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TECHNICAL EVALUATION REPORT
SECOND INTERVAL INSERVICE INSPECTION PROGRAM
OCONEE NUCLEAR STATION UNITS 1, 2, AND 3

Submitted to

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CONTENTS

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1. INTRODUCTION

Section 50.55a of 10 CFR Part 50 defines the requirements for the Inservice Inspection (ISI) Program for light-water-cooled nuclear power facilities. Incorporated by reference in this regulation is Section XI of the Boiler and Pressure Vessel Code published by the American Society of Mechanical Engineers (ASME), which provides the basis for implementing inservice inspection.*

Two types of inspections are required: (1) a preservice inspection conducted before commercial operation to establish a baseline and (2) periodic inservice inspections conducted during 10-year inspection intervals that normally start from the date of commercial operation. Separate plans for completing preservice inspection and each 10-year inservice inspection must be formulated and submitted to the U.S. Nuclear Regulatory Commission (NRC). The plan for each 10-year interval must be submitted at least six months before the start of the interval.

The current revision to 10 CFR 50.55a requires that ISI programs be updated each 120 months to meet the requirements of newer editions of Section XI. Specifically, each program is to meet the requirements (to the extent practical) of the edition and addenda of the Code incorporated in the regulation by reference in paragraph 10 CFR 50.55a(b)(2) 12 months prior to the start of the current 120-month interval. The current 120-month interval for Oconee Nuclear Station Units 1, 2, and 3 (ONS-1, 2 and 3) began March 1, 1984, and runs through March 1, 1994, and is the second inspection interval for the plant. Accordingly, the applicable version of the Code for the second ISI interval is the 1980 Edition of Section XI, with addenda through Winter 1980.

Section 2 of this report evaluates the second interval ISI plan developed by the licensee, Duke Power Company (DPC), for ONS-1, 2, and 3 for (a) compliance with this edition of Section XI, (b) compliance with ISI-related commitments identified during the NRC's review before granting an Operating License, (c) acceptability of examination sample, and (d) exclusion criteria.

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*Specific inservice test programs for pumps and valves (IST programs) are being evaluated in other reports.

Based on the date the construction permit for ONS-1, 2, and 3 was issued (November 6, 1967), the plant's components (including supports) shall meet the requirements of paragraphs 10 CFR 50.55a(g)(4) and (5) to the extent practical.

Paragraph 10 CFR 50.55a(g) recognizes that some requirements of the current edition and addenda of Section XI may not be practical to implement because of limitations of design, geometry, and materials of construction of components and systems that were designed to the older Code. The regulation therefore permits exceptions to impractical examination or testing requirements of the current Code to be requested. Relief from these requirements may be granted, provided the health and safety of the public are not endangered, giving due consideration to the burden placed on the licensee if the requirements were imposed. Section 3 of this report evaluates requests for relief dealing with inservice examination of components and with system pressure tests.

The current revision of the regulation provides that ISI programs may meet the requirements of subsequent Code editions and addenda, incorporated by reference in paragraph (b) and subject to NRC approval. Portions of such editions or addenda may be used, provided that all related requirements of the respective editions or addenda are met. Likewise, Section XI of the Code provides for certain components and systems to be exempted from its requirements. In some instances, these exemptions are not acceptable to the NRC or are only acceptable with restrictions. As appropriate, exemptions are also discussed in Section 3 of the report.

A Preservice Inspection (PSI) program was not required at ONS-1, 2, and 3 by the Code of Federal Regulations based on a construction permit date of November 6, 1967. The NRC Safety Evaluation Reports dated December 29, 1970,(1), July 6, 1973,(2) November 7, 1980,(3) January 16, 1981,(4) April 8, 1982,(5) May 17, 1982,(6) February 14, 1984,(7) and February 7, 1985,(8) evaluated Oconee Units 1, 2, and 3 first 10-year interval inspection plans and relief requests.

The initial ISI program for the second interval was submitted September 25, 1984,(9) with additional specifics provided on March 5, 1985,(10) for Unit 2 and on May 1, 1985,(11) for Unit 3. The latest revision (Revision 5) of the ISI program was submitted July 5, 1988.(12) Relief requests were submitted for the second interval on September 13, 1984,(13) November 16, 1984,(14) December 11, 1984,(15) November 12, 1985,(16) November 22, 1985,(17) January 10, 1986,(18) January 23, 1986,(19) January 31, 1986,(20) April 18, 1986,(21) May 15, 1986,(22) June 27, 1986,(23) December 3, 1986,(24) February 9, 1987,(25) March 2, 1987,(26) March 5, 1987,(27) April 7, 1987,(28) April 9, 1987,(29) September 25, 1987,(30) October 29, 1987,(31) March 7, 1988,(32) March 15, 1988,(33,34) (two letters), and March 16, 1988.(35) The November 16, 1984(14) relief request was withdrawn by letter dated November 18, 1985.(36) Two of the relief requests submitted in the September 25, 1987(30) letter (hydrotesting of repairs to valves 1BS-14 and 1FDW-329) were withdrawn by letter dated May 15, 1989.(37)

On July 22, 1985,[38] May 4, 1988,[39] and March 27, 1989,[40] the NRC requested additional information to complete the review of the ISI program and relief requests. The information was furnished as attachments to letters dated October 8, 1985,[41] October 23, 1985,[42] August 28, 1986,[43] September 19, 1986,[44] July 5, 1988,[12] and May 15, 1989.[37]

2. EVALUATION OF INSERVICE INSPECTION PLAN

2.1 Introduction

The approach being taken in this evaluation is to review the applicable program documents to determine the adequacy of their response to Code requirements and any license conditions pertinent to ISI activities. The rest of this section describes the submittals reviewed, the basic requirements of the effective Code, and the appropriate license conditions. The results of the review are then described. Finally, conclusions and recommendations are given.

2.2 Documents Evaluated

A chronology of documents on ONS-1, -2, and -3 ISI is given in Section 1 of this report.

The key documents that impact this ISI program evaluation are (1) Revision 5 of the ISI program,[12] (2) the licensee's responses to the staff's requests for additional information,[12,37,41,42,43,44] (3) the staff's previous Safety Evaluation Reports on ISI, (4) the relief requests, and (5) to a lesser extent, the previous submittals on the first interval ISI program.

2.3 Summary of Requirements

The requirements on which this review is focused include the following:

(1) Compliance with Applicable Code Editions. The Inservice Inspection Program shall be based on the Code editions defined in 10 CFR 50.55a(g)(4) and 10 CFR 50.55a(b). The licensee for ONS-1, -2, and -3 has written the first interval program to the 1980 Edition with addenda through Winter 1980. These Code requirements are summarized in 2.3.1 below and detailed Code requirements are given in Appendix A. The 1974 Edition, Summer 1975 Addenda, is to be used for selecting Class 2 welds in systems providing the functions of residual heat removal, emergency core cooling, and containment heat removal. This is a requirement of 10 CFR 50.55a(b)(2)(iv)(A).

(2) Acceptability of the Examination Sample. Inservice volumetric, surface, and visual examinations shall be performed on ASME Code Class 1 and 2 components and their supports using sampling schedules described in Section XI of the ASME Code and 10 CFR 50.55a(b). Sample size designations are identified as part of the Code requirements given in Appendix A.

(3) Exclusion Criteria. The criteria used to exclude components from examination shall be consistent with IWB-1220, IWC-1220, IWD-1220, and 10 CFR 50.55a(b).

(4) PSI Commitments. The Inservice Inspection Program should address all license conditions, qualified acceptance conditions, or other ISI-related commitments described in the Safety Evaluation Report (SER) and its supplements for the preservice examination.

2.3.1 Code Requirements

The following requirements are summarized from the 1980 Edition of Section XI with addenda through Winter 1980. Many requirements call for the examinations of all areas, while other requirements specify more limited examinations based on criteria such as representative percentage, components examined under other categories, material thickness, location relative to other welds or discontinuities, and component function and construction. For detailed requirements, see Appendix A of this report or the Code itself.

2.3.1.1 Class 1 Requirements. The following Class 1 components are to be examined in the first interval in accordance with Table IWB-2500-1:

1) Pressure-Retaining Welds in Reactor Vessels
(2) Pressure-Retaining Welds in Vessels Other than Reactor Vessels
(3) Full Penetration Welds of Nozzles in Vessels
(4) Pressure-Retaining Partial Penetration Welds in Vessels
(5) Pressure-Retaining Dissimilar Metal Welds
(6) Pressure-Retaining Bolting, Greater than 2 in. Diameter
(7) Pressure-Retaining Bolting, 2 in. and Less in Diameter
(8) Integral Attachments for Vessels
(9) Pressure-Retaining Welds in Piping
(10) Integral Attachments for Piping, Pumps, and Valves
(11) Pump Casings and Valve Bodies, including Pressure-Retaining Welds
(12) Interior of Reactor Vessel, including Integrally Welded Core Support Structures, Interior Attachments, and Removable Core Support Structures

(13) Pressure-Retaining Welds in Control Rod Housings

(14) All Pressure-Retaining Components - Pressure Tests

(15) Steam Generator Tubing.

2.3.1.2 Class 2 Requirements. The following Class 2 components are to be examined in the first interval in accordance with Table IWC-2500-1:

(1) Pressure-Retaining Welds in Pressure Vessels

(2) Pressure-Retaining Nozzle Welds in Vessels

(3) Integral Attachments for Vessels, Piping, Pumps, and Valves

(4) Pressure-Retaining Bolting Greater than 2 in. Diameter

(5) Pressure-Retaining Welds in Piping

(6) Pressure-Retaining Welds in Pumps and Valves

(7) All Pressure-Retaining Components - Pressure Tests.

2.3.1.3 Class 3 Requirements. The following Class 3 reactor-connected and associated systems are to be examined in the first interval in accordance with IWD-2500-1:

(1) Systems in Support of Reactor Shutdown Function

(2) Systems in Support of Emergency Core Cooling, Containment Heat Removal, Atmosphere Cleanup, and Reactor Residual Heat Removal

(3) Systems in Support of Residual Heat Removal from Spent Fuel Storage Pool.

2.3.1.4 Component Supports. The following examination and inspection of component supports are to be examined in the first interval in accordance with IWF-2500-1:

(1) Plate and Shell type Supports

(2) Linear Type Supports

(3) Component Standard Supports.

