 1 Reactor Pressure Vessel (RPV) Upper Vessel Shell-to-Flange Welds, Table IWB-2500-1 Category B-A, Item Number B1.30:

APPLICABLE CODE EDITION AND ADDENDA FOR THE GIVEN EXAM

The applicable ASME section XI code edition and Addenda of Record for Watts Bar Unit 2 Preservice inspection is the 2001 Edition through 2003 Addenda with applicable amendments from 10CFR50.55a.

CODE REQUIREMENTS FROM WHICH RELIEF IS REQUESTED:

In accordance with ASME Section XI, paragraph IWA-2232, "Ultrasonic examinations shall be conducted in accordance with Appendix I."

Further, in accordance with Appendix I, paragraph I-2110(b) "Ultrasonic examination of reactor vessel-to-flange welds, closure head-to-flange welds, and integral attachment welds shall be conducted in accordance with Article 4 of Section V, except that alternative examination beam angles may be used."

RELIEF REQUESTED:

Pursuant to 10 CFR 50.55a(a)(3)(i), TVA requests relief from performing the designated vessel shell-to-flange weld examination in accordance with the requirements of ASME Section XI, paragraph IWA-2232, Appendix I, and the associated Article 4 of Section V methodology in accordance with paragraph I-2110(b).

BASIS FOR RELIEF:

In accordance with ASME Section XI, Subarticle IWA-2232, TVA is required to perform ultrasonic examinations (UT) of the RPV upper shell-to-flange welds using Section XI, Appendix I, which in turn requires the use of the NDE methodologies and processes of ASME Section V, Article 4. In addition, the guidance of RG-1.150, Revision 1, was historically applied. The above listed weld is the only circumferential shell weld in the RPV that are not examined in accordance with the requirements of ASME Section XI, Appendix VIII, as mandated in 10 CFR 50.55a. This rule change mandated the use of ASME Section XI, Appendix VIII, Supplements 4 and 6 for the conduct of RPV examinations. It has been recently stated in EPRI PDI coordination meetings between the PDI committee members and the NRC Staff representatives that the NRC Staff expectations are that licensees should submit requests for relief to use the more technically advanced Appendix VIII/PDI processes for the shell-to-flange weld exams, in lieu of the Section XI Appendix I and its associated Section V, Article 4 processes.

PROPOSED ALTERNATIVES

TVA proposes to use the procedures, personnel, and equipment qualified to meet the requirements of ASME Section XI Appendix VIII, Supplements 4 and 6 as administered by the Electric Power Research Institute's (EPRI) Performance Demonstration Initiative (PDI), to conduct the required vessel-to-flange weld examinations.

JUSTIFICATION FOR GRANTING RELIEF:

ASME Section V, Article 4, describes the required techniques to be used for the UT of welds in ferretic pressure vessels with wall thicknesses greater than 2 inches. The techniques were first published in ASME Section V in the 1974 Edition, summer 1975 Addenda. The calibration techniques, recording criteria and flaw sizing methods are based upon the use of a distance-amplitude-correction curve (DAC) derived from machined reflectors in a basic calibration block. UT performed in accordance with Section V, Article 4, used recording thresholds of 50 percent DAC for the outer 80 percent of the required examination volume and 20 percent DAC from the clad/base metal interface to the inner 20 percent margin of the examination volume. Indications detected in the designated exam volume portions, with amplitudes below these thresholds, were therefore not required to be recorded. Use of the Appendix VIII/PDI processes would enhance the quality of the examination results reported because the detection sensitivity is more conservative and the procedure requires the examiner to evaluate all indications determined to be flaws regardless of their associated amplitude. The recording thresholds in Section V, Article 4, requirements and in the guidelines of RG-1.150, Revision 1, are generic and somewhat arbitrary and do not take into consideration such factors as flaw orientation, which can influence the amplitude of UT responses.

The EPRI Report NP-6273, "Accuracy of Ultrasonic Flaw Sizing Techniques for Reactor Pressure Vessels," dated March 1989, established that UT flaw sizing techniques based on tip diffraction are the most accurate. The qualified prescriptive-based UT procedures of ASME Section V, Article 4 have been applied in a controlled process with mockups of RPVs which contained real flaws and the results statistically analyzed according to the screening criteria in Appendix VIII of ASME Section XI. The results show that the procedures in Section V, Article 4, are less effective in detecting flaws than procedures qualified in accordance with Appendix VIII as administered by the PDI processes. Appendix VIII/PDI qualification procedures use the tip diffraction techniques for flaw sizing. The proposed alternative Appendix VIII/PDI UT methodology uses analysis tools based upon echo dynamic motion and tip diffraction criteria which has been validated, and is considered more accurate than the Section V, Article 4 processes.