2.3.2 License Conditions

No PSI program was required at ONS-1, 2, and 3 based on a construction permit date of November 6, 1967. As a result, there are no license conditions related to PSI. However, the augmented examination described below has been deemed necessary by the NRC staff pursuant to 10 CFR 50.55a(g)(6)(ii).

The High Pressure Injection (HPI) System in Babcock & Wilcox (B&W) designed facilities, contains a high pressure injection nozzle-to-cold leg junction in each of the four reactor coolant system cold legs. The system is used to provide coolant for emergency core cooling and to supply normal makeup (MU) to the reactor coolant system during plant operation. In early 1982, a generic cracking problem in the HPI/MU nozzle assemblies was discovered in B&W facilities, and subsequent inspections revealed cracking at Oconee Units 2 and 3. An in-depth study was undertaken by the B&W Owners Group and a report was submitted February 15, 1983.[45] This report recommended rerolling thermal sleeves, repairing or replacing damaged components, operational modifications, and an augmented inservice inspection plan. The NRC staff agreed with the recommendations of the B&W Owners Group in a memo dated November 30, 1983.[46]

2.4 Compliance with Requirements

2.4.1 Applicable Code Edition

The inservice inspection program must comply (10 CFR 50.55a(g)(4)(i)) with the requirements of the latest edition and addenda of Section XI incorporated into 10 CFR 50.55a on the date 12 months before the start of the interval. The licensee requested on December 2, 1983,[47] the approval of a common ISI interval start date of April 1, 1984, for all three Oconee units. This request was approved by the NRC on November 7, 1984.[48] Subsequent to this approval, the licensee submitted a request on January 23, 1986,[19] to move the interval start date back by one month to March 1, 1984. SAIC recommends that the March 1, 1984 start date be approved (see relief request evaluation in Section 3.5.3 of this report). Based on a March 1, 1984 start for the second interval, the applicable Code for ONS-1, -2, and -3 is the 1980 Edition of Section XI with addenda through Winter 1980.

Section 1.0 of the ISI plan states that examinations of ONS-1, -2, and -3 Class 3 components included in Examination Category D-B will be selected in accordance with Table IWD-2500-1 of the 1980 Edition through Winter 1982 addenda. Use of this later Code edition is acceptable, provided all related requirements of the later addenda are met, per 10 CFR 50.55a(g)(4)(iv).

The licensee has not explicitly stated in the ISI plan that 10 CFR 50.55a(b)(2)(iv)(A) is being complied with. This regulation requires the use of the 1974 Edition of Section XI through Summer 1975 Addenda for selection of Class 2 piping welds in residual heat removal, emergency core cooling, and containment heat removal systems. A review of the examination listings and drawings in the ISI plan has been performed, and it appears that the licensee is complying with 10 CFR 50.55a(b)(2)(iv)(A) for this interval.

The licensee has indicated his intention in Section 1.2.2 of the ISI plan to apply Code Case N-356 to the first ISI interval at ONS-1, -2, and -3. The licensee formally requested permission to apply Code Case N-356

by letter dated February 28, 1989.[49] The NRC staff approved this request by letter dated May 16, 1989.[50] This Code Case extends the recertification period of Level III NDE personnel from 3 to 5 years, and is approved for use in Regulatory Guide 1.147, Revision 7. It is therefore recommended that the licensee be allowed to use Code Case N-356 for recertification of Level III NDE personnel.

2.4.2 Code Requirements

The first interval ISI program of record is contained in Revision 5 of the ISI program.[12] The ISI program submitted was reviewed (exclusive of pump and valve testing) and the following observations were noted:

The Inservice Inspection Program for ONS-1, -2, and -3 identifies appropriate Code classes for each component of the power plant.

Examination instructions and procedures, including diagrams or system drawings identifying the extent of areas of components subject to examination, have been prepared. They are listed in the ISI program component tables, cross-referenced to weld and hanger isometrics and component identification drawings, and marked on pipe and instrument drawings (P&IDs).

Examinations and tests are to be performed and evaluated and the results recorded providing a basis for evaluation and comparison with the results of subsequent examinations as required by Code.

Visual, surface, and volumetric examinations are defined as specified by Code.

Exemptions from examination meet Code specifications IWB-1220, IWC-1220, and IWD-1220. Replacements are performed to IWA-7000.

Examination requirements, methods, acceptance standards, inspection intervals, deferrals, the selection of items to be examined, the number of items to be examined, and the examination fraction of each weld inspected meet the requirements of Tables IWB-2500-1, IWC-2500-1, IWD-2500-1, and IWF-2500-2.

2.4.3 Preservice Inspection Commitments

There are no license conditions related to PSI at ONS-1, -2, and -3. However, the NRC has required an augmented inspection of HPI/MU nozzle assemblies as discussed in Section 2.3.2 of this report. In order to address this augmented inspection, the licensee has scheduled volumetric examination of all HPI/MU safe ends at least twice during the 10-year interval at each unit. The nozzle-to-pipe welds and nozzle-to-safe end welds are also inspected as part of the normal ISI weld inspection program. The augmented inservice inspection program is subject to review by the NRC staff.

2.5 Conclusions and Recommendations

Based on the preceding evaluation, it is concluded that the Oconee Nuclear Station Units 1, 2, and 3 ISI program meets the requirements of both the Code and the NRC regulations.

The following additional conclusions are made concerning the second interval ISI plan.

The licensee requested on December 2, 1983[47] the approval of a common ISI interval start date of April 1, 1984, for all three Oconee units. This request was approved by the NRC on November 7, 1984.[48] Subsequent to this approval, the licensee submitted a request on January 23, 1986[19] to move the interval start date back by one month to March 1, 1984. The January 23, 1986 relief request is evaluated in Section 3 of this report. It is recommended that the March 1, 1984 start date for the second interval be approved.

Category D-B examinations will be performed according to the 1980 Edition, Winter 1982 Addenda. Use of this later Code edition is acceptable, provided all related requirements of the later addenda are met, per 10 CFR 50.55a(g)(4)(iv).

In a letter dated February 28, 1989,[49] the licensee requested permission to apply Code Case N-356 to the ISI plan for ONS-1, -2, and -3. By letter dated May 16, 1989,[50] the NRC gave approval to the licensee to use Code Case N-356. Subsequently, Revision 7 of Regulatory Guide 1.147 was issued, listing Code Case N-356 as generally acceptable to the NRC staff. It is therefore permissible for the licensee to apply Code Case N-356 in determining the recertification period for Level III NDE personnel.

The licensee committed in Reference 43 to review all relief requests for hydrostatic testing submitted in the first interval for applicability to the second interval, and to resubmit those relief requests for the second interval if required. Any relief requests submitted by the licensee that are not considered in the TER will require review by the staff.

3. REQUESTS FOR RELIEF FROM ASME CODE SECTION XI EXAMINATION REQUIREMENTS

Thirty-two second-interval relief requests have been identified that require review. Nineteen of these are requests for relief from hydrostatic testing following repairs. The following sections evaluate these pending relief requests.

Where relief is recommended in the following report section, it is done so on the assumption that the proposed alternative examination and all applicable Code examinations for which relief has not been requested will be performed on the subject component. Where additional examinations beyond proposed alternatives and Code requirements are deemed necessary, these are included as conditions for recommending relief.

The material included in the paragraphs titled Code Relief Request, Proposed Alternative Examination, and Licensee's Basis for Requesting Relief, is quoted directly from the relief request except for minor editorial changes such as removing references to figures and tables not included in this report.

3.1 CLASS I COMPONENTS

3.1.1 Reactor Vessel

3.1.1.1 Relief Request ONS-001, Nozzle-to-Safe End and Safe End-to-Pipe Welds, Units 1, 2, and 3 Category B-F, Item B5.10

Code Requirement

All nozzle-to-safe end and safe end-to-pipe welds in nominal pipe size 4 in. or greater in the reactor vessel shall be surface and volumetrically examined in accordance with Figure IWB-2500-8 during each inspection interval. The safe end weld examinations may be performed coincident with the vessel nozzle examinations required by Category B-D. Dissimilar metal welds between combinations of (a) carbon or low alloy steels to high alloy steels, (b) carbon or low alloy steels to high nickel alloys, and (c) high alloy steel to high nickel alloys are included.

Code Relief Request

Relief is requested from surface examinations of circumferential welds for the two core flood nozzle-to-safe end welds at each unit.

Proposed Alternative Examination

Welds will be inspected by UT from the inside surface.

Licensee's Basis for Requesting Relief

Approximately 40 man-hours would be required to prepare each of the two core flood nozzle safe ends for inspection. The preparation would involve removal of the refueling canal seal plate, shielding bricks, shielding supports in the nozzle area, and insulation. The radiation levels in this area are expected to be 0.5 to 1 R/hr. An alternative approach is to enter from the bottom of the vessel and build a scaffold approximately 30 ft high to reach the nozzles. This approach would require approximately 80 man-hours, 40 in the 0.5 to 1 R/hr area and the other 40 in the 1-2 R/hr radiation present at the bottom of the reactor vessel, for a total exposure of 60-120 man-rem. Shielding is considered impractical in this area. Any remote inspection would require practically the same preparation work.

Evaluation

The core flood tanks inject water directly into the reactor vessel following a break in the primary pressure-retaining boundary, thereby providing a vital source of water for reactor core cooling. Assurance that the welds and base metal in the core flood system are structurally sound must therefore be provided by either performing the required examinations or an alternative that will provide equivalent or superior results. The increase in safety achieved by performing the required surface examination or an equivalent alternative outweighs the impracticalities cited by the licensee.

The licensee has not provided sufficient technical justification that the proposed volumetric examination will detect OD flaws. Therefore, to provide the degree of assurance necessary that outside diameter (OD) flaws will be detected, the licensee should either (1) demonstrate that OD flaws can be detected using the proposed alternative volumetric examination or (2) perform the surface examination as required. If the licensee chooses the first option, he should clearly demonstrate to the NRC staff that the actual procedure and instrument that would be used in the examination would detect OD flaws in the existing configuration. This demonstration should prove that OD flaws can be detected of the type which would be expected to be detected by the required surface examination on the subject safe-end welds. Demonstration of detection of machined calibration notches in a basic calibration block is not adequate for this purpose.

Conclusions and Recommendations

Based on the above evaluation, it is concluded that relief should be granted only if the licensee demonstrates by the next refueling outage that the actual procedure and instrument that would be used in the proposed examination would detect OD flaws in the existing configuration. If he cannot demonstrate to the satisfaction of NRC that the proposed examination would detect OD flaws, relief should be denied.

References

References 9, 12, 13, and 41.

3.1.2 Pressurizer

No relief requests.

3.1.3 Heat Exchangers and Steam Generators

No relief requests.

3.1.4 Piping Pressure Boundary

3.1.4.1 Relief Request ONS-002, Nozzle-to-Pipe Welds, Units 1, 2, and 3
Category B-J, Item B9.11

Code Requirement

For circumferential welds with nominal pipe size 4 in. and greater, surface plus volumetric examinations in accordance with Figure IWB-2500-8 shall be performed during each inspection interval on essentially 100% of the weld. The examination 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 the following limits under loads associated with specific seismic events and operational conditions:

(1) primary plus secondary stress intensity range of $2.4S_m$ for ferritic steel and austenitic steel, and

(2) cumulative usage factor U of 0.4.

(c) All dissimilar metal welds between combinations of:

(1) carbon or low alloy steels to high alloy steels,

(2) carbon or low alloy steels to high nickel alloys, and

(3) high alloy steels to high nickel alloys.

(d) Additional piping welds so that the total equals 25% of the circumferential joints in the reactor coolant piping system. This total does not include welds excluded by IWB-1220.

These additional welds may be located in one loop (one loop is currently defined for both PWR and BWR plants in the 1980 Edition).

for welds in carbon or low alloy steels, only those welds showing reportable preservice transverse indications need be examined for transverse reflectors.

Code Relief Request

Relief is requested from surface examinations of circumferential welds for four inlet and two outlet nozzle-to-pipe welds in the Reactor Coolant System.

Proposed Alternative Examination

Welds will be volumetrically examined from the vessel ID using an immersion ultrasonic technique, which will not require access to the OD surface of the weld. The outlet nozzle-to-pipe welds will be inspected during the first inspection period of the second interval. The inlet nozzle-to-pipe welds will be inspected during the third inspection period of the second interval.

Licensee's Basis for Requesting Relief

There are four inlet and two outlet nozzle-to-pipe welds in each Oconee Reactor Coolant System. These nozzles are SA 508 Class 2, welded to A106 Gr. C pipe. The inlet nozzle welds are 33.5 in. diameter, 2.33 in. nominal wall thickness, and the outlet nozzles are 36 in. diameter, 2.86 in. nominal wall thickness. Preparing these welds for surface inspection will require removal of the refueling canal seal plate, shielding bricks, shielding supports in the nozzle areas, and insulation. This would require approximately 300 man-hours of work in a 700-1000 m-rem/hour area for each unit. Sheilding would be impractical in this area due to the limited space and close proximity to the reactor vessel.

Evaluation

The licensee has proposed to eliminate the surface examination but to perform a volumetric examination conducted from the reactor vessel ID. The examination volume was not specified by the licensee. This alternative volumetric examination is not, however, sufficient in itself to provide the degree of assurance necessary that OD flaws will be detected. The increase in safety achieved

by performing the required surface examination or an equivalent alternative outweighs the impracticalities cited by the licensee. The licensee should either (1) demonstrate that OD flaws can be detected using the proposed alternative volumetric examination or (2) perform the surface examination as required. If the licensee chooses the first option, he should clearly demonstrate to the NRC staff that the actual procedure and instrument that would be used in the examination would detect OD flaws in the existing configuration. Relief from the surface examination should only be granted if the licensee can make this demonstration to the satisfaction of the NRC staff.

The demonstration should prove that OD flaws can be detected of the type which would be expected to be detected by the required surface examination on the subject welds. Demonstration of detection of machined calibration notches in a basic calibration block is not adequate for this purpose.

In addition, the alternative examination schedule that the licensee has proposed does not meet the minimum requirements for examinations to be completed during the second inspection period of the second interval as described in Table IWB-2412-1 of Section XI. The licensee, whether the first or second option is followed, should conform to the Table IWB-2412-1 schedule requirements.

Conclusions and Recommendations

Based on the above evaluation, it is concluded that relief should only be granted if the licensee meets both of the following conditions:

(a) demonstrates that the actual procedure and instrument that would be used in the proposed examination would detect OD flaws in the existing configuration, and

(b) performs the examination in accordance with the schedule requirements given in Table IWB-2412-1.

References

References 9, 12, 13, and 41.

3.1.5 Pump Pressure Boundary

3.1.5.1 Relief Requests ONS-007 and ONS-008, Unit 2 and 3, Reactor Coolant Pump Casing Welds and Internal Surfaces, Units 2 and 3, Categories B-L-1 and B-L-2, Items B12.10 and B12.20

Code Requirements

Pump Casing Welds, Item B12.10

Essentially 100% of the lengths of the pressure-retaining welds in at least one pump in each group of pumps performing similar functions in the system (e.g., recirculating coolant pumps) shall be volumetrically examined in accordance with Figure IWB-2500-16 during each inspection interval. A supplementary surface examination may be performed as required in IWB-3518.1(d). The examinations may be performed at or near the end of the inspection interval.

Pump Casings, Item B12.20

The internal surfaces of at least one pump in each group of pumps performing similar functions in the system (e.g., recirculating coolant pumps) shall be visually examined (VT-3) during each inspection interval. The examination may be performed on the same pump selected for volumetric examination of welds. The examinations may be performed at or near the end of the inspection interval.

Code Relief Request

Relief is requested from the requirements to examine 100% of the pump pressure retaining welds and internal surfaces.

Proposed Alternative Examination

The remaining portion of the casing can be visually and volumetrically inspected and the results of this portion of the inspection should be indicative of what conditions exist in the inaccessible areas.

Licensee's Basis for Requesting Relief

The pressure-retaining welds in Reactor Coolant Pump (RCP) A1 (Unit 3) and A2 (Unit 2) were inspected in the third inspection period of the first 10-year interval. Due to maintenance activities

in the first inspection period of the second 10-year interval, on RCP B1 (Unit 3) and the second inspection period of the second 10-year interval on RCP A1 (Unit 2), the pressure-retaining weld of the pump casing was accessible for inspection. The RCPs for Units 2 and 3 are manufactured by Bingham-Williamette Company and designed in such a way that a large portion of the internal pressure boundary is inaccessible for visual inspection, and small areas at the outer edges of the volume are inaccessible for volumetric inspection using radiography. The area on the inside radius of the discharge nozzle is too thick (approximately 14-in.) to inspect with any available technique. Ultrasonic inspection is impractical due to the pump casing being composed of cast stainless steel having characteristics of large grain size and high attenuation.

Evaluation

Because of the Bingham-Williamette design of the Units 2 and 3 RCPs, it is impractical to volumetrically examine 100% of the casing welds and visually examine 100% of the internal pressure boundary surface. The licensee has proposed to perform the required examinations to the maximum extent practical. The welds and surface area which can be examined are sufficient to determine the general condition of the pump and, along with the Code-required hydrostatic test and pump testing as required by IWP, will provide necessary assurance of structural reliability. Therefore, relief is recommended.

Conclusions and Recommendations

Based on the above evaluation, it is concluded that for the examinations discussed above, the Code requirements are impractical. It is further concluded that the proposed alternative examinations will provide necessary assurance of structural reliability. Therefore, relief is recommended as requested.

References

References 12, 25, and 35.

3.1.6 Valve Pressure Boundary

No relief requests.

3.2 CLASS 2 COMPONENTS

3.2.1 Pressure Vessels

No relief requests.

3.2.2 Piping Pressure Boundary

3.2.2.1 Relief Request ONS-006, Containment Spray System and Reactor Building Emergency Sump Piping Welds, Units 1, 2, and 3 Category C-F, Item C5.11 (Category C-F, Item C2.1 in 74S75)

Code Requirement

Table IWC-2520, Category C-F in the 1974 Summer 1975 Edition of Section XI requires 100% examination of circumferential butt welds at structural discontinuities and circumferential butt welds in piping within 3 pipe diameters of the centerline of rigid pipe anchors or anchors at the penetration of the primary reactor containment, or at rigidly anchored components. IWC-2411(e) requires that 25% of the required welds be examined during the first interval, with a different 25% examined for each successive interval. In accordance with the 1980 Winter 1980 Code, the examination method required is a surface examination in accordance with Figure IWC-2500-7 for welds in piping of nominal wall thickness 1/2-inch or less.

Code Relief Request

Relief is requested from surface examination of Containment Spray System piping beyond valves BS-14 and BS-19 to containment spray nozzles and piping from the reactor building emergency sump to valves LP-19 and LP-20.

Proposed Alternative Examination

The license has proposed no alternative examination.

Licensee's Basis for Requesting Relief

The piping of the Reactor Building Spray System from valves BS-14 and BS-19, which runs vertically and adjacent to the Reactor Building wall to the spray nozzles at the building dome, makes the required examination difficult and dangerous to perform. The

piping from the reactor building emergency sump to valves LP-19 and LP-20 is embedded in concrete and is inaccessible for the required examination.

The design pressure of the piping is within the limit for exemption under IWC-1220(b); however, the design temperature is not. Although the design temperature of the piping is 300°F, analysis indicates that the maximum temperature of the fluid to be contained within the piping following the Design Basis accident is 250°F and that the fluid temperature will drop below 200°F within 25 hours after the Design Basis accident. In sum, the subject piping is not normally subjected to the design conditions noted and would only be operated in excess of 200°F for approximately 25 hours following a Design Basis accident.

Evaluation

For the subject containment spray piping, relief is not recommended since the licensee's description of "difficult and dangerous" is not sufficient justification for declaring the Code requirements impractical.

For the portions of reactor building emergency sump line that is encased in concrete, ability to volumetrically and/or surface examine these welds is restricted by not having access to the outside surface. Alternatively, performance of flow tests required by IWC-5221 and IWC-5222 would provide adequate assurance of structural reliability for this interval.