UT performed in accordance with the Section V, Article 4 processes requires the use of beam angles of 0°, 45°, 60°, and 70° with recording criteria that precipitates equipment changes. Having to perform these process changes is time consuming and results in increased radiation exposure for the examination personnel. Having to comply with the specific ASME Section XI, Appendix I requirements for the RPV circumferential shell-to-flange weld, when the data is obtained using a less technically advanced process, results in an examination that does not provide a compensating increase in quality and safety for the higher costs and personnel exposures involved.

For future RPV shell-to-flange weld examinations TVA does not anticipate any less coverage than the required minimum of 90 percent of coverage. However, if any such limitations are encountered during the conduct of the examinations, separate individual relief requests will be submitted, as needed.

Procedures, equipment, and personnel qualified through the Appendix VIII, Supplements 4 and 6 PDI programs have shown to have a high probability of detection of flaws and are generally considered superior to the techniques employed earlier for RPV examinations. This results in increased reliability of RPV inspections and conditions where an acceptable level of quality and safety is provided with the proposed alternative methodologies. Accordingly, approval of this alternative evaluation process is requested pursuant to 10 CFR 50.55a(a)(3)(i).

IMPLEMENTATION SCHEDULE AND DURATION:

Upon approval by the NRC staff, TVA will implement the provisions of this request for the Preservice Inspection for Watts Bar Unit 2.

PRECEDENTS

Note that this request for relief is similar to the request granted to Watts Bar Unit 1 during the First and Second 10 Year Intervals submitted most recently in a letter from TVA to the NRC, dated February 7, 2007 and approved by the Staff in a letter dated February 28, 2008 (Ref. ML080630679).

SECTION 10.0

ASME SECTION XI

TECHNICAL POSITIONS

Technical determination made during implementation of this PSI program and/or the examinations to clarify a position that is not clearly understandable or exclusive to Watts Bar Unit 2 from the referenced requirements. Each Technical Position should be numbered (1,2,3,ect.) and reference to the corresponding paragraph in this or any other document that the subject pertains to and signed by as a minimum the program owner and a technical person, if appropriate and inserted in its entirety into this section following the next revision,.

TP Number	Subject	Reference	Comments
TP-1	Basis for Section XI Boundary Identification	Section XI Class 1, 2 & 3 Components	May be used for all Section XI activities or individually as stated in the TP.

Basis for
Section XI Boundary Identification

Watts Bar Nuclear (WBN) Unit 2
ASME Section XI Preservice Inspection (PSI)

TP-1

This document is a technical position to establish the basis of the interrelationships with TVA classification system and ASME Section XI activities. Nothing in this technical position shall change the overall classification of a system or component from its original design. The intent is to adjoin the design of the plant with the inspection requirements of ASME Section XI requirements for inspection. The overall design of systems structures and components to the appropriate TVA classification is based on the guidelines in the Design Criteria Document, procedure number WB-DC-40-36, "The Classification of Piping, Pumps, Valves, and Vessels". These criteria apply to piping, pumps, valves, and other pressure retaining components within fluid systems that perform a safety function. Primary and secondary safety functions are classified according to their relative importance in protecting the health and safety of the general public. The TVA Class A, B, C and D systems are classified as ASME Section III Class 1, 2 and 3 respectively, based on the relationship between the ANS Safety Class, TVA classifications, and Regulatory Guide 1.26 classifications. The Mechanical flow diagrams are labeled with the TVA classification in such a manner that the classification of every portion of a system can be determined from its flow diagram. The flow diagrams are used to designate the TVA classification A, B, C and D to establish the ASME Class 1, 2 or 3 boundaries to determine the ASME Section XI requirements.

ASME Section XI requires components identified for inspection and testing shall be governed by the group classification criteria and provides the inspection requirements for Class 1, 2 and 3 components. ASME Section XI, IWA-1320 states the rules for IWB shall be applied to those systems whose components are classified ASME Class 1 and the rules for IWC apply to components classified as ASME Class 2 and the rules for IWD apply to components classified as ASME Class 3.

Therefore, based on the guidance of WB-DC-40-36 with reference to the ANS documents and Regulatory Guide 1.26 for classification of components, the labeling and marking of the boundary interface on the flow diagrams for classification of system, Section XI activities shall be determined for ASME Class 1, 2 and 3 systems and components. In reference to the boundary marking on the mechanical flow diagrams, Section XI inspection and testing boundaries will be determined, as required and if needed to farther distinguish the boundaries a color coding method can be used for informational purposes only for the various activities. To further distinguish the activities they are separated to explain the intent of the each and color coding of the boundaries.