The ASME Code Committee has addressed the subject of open-ended portions of systems in Code Case N-408 (approved by ASME, July 12, 1984). Code Case N-408 is as follows:

Inquiry: When determining the components subject to examination and establishing the examination requirements for Class 2 piping under Section XI, what alternative exemptions to those stated in IWC-1220 and what alternative examination requirements to those stated in IWC-2500, Category C-F, may be used?

Reply: Paragraph (a)(6) of the reply exempts piping and other components of any size beyond the last shutoff valve in open-ended systems (or portions of systems) of RHR, ECC, and CHR systems that do not contain water during normal plant operating conditions from the volumetric and surface examination requirements of IWC-2500.

Code Case N-408 has been referenced in Regulatory Guide 1.147, Revision 6, dated May 1988. Therefore, Code Case N-408 is acceptable for use in current or updated inservice inspection

programs. This regulatory position provides an exclusion from volumetric or surface examination for ASME Code Class 2 piping and other components of any size beyond the last shutoff valve in open-ended portions of systems that do not contain water during normal plant operating conditions.

Conclusions and Recommendations

Based on the above evaluation, the following is concluded:

(a) for the subject containment spray piping, the licensee has not provided sufficient justification for declaring the Code requirements impractical. Therefore, relief is not recommended for this piping.

(b) for the portion of the emergency sump line that is embedded in concrete, relief is recommended, provided that the flow tests required by IWC-5221 and IWC-5222 are performed.

The licensee should review the provisions of Code Case N-408 as stated above for possible applicability to the open-ended piping for which relief is requested.

References

References 12 and 16.

3.2.3 Pump Pressure Boundary

No relief requests.

3.2.4 Valve Pressure Boundary

No relief requests.

3.3 CLASS 3 COMPONENTS

No relief requests.

3.4 PRESSURE TESTS

3.4.1 Class 1 Components

3.4.1.1 Relief Request ONS-005, Hydrostatic Test of Reactor Coolant System, Units 1, 2, and 3, Category B-P, Item B15.51

Code Requirement

The piping pressure-retaining boundary shall be visually examined (VT-2) during the system hydrostatic test performed in accordance with IWB-5222 once per inspection interval. The pressure-retaining boundary during the test shall include all Class 1 components within the system boundary. The examinations may be performed at or near the end of the inspection interval. System pressure tests of the reactor coolant system shall be conducted in accordance with IWA-5000. System pressure tests for repaired, replaced, or altered components shall be governed by IWA-5214(c).

Code Relief Request

Relief is requested from the Code hydrostatic tests of the following pipe sections in the Reactor Coolant System:

Piping between valves 1RC-4 and 1RC-66 (SYS 50, ISO 47, Unit 1)
2RC-4 and 2RC-66 (SYS 50, ISO 44, Unit 2)
3RC-4 and 3RV-67 (SYS 50, ISO 45, Unit 3)

Proposed Alternative Examination

There is one 3 in. NPS, 0.438 in. wall weld, and one 2-1/2 in. NPS, 0.375 in. wall weld between each set of valves. Both welds in each unit will receive a liquid penetrant inspection at or near the end of the inspection interval. This inspection will be done in addition to any other ISI inspections performed on the system.

Licensee's Basis for Requesting Relief

Personnel safety requirements call for valve RC-4 to be closed during reactor coolant system pressure tests. This valve would have to be open to produce hydrostatic test conditions at valve RC-66 (or valve RV-67).

Evaluation

The subject section of piping is in the pressurizer relief piping. Valves 1, 2, and 3RC-4 are gate valves which are open during normal operation, but are closed during hydrostatic testing. Valves IRC-66, 2RC-66, and 3RV-67 are relief valves which cannot be exposed to the reactor coolant system hydrostatic test pressure for personnel safety reasons. There are two welds (3 in. and 2-1/2 in.) between the two valves. The licensee has proposed to perform a liquid penetrant examination on the subject welds at or near the end of the inspection interval.

The proposed alternative examination, along with the Code-required system leakage test each refueling outage, will provide adequate assurance of structural reliability.

Conclusions and Recommendations

Based on the above evaluation, it is concluded that for the examinations discussed above, the Code requirements are impractical. It is further concluded that the proposed alternative examinations will provide necessary added assurance of structural reliability. Therefore, relief is recommended as requested.

References

References 9, 12, 13, and 41.

3.4.1.2 Hydrostatic Testing of Class 1 Repair Welds Associated with Valve 1LP-46, Unit 1, IWA-4440

Code Requirement

IWA-4440 states that after repairs by welding on the pressure-retaining boundary, a system hydrostatic test shall be performed in accordance with IWA-5000. IWA-5214(b) requires that the test pressure and temperature for a system hydrostatic test subsequent to the component repair or replacement shall comply with the system test pressure and temperature specified in IWB-5222, IWC-5222, and IWD-5223, as applicable to the system which contains the repaired or replaced component.

Code Relief Request

Relief is requested from the requirement of hydrostatic testing following the maintenance or modifications concerning a 1-1/2 in. check valve, number 1LP-46.

Proposed Alternative Examination

It is proposed to liquid penetrant test the stainless steel socket welds that replaced valve 1LP-46. Additionally, visual examination for leakage at system operating temperature and pressure will be performed.

Licensee's Basis for Requesting Relief

Hydrostatic testing is impractical and uneconomical because the entire pressurizer would have to be pressurized to perform the test.

Evaluation

Valve 1LP-46 is an alarm check valve in a 1-1/2 inch pipe. To perform the required hydrostatic test, the entire pressurizer would need to be pressurized. The licensee has proposed to perform a surface examination and a visual examination for leakage at system operating temperature and pressure in lieu of the required hydrostatic test. This examination is acceptable for all partial penetration welds. If there are full penetration repair welds associated with valve 1LP-46, a volumetric examination should be performed.

Conclusions and Recommendations

Based on the above evaluation, it is concluded that for the examinations discussed above, the Code requirements are impractical. It is further concluded that the alternative examinations discussed above will provide necessary added assurance of structural reliability. Therefore, relief is recommended provided all full penetration welds are volumetrically examined.

References

Reference 15.

3.4.1.3 Hydrostatic Testing of Class 1 Repair Welds Associated with Low Pressure Injection System Valve 2LP-45, Unit 2, IWA-4440

Code Requirements

IWA-4440(a) states that after repairs by welding on the pressure-retaining boundary, a system hydrostatic test shall be performed in accordance with IWA-5000. IWA-5214(b) requires that the test pressure and temperature for a system hydrostatic test subsequent to the component repair or replacement shall comply with the system test pressure and temperature specified in IWB-5222, IWC-5222, and IWD-5223, as applicable to the system which contains the repaired or replaced component.

Code Relief Request

Relief is requested from hydrostatic testing of repair welds associated with the Low Pressure Injection System.

Proposed Alternative Examination

2LP-45 will be inspected in accordance with IWA-5211(b) during the next Unit 2 cold shutdown of sufficient duration.

Licensee's Basis for Requesting Relief

2LP-45 is used to cool down the pressurizer while shutting down the reactor. It is not utilized during normal operations. Thus, testing of 2LP-45 during operation would cause a depressurization event.

Evaluation

In the licensee's May 15, 1989[37] response to the staff's request for additional information, the licensee states that Valve 2LP-45 has subsequently been replaced by Valve 2LP-131. Any repair welds associated with Valve 2LP-45 therefore apparently no longer exist. Even though it is apparent that the Code requirements were not met for these repair welds while they existed, it is concluded that relief is no longer required. Relief from the replacement welds of Valve 2LP-131 was submitted March 7, 1988,[32] and this relief request is evaluated elsewhere in this report (see Section 3.4.1.5).

Conclusions and Recommendations

Based on the above evaluation, it is concluded that for the repair welds discussed above, relief is no longer required.

References

References 30, 32, and 37.

3.4.1.4 Hydrostatic Testing of Class 1 Repair Welds Associated with High Pressure Injection System Valve 2HP-188, Unit 2, IWA-4440

Code Requirement

IWA-4440(a) states that after repairs by welding on the pressure-retaining boundary, a system hydrostatic test shall be performed in accordance with IWA-5000. IWA-5214(b) requires that the test pressure and temperature for a system hydrostatic test subsequent to the component repair or replacement shall comply with the system test pressure and temperature specified in IWB-5222, IWC-5222, and IWD-5223, as applicable to the system which contains the repaired or replaced component.

Code Relief Request

Relief is requested from hydrostatic testing of repair welds associated with High Pressure Injection System Valve 2HP-188.

Proposed Alternative Examination

2HP-188 will be inspected in accordance with IWA-5211(b) during the next Unit 2 refueling outage (end of Cycle 9). The inspection will be performed during check valve testing on 2HP-152 and 2HP-153 (as specified in the Oconee Nuclear Station Inservice Inspection Program Manual).

Licensee's Basis for Requesting Relief

Pressure testing of 2HP-188 during normal operation would unnecessarily cause an additional thermal cycle on the B-loop injection nozzles.

Evaluation

Valve 2HP-188 is a 4-inch check valve in the high pressure injection charging piping. The licensee has proposed to perform a system functional test (IWA-5211(b)) on the subject welds, rather than a required hydrostatic test. The subject welds are not isolable from the reactor coolant system, rendering a hydrostatic test impractical. It is therefore recommended that a surface examination be performed on all partial penetration repair welds and volumetric examinations be performed on all full penetration

repair welds associated with Valve 2HP-138. This examination, along with the proposed system functional test and the Code-required hydrostatic test as part of the 10-year ISI plan, will provide necessary assurance of structural reliability. Therefore, relief is recommended.

Conclusions and Recommendations

Based on the above evaluation, it is concluded that for the hydrostatic test discussed above, the Code requirements are impractical. It is further concluded that the alternative examination discussed above will provide necessary assurance of structural reliability. Therefore, relief is recommended, provided

(a) for partial penetration repair welds, a surface examination is performed,

(b) for full penetration repair welds, a volumetric examination is performed, and

(c) a visual examination is performed at operating temperature and pressure.

References

Reference 30.

3.4.1.5 Hydrostatic Testing of Class 1 and 2 Repair Welds Associated with Low Pressure Injection System Valves LP-131, LP-132, and LP-133, Units 1 and 2, IWA-4440

Code Requirement

IWA-4440(a) states that after repairs by welding on the pressure retaining boundary, a system hydrostatic test shall be performed in accordance with IWA-5000. IWA-5214(b) requires that the test pressure and temperature for a system hydrostatic test susequent to the component repair or replacement shall comply with the system test pressures and temperatures specified in IWB-5222, IWC-5222, and IWD-5223, as applicable to the system which contains the repaired or replaced component.

Code Relief Request

Relief is requested from performing hydrostatic testing on repair welds associated with Low Pressure Injection System Valves LP-131, LP-132, and LP-133 at Units 1 and 2.

Proposed Alternative Examination

A liquid penetrant examination and an inservice leak inspection at operating temperature and pressure will be performed to verify the integrity of the welds.

Licensee's Basis for Requesting Relief

It is impractical to perform a hydrostatic test of the welds associated with installation of Valves LP-131, LP-132, and LP-133. The piping and welds associated with the installation of these valves cannot be isolated from the reactor coolant system. Hydrostatic testing of these valves would unnecessarily place additional hydrostatic test cycles on the reactor coolant system.

Evaluation

Valves LP-131, -132, and -133 are identically configured at Unit 1 and Unit 2. Valve LP-131 is a 1-1/2 inch Class 1 check valve. Valves LP-132 and LP-133 are 1-1/2 inch Class 2 gate valves, normally closed. The piping is designed for 2500 psig and 300^{o}F. Due to the arrangement of check valves, the subject valves cannot

be isolated from the reactor coolant system for hydrostatic testing rendering such tests impractical. The licensee has proposed to perform a dye penetrant test and a visual examination at system pressure and temperature.

Code Case N-416, which has been referenced in Regulatory Guide 1.147, Revision 6, dated May 1988, gives alternate examination requirements for Class 2 piping after repair or replacement. According to Code Case N-416, hydrostatic test of a repair or replacement on Class 2 piping that cannot be isolated by existing valves or that requires securing safety or relief valves may be deferred until the next regularly scheduled system hydrostatic test, provided both of the following conditions are met:

(a) prior to or immediately upon returning to service, a visual examination (VT-2) for leakage shall be conducted during a system functional test or during a system inservice test in the repaired or replaced portion of the piping system, and

(b) the repair or replacement welds shall be exmained in accordance with IWA-7000 using volumetric examination methods (IWA-2230) for full penetration welds or surface examination methods (IWA-2220) for partial penetration welds.

Code Case N-416 is referenced in Section 1.2 of the ISI plan; however, the licensee has not provided sufficient information to determine if the repair areas are partial or full penetration welds. If the Class 2 repair areas covered under this relief request are partial penetration welds, the provisions of Code Case N-416 are being met, and relief is not required. If any of the subject Class 2 repair welds are full penetration welds, the volumetric examination requirements of Code Case N-416 should be performed.

It is recommended that the Class 1 repair welds covered under this relief request comply with the same requirements discussed above for Class 2 welds.

Conclusions and Recommendations

Based on the above evaluation, the following is concluded:

(a) If the repair areas are partial penetration welds, the proposed examinations for the Class 2 repairs meet the requirements of Code Case N-416, and relief is not required, and for the Class 1 repairs, relief is recommended as requested.

(b) If the repair areas are full penetration welds, the volumetric examinations required by Code Case N-416 should be performed on both the Class 1 and Class 2 welds.

References

References 27, 31, and 32.

3.4.2 Class 2 Components

3.4.2.1 Hydrostatic Test of Steam Generator Drain Lines After Repair, Unit 3, Article IWA-4440

Code Requirement

IWA-4440(a) states that after repairs by welding on the pressure-retaining boundary, a system hydrostatic test shall be performed in accordance with IWA-5000. IWA-5214(b) requires that the test pressure and temperature for a system hydrostatic test subsequent to the component repair or replacement shall comply with the system test pressure and temperature specified in IWB-5222, IWC-5222, and IWD-5223, as applicable to the system which contains the repaired or replaced component.

Code Relief Request

Relief is requested from the hydrostatic testing requirements of Paragraph IWA-4400(a) for the portion of steam generator drain lines between 3A OTSG and 3FDW-144 at Unit 3.

Proposed Alternative Examination

The following alternative examinations will be imposed on the weld repair areas:

(a) The welds will be penetrant tested, then examined during the system pressure test prior to the Unit 3 startup.

(b) The welds will also be inspected during the OTSG/MS line hydro as part of the Inservice Inspection Plan.

Licensee's Basis for Requesting Relief

To perform the required hydrostatic test on welds 24C, 25A, and 26A would require the filling of the Steam Generator and Main Steam lines up to the stop valves with water.

Evaluation

The subject welds are in the 1-1/2 inch steam generator 3A drain line. The only way to hydrotest the subject lines is to fill the steam generator secondary side and steam lines to the stop valves with water and pressurize the system to the required

hydrostatic pressure. The licensee has proposed to perform a dye penetrant test of the repair weld areas and a system pressure test prior to plant startup.

Code Case N-416, which has been referenced in Regulatory Guide 1.147, Revision 6, dated May 1988, gives alternate examination requirements for Class 2 piping after repair or replacement. According to Code Case N-416, hydrostatic test of a repair or replacement on Class 2 piping that cannot be isolated by existing valves or that requires securing safety or relief valves may be deferred until the next regularly scheduled system hydrostatic test provided both of the following conditions are met:

(a) prior to or immediately upon returning to service, a visual examination (VT-2) for leakage shall be conducted during a system functional test or during a system inservice test in the repaired or replaced portion of the piping system, and

(b) the repair or replacement welds shall be examined in accordance with IWA-7000 using volumetric examination methods (IWA-2230) for full penetration welds or surface examination methods (IWA-2220) for partial penetration welds.

Code Case N-416 is referenced in Section 1.2 of the ISI plan; however, the licensee has not provided sufficient information to determine if the repair areas are partial or full penetration welds. If the repair areas covered under this relief request are partial penetration welds, the provisions of Code Case N-416 are being met, and relief is not required. If any of the subject repair areas are full penetration welds, the volumetric examination requirements of Code Case N-416 should be performed.

Conclusions and Recommendations

Based on the above evaluation, the following is concluded:

(a) If the repair areas are partial penetration welds, the proposed examinations meet the requirements of Code Case N-416, and relief is not required.

(b) If the repair areas are full penetration welds, the volumetric examinations required by Code Case N-416 should be performed.

References

Reference 17.

3.4.2.2 Hydrostatic Testing of Class 2 Repair Welds Associated with Unit 2 Main Steam Power Operated Valve 2MS-84 Unit 2, IWA-4440

Code Requirement

IWA-4440(a) states that after repairs by welding on the pressure-retaining boundary, a system hydrostatic test shall be performed in accordance with IWA-5000. IWA-5214(b) requires that the test pressure and temperature for a system hydrostatic test subsequent to the component repair or replacement shall comply with the system test pressure and temperature specified in IWB-5222, IWC-5222, and IWD-5223, as applicable to the system which contains the repaired or replaced component.

Code Relief Request

Relief is requested from hydrostatic testing requirements for Unit 2 Main Steam Power Operated Valve 2MS-84 repair welds.

Proposed Alternative Examination

(a) The welds will be 100% radiographed.

(b) The welds will also be inspected during the OTSG/MS line hydro as part of the Inservice Inspection Plan.

Licensee's Basis for Requesting Relief

To perform the required hydrostatic test would require the filling of the main steam line with water, and would place additional cycles on the steam generator.

Therefore, the licensee requests that Valve 2MS-84 be considered exempt from the requirements of Paragraph IWC-5210(a)(2).

Evaluation

Valve 2MS-84 is in a pipe that is 8 in. ID x 1/2 in. nominal wall thickness. The only way to hydrostatic test the subject lines is to fill the steam generator secondary side and steam lines to the stop valves with water and pressurize the system to the required hydrostatic pressure. The licensee has proposed to perform a radiographic test of the repair weld areas.

Code Case N-416, which has been referenced in Regulatory Guide 1.147, Revision 6, dated May 1988, gives alternate examination requirements for Class 2 piping after repair or replacement. According to Code Case N-416, hydrostatic test of a repair or replacement on Class 2 piping that cannot be isolated by existing valves or that requires securing safety or relief valves may be deferred until the next regularly scheduled system hydrostatic test provided both of the following conditions are met:

(a) prior to or immediately upon returning to service, a visual examination (VT-2) for leakage shall be conducted during a system functional test or during a system inservice test in the repaired or replaced portion of the piping system, and

(b) the repair or replacement welds shall be examined in accordance with IWA-7000 using volumetric examination methods (IWA-2230) for full penetration welds or surface examination methods (IWA-2220) for partial penetration welds.

Code Case N-416 is referenced in Section 1.2 of the ISI plan; however, the licensee has not provided sufficient information to determine if the repair areas are partial or full penetration welds. If the repair areas covered under this relief request are full penetration welds, the provisions of Code Case N-416 are being met, and relief is not required. If any of the subject repair areas are partial penetration welds, the surface examination requirements of Code Case N-416 should be performed.

Conclusions and Recommendations

Based on the above evaluation, the following is concluded:

(a) If the repair areas are full penetration welds, the proposed examinations meet the requirements of Code Case N-416, and relief is not required.

(b) If the repair areas are partial penetration welds, the surface examinations required by Code Case N-416 should be performed.

References

Reference 24.

3.4.2.3 Hydrostatic Testing of Class 2 Repair Welds Associated with Low Pressure Service Water Valve 3LPSW-15, Unit 3, IWA-4440

Code Requirement

IWA-4440 states that after repairs by welding on the pressure-retaining boundary, a system hydrostatic test shall be performed in accordance with IWA-5000. IWA-5214(b) requires that the test pressure and temperature for a system hydrostatic test subsequent to the component repair or replacement shall comply with the system test pressure and temperature specified in IWB-5222, IWC-5222, and IWD-5223, as applicable to the system which contains the repaired or replaced component.

Code Relief Request

Relief is requested from hydrostatic testing repair welds associated with Low Pressure Service Water Valve 3LPSW-15.

Proposed Alternative Examination

A radiographic test will be performed, and an inservice leak inspection will be performed at operating temperature and pressure.