1) ASME Section **XI** Systems and **C**omponents (**XISC**)

This activity is to identify the system boundaries for components subject to Section XI activities. The boundaries are established based on the WBN -2 design and mechanical flow diagrams that apply to items classified as TVA Class A, B, C and D or ASME Section III Code Class 1, 2 & 3. This activity is not intended to include the Section XI inspection or testing requirements on systems or portions of a system that are optionally upgraded to a high classification, unless specifically directed by other requirements. This applies to systems of nonnuclear safety class to ASME Section III Class 2 or 3 and/or

Class 3 to Class 2, Class 2 to Class 1 or any combination there of. All other boundaries on safety Class systems represent the activities associated with Section XI, including Repair and Replacement regardless of the reason or method that detected the condition requiring the repair/replacement. To further distinguish the boundaries a set of color coded drawing can be established and labeled (i.e.2-48W801-1-XISC) with the XISC to designate the activities for systems and components for this scope of Section XI. Red will be used to represent TVA Safety Class A or ASME Code Class 1. Yellow will be used to represent TVA Safety Class B or ASME Code Class 2 and finally green to represent TVA Safety Class C & D or ASME Code Class 3. This set of color coded drawing is for informational use only and should be review for changes during periodic and/or interval updates to correspond with Section XI.

Note: This set of drawings may or may not be needed prior to startup as explained in NGDC PP-15, paragraph 2.0 C, but is needed to establish the remaining color coded drawings.

2) ASME Section **XI** Pressure **T**ests **(XIPT)**

This activity is to identify the pressure testing requirements based on Section XI and within the previously established boundaries for Systems and Components. The pressure test boundaries are determined and established by the general requirements of Article IWA-5000 for ASME Class 1, 2, & 3 systems and components requiring a pressure test. The boundary limits are generally defined by the location of the safety class interface valves within the system or as describe in IWB, IWC and IWD requirements for Class 1, 2 and 3 systems respectively. This activity is not intended to include the Section XI inspection or testing requirements on systems or portions of a system that are optionally upgraded to a high classification, unless specifically directed by other requirements. This applies to systems of nonnuclear safety class to ASME Section III Class 2 or 3 and/or Class 3 to Class 2, Class 2 to Class 1 or any combination there of. All other boundaries on safety Class systems that represent the activities associated with Section XI are to enhance and distinguish the various pressure test boundaries. A color coded drawing can be established and labeled (i.e. 2-48W801-1-XIPT) with the XIPT, to designate the system boundaries requiring a pressure tests and a visual VT-2 to be performed. The colors used to represent Class 1, 2 & 3 components are the same as previously established. This set of drawings is for informational use only and should be review for changes during periodic and/or interval updates to correspond with Section XI.

Note: This set of drawings may or may not be needed prior to startup as explained in NGDC PP-15, paragraph 2.0 C, but is needed to establish the remaining color coded drawings.

3) ASME Section **XI EX**aminations **(XIEX)**

This activity is to identify the examination requirements based on Section XI and within the previously established boundaries for systems and components that are not exempted from volumetric, surface or visual requirements on Class 1, 2 and 3 pressure retaining components. This activity is not intended to include the Section XI inspection or testing requirements on systems or portions of a system that are optionally upgraded to a high classification, unless specifically directed by other requirements. This applies to systems of nonnuclear safety class to ASME Section III Class 2 or 3 and/or Class 3 to Class 2, Class 2 to Class 1 or any combination there of. All other boundaries on safety Class systems that represent the activities associated with Section XI are to enhance and distinguish the various examination boundaries. A color coded drawing can be established and labeled (i.e.2-48W801-1-XIEX) with the

XIEX, to designate the system boundaries requiring an examination by volumetric, surface or visual VT-1 or VT-3 methods. The colors used to represent Class 1, 2 & 3 components are the same as previously established. This set of drawings is for informational use only and should be review for changes during periodic and/or interval updates to correspond with Section XI. Also, the drawings will be a reference to establish the boundaries when creating the various location drawings to identify the individual examinations that will support the population of WBN Unit 2 Preservice Inspection Program Plan.

4) ASME Section XI IWE/IWL (**XIIWE**)

This activity is to identify the examination boundaries based on Section XI IWE (ASME Categories MC) requirements that are determined to be accessible and not exempt. The boundaries will be determined by using the configuration drawing based on the design of WBN-2. To enhance and distinguish the various examination boundaries a color coded drawing can be established and labeled XIIWE, to designate the system boundaries requiring an examination. The boundaries will be represented by an outline of the color blue to designate the boundaries for examination. This set of drawings is for informational use only and should be review for changes during periodic and/or interval updates to correspond with Section XI. Also, the drawing will be referenced to establish the detailed IWE drawing for PSI and ISI.

Note: The revision on all flow diagrams and the revision (RXX) used on the informational use color coded drawing for Section XI does not have to be the same but shall be reviewed for changes that will effect the overall Section XI configuration for inspection and/or testing. As a minimum these drawing shall be reviewed prior to each period and/or interval change as described in the WBN-2 Program Plan.