Licensee's Basis for Requesting Relief

Isolation valve 3LPSW-108 leaks past the seat. Consequently, in order to further isolate 3LPSW-15, the entire LPSW system must be shut down. Shutting down the LPSW system would require shutting down all three reactors.

Evaluation

The only way to hydrostatically test the subject welds is to shut down the entire Low Pressure Service Water system, which requires shutting down all three reactors. The licensee has proposed to perform a radiographic examination of the repair weld areas, and a system pressure test prior to startup.

Code Case N-416, which has been referenced in Regulatory Guide 1.147, Revision 6, dated May 1988, gives alternate examination requirements for Class 2 piping after repair or replacement. According to Code Case N-416, hydrostatic test of a repair or replacement on Class 2 piping that cannot be isolated by existing valves or that

requires securing safety or relief valves may be deferred until the next regularly scheduled system hydrostatic test provided both of the following conditions are met:

(a) prior to or immediately upon returning to service, a visual examination (VT-2) for leakage shall be conducted during a system functional test or during a system inservice test in the repaired or replaced portion of the piping system, and

(b) the repair or replacement welds shall be examined in accordance with IWA-7000 using volumetric examination methods (IWA-2230) for full penetration welds or surface examination methods (IWA-2220) for partial penetration welds.

Code Case N-416 is referenced in Section 1.2 of the ISI plan; however, the licensee has not provided sufficient information to determine if the repair areas are partial or full penetration welds. If the repair areas covered under this relief request are partial penetration welds, the provisions of Code Case N-416 are being met, and relief is not required. If any of the subject repair areas are full penetration welds, the volumetric examination requirements of Code Case N-416 should be performed.

Conclusions and Recommendations

Based on the above evaluation, the following is concluded:

(a) If the repair areas are full penetration welds, the proposed examinations meet the requirements of Code Case N-416, and relief is not required.

(b) If the repair areas are partial penetration welds, the surface examinations required by Code Case N-416 should be performed.

References

References 27 and 37.

3.4.2.4 Hydrostatic Testing of Class 2 Repair Welds Associated with Low Pressure Injection System Valve 2LP-19, Unit 2, IWA-4440

Code Requirement

IWA-4440(a) states that after repairs by welding on the pressure-retaining boundary, a system hydrostatic test shall be performed in accordance with IWA-5000. IWA-5214(b) requires that the test pressure and temperature for a system hydrostatic test subsequent to the component repair or replacement shall comply with the system test pressure and temperature specified in IWB-5222, IWC-5222, and IWD-5223, as applicable to the system which contains the repaired or replaced component.

Code Relief Request

Relief is requested from hydrostatic testing repair welds associated with Low Pressure Injection System Valve 2LP-19.

Proposed Alternative Examination

2LP-19 will be inspected in accordance with IWA-5211(b) during the next Unit 2 refueling outage (end of Cycle 9). The system will be pressurized by installation of a flange on the open end.

Licensee's Basis for Requesting Relief

2LP-19 cannot be pressurized since the system is open-ended.

Evaluation

Valve 2LP-19 is a 14-in. gate valve that is normally closed with an open-ended discharge to the reactor building sump. There is a flange connection on the open end of the piping to which a blind flange can be attached. The licensee has proposed to perform a system functional test (IWA-5211(b)) on the subject welds with the blind flange installed. Based on a review of Drawing OFD-102A-21, Rev. 3, there does not appear to be any reason why the required hydrostatic test (IWC-5222) cannot be performed in place of the system functional test proposed. The licensee should either (1) perform the required hydrostatic test or (2) conduct a nondestructive examination (surface examination of partial welds, volumetric examination of full penetration welds) in accordance with alternative examinations for Class 2 piping given in Code Case N-416.

Conclusions and Recommendations

Based on the above evaluation, it is concluded that there is not sufficient justification for declaring the Code requirements impractical. The licensee should perform either of the following examinations:

(a) The required hydrostatic test (IWC-5222) with the blind flange installed, or

(b) Along with the proposed system functional test (IWC-5221(b)), a surface examination of all partial penetration welds and a volumetric examination of all full penetration welds should be performed in accordance with Code Case N-416.

References

Reference 30.

3.4.2.5 Hydrostatic Test of a Repair to Class 2 Feedwater System Weld 30B, Unit 1, IWA-4440

Code Requirement

IWA-4440(a) states that after repairs by welding on the pressure-retaining boundary, a system hydrostatic test shall be performed in accordance with IWA-5000. IWA-5214(b) requires that the test pressure and temperature for a system hydrostatic test subsequent to the component repair or replacement shall comply with the system test pressure and temperature specified in IWB-5222, IWC-5222, and IWD-5223, as applicable to the system which contains the repaired or replaced component.

Code Relief Request

Relief is requested from hydrostatic testing of repairs to Unit 1 Feedwater System Class 2 Weld 30B.

Proposed Alternative Examination

A VT-2 inspection and a radiograph will be performed on the subject weld. In addition, the weld will be hydrostatically tested as part of the 10-year ISI of feedwater, OTSG, and Main Steam.

Licensee's Basis for Requesting Relief

Performing the required pressure test would require a hydrostatic test of the Once Through Steam Generator (OTSG), and associated piping. Hydrostatic testing of the OTSG would require filling the Main Steam lines with water and would unnecessarily place additional hydrostatic test cycles on the OTSG.

Evaluation

The only way to hydrotest the subject weld is to fill the steam generator secondary side and steam lines to the stop valves with water and pressurize the system to the required hydrostatic pressures. The licensee has proposed to perform a radiographic inspection of the repair weld areas and a system pressure test prior to plant startup.

Code Case N-416, which has been referenced in Regulatory Guide 1.147, Revision 6, dated May 1988, gives alternate examination requirements for Class 2 piping after repair or replacement. According to Code Case N-416, hydrostatic test of a repair or replacement on Class 2 piping that cannot be isolated by existing valves or that requires securing safety or relief valves may be deferred until the next regularly scheduled system hydrostatic test provided both of the following conditions are met:

(a) prior to or immediately upon returning to service, a visual examination (VT-2) for leakage shall be conducted during a system functional test or during a system inservice test in the repaired or replaced portion of the piping system, and

(b) the repair or replacement welds shall be examined in accordance with IWA-7000 using volumetric examination methods (IWA-2230) for full penetration welds or surface examination methods (IWA-2220) for partial penetration welds.

Code Case N-416 is referenced in Section 1.2 of the ISI plan; however, the licensee has not provided sufficient information to determine if the repair areas are partial or full penetration welds. If the repair areas covered under this relief request are full penetration welds, the provisions of Code Case N-416 are being met, and relief is not required. If any of the subject repair areas are partial penetration welds, the surface examination requirements of Code Case N-416 should be performed.

Conclusions and Recommendations

Based on the above evaluation, the following is concluded:

(a) If the repair areas are full penetration welds, the proposed examinations meet the requirements of Code Case N-416 and relief is not required.

(b) If the repair areas are partial penetration welds, the surface examinations required by Code Case N-416 should be performed.

References

Reference 31.

3.4.2.6 Hydrostatic Testing of Repairs to Class 2 Low Pressure Service Water System Welds 31 and 32 Associated with Valve 1LPSW-6, Unit 1, IWA-4440

Code Requirement

IWA-4440(a) states that after repairs by welding on the pressure-retaining boundary, a system hydrostatic test shall be performed in accordance with IWA-5000. IWA-5214(b) requires that the test pressure and temperature for a system hydrostatic test subsequent to the component repair or replacement shall comply with the system test pressure and temperature specified in IWB-5222, IWC-5222, and IWD-5223, as applicable to the system which contains the repaired or replaced component.

Code Relief Request

Relief is requested from hydrostatic testing of repairs to Welds 31 and 32 associated with Valve 1LPSW-6.

Proposed Alternative Examination

Welds will be radiographed and a VT-2 examination will be performed when the system is placed inservice.

Licensee's Basis for Requesting Relief

Welds 31 and 32 cannot be hydrostatically tested since the marbo plug used for the pressure boundary cannot withstand the differential pressure from the opposite direction. Further isolation would require shutdown of all three reactors.

Evaluation

Valve 1LPSW-6 is in a ten-inch pipe. The licensee has stated that the marbo plug, an isolation device, would unseat with the applied differential pressure across the plug caused by the hydrostatic test pressure.

Code Case N-416, which has been referenced in Regulatory Guide 1.147, Revision 6, dated May 1988, gives alternate examination requirements for Class 2 piping after repair or replacement. According to Code Case N-416, hydrostatic test of a repair or replacement on Class 2 piping that cannot be isolated by existing valves or that

requires securing safety or relief valves may be deferred until the next regularly scheduled system hydrostatic test provided both of the following conditions are met:

(a) prior to or immediately upon returning to service, a visual examination (VT-2) for leakage shall be conducted during a system functional test or during a system inservice test in the repaired or replaced portion of the piping system, and

(b) the repair or replacement welds shall be examined in accordance with IWA-7000 using volumetric examination methods (IWA-2230) for full penetration welds or surface examination methods (IWA-2220) for partial penetration welds.

Code Case N-416 is referenced in Section 1.2 of the ISI plan; however, the licensee has not provided sufficient information to determine if the repair areas are partial or full penetration welds. If the repair areas covered under this relief request are full penetration welds, the provisions of Code Case N-416 are being met, and relief is not required. If any of the subject repair areas are partial penetration welds, the surface examination requirements of Code Case N-416 should be performed.

Conclusions and Recommendations

Based on the above evaluation, the following is concluded:

(a) If the repair areas are full penetration welds, the proposed examinations meet the requirements of Code Case N-416, and relief is not required.

(b) If the repair areas are partial penetration welds, the surface examinations required by Code Case N-416 should be performed.

References

References 31 and 37.

3.4.2.7 Hydrostatic Testing of Class 2 and 3 Repair Welds Associated with Low Pressure Service Water System Valve 1LPSW-15, Unit 1, IWA-4440

Code Requirement

IWA-4440(a) states that after repairs by welding on the pressure-retaining boundary, a system hydrostatic test shall be performed in accordance with IWA-5000. IWA-5214(b) requires that the test pressure and temperature for a system hydrostatic test subsequent to the component repair or replacement shall comply with the system test pressure and temperature specified in IWB-5222, IWC-5222, and IWD-5223, as applicable to the system which contains the repaired or replaced component.

Code Relief Request

Relief is requested from hydrostatic testing of repair welds associated with Low Pressure Service Water System Valve 1LPSW-15.

Proposed Alternative Examination

A radiograph will be performed, and an inservice leak inspection will be performed at operating temperature and pressure.

Licensee's Basis for Requesting Relief

In order to isolate 1LPSW-15, the entire LPSW system must be shut down, which would require shutting down all three reactors.

Evaluation

Valve 1LPSW-15 is in a ten-inch pipe. The only way to hydrotest the subject welds is to shut down the entire LPSW system, which requires shutting down all three reactors. The licensee has proposed to perform a radiographic inspection of the weld repair areas and a visual examination for leakage at system operating pressure and temperature.

Code Case N-416, which has been referenced in Regulatory Guide 1.147, Revision 6, dated May 1988, gives alternate examination requirements for Class 2 piping after repair or replacement. According to Code Case N-416, hydrostatic test of a repair or replacement on Class 2 piping that cannot be isolated by existing valves or that

requires securing safety or relief valves may be deferred until the next regularly scheduled system hydrostatic test provided both of the following conditions are met:

(a) prior to or immediately upon returning to service, a visual examination (VT-2) for leakage shall be conducted during a system functional test or during a system inservice test in the repaired or replaced portion of the piping system, and

(b) the repair or replacement welds shall be examined in accordance with IWA-7000 using volumetric examination methods (IWA-2230) for full penetration welds or surface examination methods (IWA-2220) for partial penetration welds.

Code Case N-416 is referenced in Section 1.2 of the ISI plan; however, the licensee has not provided sufficient information to determine if the repair areas are partial or full penetration welds. If the repair areas covered under this relief request are full penetration welds, the provisions of Code Case N-416 are being met, and relief is not required. If any of the subject repair areas are partial penetration welds, the surface examination requirements of Code Case N-416 should be performed.

Conclusions and Recommendations

Based on the above evaluation, the following is concluded:

(a) If the repair areas are full penetration welds, the proposed examinations meet the requirements of Code Case N-416, and relief is not required.

(b) If the repair areas are partial penetration welds, the surface examinations required by Code Case N-416 should be performed.

References

References 31 and 37.

3.4.2.8 Hydrostatic Testing of Class 2 Repair Welds Associated with Feedwater System Valves 1FDW-207 and 1FDW-209, Unit 1, IWA-4440

Code Requirement

IWA-4440(a) states that after repairs by welding on the pressure-retaining boundary, a system hydrostatic test shall be performed in accordance with IWA-5000. IWA-5214(b) requires that the test pressure and temperature for a system hydrostatic test subsequent to the component repair or replacement shall comply with the system test pressure and temperature specified in IWB-5222, IWC-5222, and IWD-5223, as applicable to the system which contains the repaired or replaced component.

Code Relief Request

Relief is requested from hydrostatic testing of repair welds associated with Feedwater System Valves 1FDW-207 and 1FDW-209.

Proposed Alternative Examination

A VT-2 examination of welds will be performed during hot shutdown. In addition, dye penetrant testing will be performed on welds.

Licensee's Basis for Requesting Relief

The inlet side of FDW-207 and FDW-209 cannot be hydrostatically tested without pressurizing the steam generator.

Evaluation

Valves 1FDW-207 and 1FDW-209 are in 1-1/2 inch piping connected to steam generator 1B. The only way to hydrotest the subject welds is to fill the steam generator secondary side and steam lines to the stop valves with water and pressurize the system to the required hydrostatic pressure. The licensee has proposed to perform a dye penetrant test of the repair weld areas and a system pressure test prior to plant startup.

Code Case N-416, which has been referenced in Regulatory Guide 1.147, Revision 6, dated May 1988, gives alternate examination requirements for Class 2 piping after repair or replacement. According to Code Case N-416, hydrostatic test of a repair or replacement

on Class 2 piping that cannot be isolated by existing valves or that requires securing safety or relief valves may be deferred until the next regularly scheduled system hydrostatic test provided both of the following conditions are met:

(a) prior to or immediately upon returning to service, a visual examination (VT-2) for leakage shall be conducted during a system functional test or during a system inservice test in the repaired or replaced portion of the piping system, and

(b) the repair or replacement welds shall be examined in accordance with IWA-7000 using volumetric examination methods (IWA-2230) for full penetration welds or surface examination methods (IWA-2220) for partial penetration welds.

Code Case N-416 is referenced in Section 1.2 of the ISI plan; however, the licensee has not provided sufficient information to determine if the repair areas are partial or full penetration welds. If the repair areas covered under this relief request are partial penetration welds, the provisions of Code Case N-416 are being met, and relief is not required. If any of the subject repair areas are full penetration welds, the volumetric examination requirements of Code Case N-416 should be performed.

Conclusions and Recommendations

Based on the above evaluation, the following is concluded:

(a) If the repair areas are partial penetration welds, the proposed examinations meet the requirements of Code Case N-416, and relief is not required.

(b) If the repair areas are full penetration welds, the volumetric examinations required by Code Case N-416 should be performed.

References

References 31 and 37.

3.4.2.9 Hydrostatic Testing of Class 2 Repair Welds Associated with Feedwater System Valves 2FDW-206, 2FDW-209, and 2FDW-144, Unit 2, IWA-4440

Code Requirement

IWA-4440(a) states that after repairs by welding on the pressure-retaining boundary, a system hydrostatic test shall be performed in accordance with IWA-5000. IWA-5214(b) requires that the test pressure and temperature for a system hydrostatic test subsequent to the component repair or replacement shall comply with the system test presssure and temperature specified in IWB-5222, IWC-5222, and IWD-5223, as applicable to the system which contains the repaired or replaced component.

Code Relief Request

Relief is requested from hydrostatic testing of repair welds associated with Feedwater System Valves 2FDW-206, 2FDW-209, and 2FDW-144.

Proposed Alternative Examination

A liquid penetrant examination and a VT-2 inspection at operating temperature and pressure will be performed to verify the integrity of the welds. In addition, the welds will be hydrostatically tested during the second 10-year interval inservice inspection hydrotest of the main steam lines.

Licensee's Basis for Requesting Relief

The piping and welds associated with installation of the valves cannot be isolated from the steam generators. Hydrostatic testing of these valves would require hydrostatic testing of the steam generators and associated piping. Hydrostatic testing of the steam generators would require filling the main steam lines with water and would unnecessarily place additional hydrostatic test cycles on the steam generators.

Evaluation

The subject valves are in 1-1/2 inch piping connected to the steam generator. The only way to hydrotest the subject welds is to fill the steam generator secondary side and steam lines to the stop

valves with water and pressurize the system to the required hydrostatic pressure. The licensee has proposed to perform a dye penetrant test of the repair weld areas and a system pressure test prior to plant startup.

Code Case N-416, which has been referenced in Regulatory Guide 1.147, Revision 6, dated May 1988, gives alternate examination requirements for Class 2 piping after repair or replacement. According to Code Case N-416, hydrostatic test of a repair or replacement on Class 2 piping that cannot be isolated by existing valves or that requires securing safety or relief valves may be deferred until the next regularly scheduled system hydrostatic test provided both of the following conditions are met:

(a) prior to or immediately upon returning to service, a visual examination (VT-2) for leakage shall be conducted during a system functional test or during a system inservice test in the repaired or replaced portion of the piping system, and

(b) the repair or replacement welds shall be examined in accordance with IWA-7000 using volumetric examination methods (IWA-2230) for full penetration welds or surface examination methods (IWA-2220) for partial penetration welds.

Code Case N-416 is referenced in Section 1.2 of the ISI plan; however, the licensee has not provided sufficient information to determine if the repair areas are partial or full penetration welds. If the repair areas covered under this relief request are partial penetration welds, the provisions of Code Case N-416 are being met, and relief is not required. If any of the subject repair areas are full penetration welds, the volumetric examination requirements of Code Case N-416 should be performed.

Conclusions and Recommendations

Based on the above evaluation, the following is concluded:

(a) If the repair areas are partial penetration welds, the proposed examinations meet the requirements of Code Case N-416, and relief is not required.

(b) If the repair areas are full penetration welds, the volumetric examinations required by Code Case N-416 should be performed.

References

Reference 34.

3.4.3 Class 3 Components

3.4.3.1 Pressure Testing of Class 3 Emergency Feedwater System Piping, Units 1, 2, and 3, Category D-A, Item D1.10

Code Requirement

Paragraph IWA-5211(c) requires that a system inservice test be conducted to perform a visual examination (VT-2) while the system is in service under operating pressure. The examination shall be conducted each inspection period.

Code Relief Request

Relief is requested from performing a system inservice test on the emergency feedwater system piping downstream of valves FDW-372 and FDW-382 on all three units.

Proposed Alternative Examination

Piping will be pressurized during the steam generator/main steam line hydrostatic test as part of the inservice inspection plan during the 10-year interval.

Licensee's Basis for Requesting Relief

This section of piping cannot be adequately isolated from the steam generator. Testing of this section during operation could result in thermal shock on steam generator tubes.

Evaluation

The emergency feedwater system is intended to operate only in emergency situations. Operating this system downstream of the last shutoff valves during normal plant operation could result in thermal shock to steam generator tubes. The licensee's proposed alternative examination will provide necessary added assurance of structural integrity during this interval.

Conclusions and Recommendations

Based on the above evaluation, it is concluded that the Code requirements are impractical. It is further concluded that the proposed alternative examination will provide necessary added assurance of structural integrity during this interval. Therefore, relief is recommended as requested.

References

Reference 18.

3.4.3.2 Pressure Testing of the Reactor Building Hydrogen Purge Cart, Units 1, 2, and 3, Category D-B, Item D2.10

Code Requirements

Paragraph IWA-5224(d) states that where the respective system primary pressure ratings on the suction side and discharge side of system pumps differ, the system boundary shall be divided into two separate boundaries (such as suction side and discharge side test boundaries).

Code Relief Request

Relief is requested from the requirements of IWA-5224(d) for the reactor building hydrogen purge cart on all three units.