Prepared By: E. Lynn McClain 5/12/2008

Program Owner: E. Lynn McClain 5/12/2008

Technical Review: Charlie Driskell 5/12/2008

SECTION 11.0

DRAWING

REFERENCE LIST

Some of the drawings will be included as the preservice inspections are completed and the drawings are updated.

Drawing Number	Drawing Title (System)	Code Class
47W801-1	Main & Reheat Steam (1)	2
47W801-2	SG Blowdown (1)(15)	2
47W803-1	Feedwater (3)	2
47W803-2	Auxiliary Feedwater (3)	2&3
47W803-3	Auxiliary Feedwater (3)	3
47W809-1	Chemical & Volume Control (62)	1,2&3
47W809-2	CVC & Boron Recovery (62)	2&3
47W809-3	CVC & Boron Recovery (62)	3
47W809-5	CVC & Boron Recovery (62)	3
47W809-7	Flood Mode Boration Makeup (84)	2&3
47W809-9	Chemical & Volume Control (62)	2
47W810-1	Residual Heat Removal (74)	1,2&3
47W811-1	Safety Injection (63)	1,2&3
47W812-1	Containment Spray (72)	2&3
47W813-1	Reactor Coolant (68)	1&2
47W814-2	Ice Condenser (61)	2
47W819-1	Primary Water (81)	2
47W830-1	Waste Disposal (77)	2
47W845-1	Essential Raw Cooling Water (67)	3
47W845-2	Essential Raw Cooling Water (67)	3
47W845-3	Essential Raw Cooling Water (67)	2&3
47W845-4	Essential Raw Cooling Water (67)	3
47W845-5	Essential Raw Cooling Water (67)	3
47W850-2	Fire Protection Raw Service Water (26)	3
47W855-1	Fuel Pool Cooling & Cleaning (78)(62)	2&3
47W859-1	Component Cooling (70)	3
47W859-3	Component Cooling (70)	2&3
47W859-4	Component Cooling (70)	3
47W862-2	SG Wet Layup, Closed Recirculation Loop (41)	2
47W865-5	Air Conditioning Chilled Water (31)	2

SECTION 12.0

ASME SECTION XI

TERMS

ALARA:	As Low As Reasonably Achievable
ANII:	Authorized Nuclear Inservice Inspector
ASME:	American Society of Mechanical Engineers
AUG:	Augmented
BC:	Branch Connection
CFR:	Code of Federal Regulations
CH:	Charging
CHR:	Containment Heat Removal
Circ:	Circumferential
CL:	Cold Leg
CCS:	Component Cooling System
CRD:	Control Rod Drive
CSS:	Containment Spray System
CS:	Carbon Steel
CSP:	Containment Spray Pump
CVCS:	Chemical and Volume Control System
DWG:	Drawing
DM:	Dissimilar Metal
ECCS:	Emergency Core Cooling System
ERCW:	Essential Raw Water Cooling System
E:	Elbow
FW:	Feedwater
FMBMS:	Flood Mode Boration Makeup System
HL:	Hot Leg
HPFP:	High Pressure Fire Protection
Hx:	Heat Exchanger
IEP:	Inspection and Examination Procedures
INPO:	Institute for Nuclear Power Operations
PSI:	Preservice Inspection
MSS:	Main Steam System

NDE:	Nondestructive Examination
NRC:	Nuclear Regulatory Commission
P:	Pipe
PENT:	Penetration
PSV:	Pressure Relief or Safety Valve
PWR:	Pressurized Water Reactor
PZR:	Pressurizer
PCV:	Pressure Control Valve
R:	Reducer
RC:	Reactor Coolant
RCP:	Reactor Coolant Pump
REV:	Revision
RHR:	Residual Heat Removal
RHRS:	Residual Heat Removal System
RECIRC:	Recirculation
RCS:	Reactor Coolant System
RPV:	Reactor Pressure Vessel
RSW:	Raw Service Water (System)
RLV:	Relief Valve
RX:	Reactor
SDCHX:	Shutdown Cooling Heat Exchanger
SD:	Shutdown
SER:	Safety Evaluation Report
SG:	Steam Generator
SGBD:	Steam Generator Blowdown (System)
SIS:	Safety Injection System
SI:	Safety Injection
SUR:	Surface Examination
SFPC:	Spent Fuel Pit Cooling (System)
SS:	Stainless Steel
Tee:	Tee
TK:	Thickness
Tech. Spec:	Technical Specification
TRM:	Technical Requirements Manual
TVA	Tennessee Valley Authority
UFSAR:	Updated Final Safety Analysis Report

VCT: Volume Control Tank
VOL: Volumetric Examination
VT: Visual Examination
VE: Visual Examination (VT-2 Augmented Type)
WDS: Waste Disposal System
WBN: Watts Bar Nuclear