Proposed Alternative Examination

A visual examination will be performed.

Licensee's Basis for Requesting Relief

The inlet side of the Reactor Building Hydrogen Purge Blower design pressure is 0 psi; the outlet side of the blower design pressure is 0.65 psi. The blower cannot be isolated from the system; consequently, a leak test would damage the blower. Therefore, the requirements of IWA-5224(d) cannot be fulfilled.

Evaluation

The reactor building hydrogen purge system is operated as necessary to maintain the hydrogen concentration below the control limit. It appears that both the suction and discharge portions of this arrangement can be considered open ended, for which IWD-5223(c) and (d) would be applied. Therefore, confirmation of adequate flow during system operation shall be acceptable in lieu of the system hydrostatic test. The blower need not act as a pressure boundary for such a test, and relief is not required.

Conclusions and Recommendations

Based on the above evaluation, it is concluded that for the purge cart discussed above, relief is not necessary. Confirmation of adequate flow during system operation will be acceptable in lieu of the system hydrostatic test.

References

Reference 22.

3.4.3.3 Pressure Testing of Class 3 Penetration Room Ventilation System, Units 1, 2, and 3, Category D-B, Item D2.10

Code Requirement

IWD-5210(a) requires that the pressure-retaining components within the boundary of each system specified in the examination categories of Table IWD-2500-1 shall be pressure tested and examined in accordance with Table IWD-2500-1 during the following tests:

(1) system inservice test, IWA-5211(c)
(2) system functional test, IWA-5211(b)
(3) system hydrostatic test, IWA-5211(d).

Code Relief Request

Relief is requested from pressure testing of the penetration room ventilation system.

Proposed Alternative Examination

No alternative proposed.

Licensee's Basis for Requesting Relief

The Penetration Room Ventilation System collects and processes potential reactor building penetration leakage to minimize environmental activity levels resulting from post-accident reactor building leaks.

The required inspection cannot be performed due to the fact that when the system is in service, it is not under pressure, but under a vacuum that extends to an open-ended system.

Evaluation

There is no way to pressure test the subject lines since they operate under vacuum and are open ended.

The Code does not specifically address pressure testing of open-ended lines under vacuum. However, the requirements of IWD-5223(d) state that for open-ended portions of discharge lines beyond the last shutoff valve in nonclosed systems (e.g., service water

systems), confirmation of adequate flow during system operation shall be acceptable in lieu of the system pressure test. These requirements could logically be applied to the Penetration Room Ventilation System. It is therefore recommended that confirmation of adequate flow during system operating be obtained in lieu of pressure testing for the subject lines.

Conclusions and Recommendations

Based on the above evaluation, it is concluded that the Code requirements are impractical. It is further concluded that the alternative examination discussed above will provide necessary assurance of structural reliability. Therefore, relief is recommended provided that adequate flow during system operation is obtained.

References

Reference 28.

3.4.3.4 Hydrostatic Testing of Class 3 Purification Demineralizer Piping, Units 1, 2, and 3, IWA-5240

Code Requirements

IWA-5241 requires visual examination (VT-2) to be conducted by examining the accessible external exposed surfaces of pressure-retaining components for evidence of leakage. For components whose external surfaces are inacessible for direct visual examination, only the examination of surrounding area, including floor areas or equipment surfaces located underneath the components, for evidence of leakage shall be required.

Code Relief Request

Relief is requested from visual examination of Purification Demineralizer Piping during hydrostatic testing.

Proposed Alternative Examination

Piping will be hydrostatically tested during the 10-year inservice inspection by performing a pressure drop test.

Licensee's Basis for Requesting Relief

Piping from the demineralizer to the point where the piping penetrates the floor cannot be inspected due to the fact that radiation dose at the demineralizer is in excess of 250 R.

Evaluation

Visual examination of the Purification Demineralizer Piping cannot be performed due to the unacceptably high radiation dosage that would be received by inspectors. The licensee has proposed as an alternate to perform a pressure drop test on the subject piping. IWA-5244 addresses such a test to be performed on buried components. A pressure loss test is an acceptable alternative for the inaccessible Purification Demineralizer Piping.

Conclusions and Recommendations

Based on the above evaluation, it is concluded that for the piping discussed above, the Code requirements are impractical. It is further concluded that the proposed alternative examination will provide adequate assurance of structural reliability. Therefore, relief is recommended as requested.

References

References 28 and 29.

3.4.3.5 Hydrostatic Testing of Emergency Feedwater Pump Turbine Steam Drain Gate Valve 1SD43, Unit 1, Article IWA-4440

Code Requirement

IWA-4440(a) states that after repairs by welding on the pressure-retaining boundary, a system hydrostatic test shall be performed in accordance with IWA-5000. IWA-5214(b) requires that the test pressure and temperature for a system hydrostatic test subsequent to the component repair or replacement shall comply with the system test pressure and temperature specified in IWB-5222, IWC-5222, and IWD-5223, as applicable to the system which contains the repaired or replaced component. IWA-4400(b)(5) states that component connections, piping, and associated valves that are 1 in. nominal pipe size and smaller may be exempted from the system hydrostatic test.

Code Relief Request

Relief is requested from the requirement of hydrostatic testing following maintenance or modifications concerning a 3/4 in. Velan Model WH-254B-2TY Gate Valve.

Proposed Alternative Examination

Liquid penetrant testing will be performed on the welds, and a leak check will be performed at system temperature and pressure (495 psig and 310^{o}F).

Licensee's Basis for Requesting Relief

Hydrostatic testing of this valve is impractical and uneconomical; since the valve cannot be isolated, testing would require pressurization of both the auxiliary steam header and the Turbine Driven Emergency Feedwater Pump.

Evaluation

Article IWA-4000, Repair Procedures, gives rules for repairs and attaching replacements. Paragraph IWA-4400 of this article defines the rules for hydrostatic testing as applied to repairs and replacements. This paragraph includes an exemption from

hydrostatic testing of repaired or replaced valves that are 1-in. nominal pipe size and smaller (IWA-4400(b)(5)). The gate valve for which relief was requested falls in the 1-in. and under valve category. Therefore, relief is not required.

Conclusions and Recommendations

Based on the above evaluation, it is concluded that the relief request discussed above is not required and, therefore, should not be granted.

References

Reference 15.

3.4.3.6 Hydrostatic Testing of a Repair Weld in the Emergency Feedwater Pump Turbine Oil Cooler Pump Suction Line, Unit 1, Article IWA-4440

Code Requirement

IWA-4440(a) states that after repairs by welding on the pressure-retaining boundary, a system hydrostatic test shall be performed in accordance with IWA-5000. IWA-5214(b) requires that the test pressure and temperature for a system hydrostatic test subsequent to the component repair or replacement shall comply with the system test pressure and temperature specified in IWB-5222, IWC-5222, and IWD-5223, as applicable to the system which contains the repaired or replaced component.

Code Relief Request

Relief is requested from performing a hydrostatic test in accordance with IWA-4400(a) on the emergency feedwater pump turbine oil cooler pump suction line tie-in weld to the 78-in. condenser circulating water line at Unit 1.

Proposed Alternative Examination

In lieu of the hydrostatic test, the weld will be inservice leak-tested and penetrant-tested prior to returning the emergency feedwater pump turbine oil cooler pump to service.

Licensee's Basis for Requesting Relief

The subject repair weld cannot be isolated from the condenser circulating water system. Performance of the required hydrostatic test would require pressurizing the system to the condenser circulating water pumps.

Evaluation

The line containing the repair weld cannot be isolated from the 78-in. condenser circulating water intake pipe, rendering the required hydrostatic test impractical. The licensee has proposed to perform a dye-penetrant test of the repair weld areas and a system pressure test prior to returning the emergency feedwater pump turbine oil cooler pump to service. These examinations are a reasonable alternative to the required hydrostatic test for the subject Class 3 repair weld.

Conclusions and Recommendations

Based on the above evaluation, it is concluded that for the repair weld discussed above, the Code requirements are impractical. It is further concluded that the proposed alternative examinations will provide necessary assurance of structural reliability. Therefore, relief is recommended as requested.

References

Reference #1.

3.4.3.7 Hydrostatic Testing of Class 3 Repair Welds Associated with Auxiliary Steam Check Valve 1AS-39, Unit 1, IWA-4440

Code Requirement

IWA-4440(a) states that after repairs by welding on the pressure-retaining boundary, a system hydrostatic test shall be performed in accordance with IWA-5000. IWA-5214(b) requires that the test pressure and temperature for a system hydrostatic test subsequent to the component repair or replacement shall comply with the system test pressures and temperatures specified in IWB-5222, IWC-5222, and IWD-5223, as applicable to the system which contains the repaired or replaced component.

Code Relief Request

Paragraph IWA-5211(a), which states that the pressure retaining components within each system boundary shall be subject to system pressure tests under which conditions visual examination VT-2 is performed in accordance with IWA-5240 to detect leakages. The required system pressure tests and examinations, as referenced in Table IWA-5210-1, may be conducted in conjunction with one or more of the following system tests or operations:

(a) a system leakage test conducted following opening and reclosing of a component in the system after pressurization to nominal operating pressure. (We assume that the licensee actually meant that the requirements under IWA-5214(b), hydrostatic test subsequent to component repair and replacement, are impractical.)

Proposed Alternative Examination

Welds made on piping will be radiographed and a visual examination will be performed at system temperature and pressure.

Hydrostatic testing of welds will be performed later as a part of the 10-year Inservice Inspection Plan.

Licensee's Basis for Requesting Relief

The auxiliary steam header cannot be drained properly after the performance of the hydrostatic test required by IWA-5211(a). (We assume the licensee means IWA-5214(b), hydrostatic test subsequent to repairs and replacements.)

Evaluation

The licensee has stated that the auxiliary steam header cannot be drained properly after the performance of a hydrostatic test. As an alternative, the welds will be radiographed and visually examined at system operating temperature and pressure. The welds will be hydrostatically tested at the end of the 10-year interval as part of the ISI plan.

The proposed alternative examination, along with the Code-required hydrostatic test at the end of the interval, will provide necessary assurance of structural reliability. Therefore, relief is recommended.

Conclusions and Recommendations

Based on the above evaluation, it is concluded that for the examination discussed above, the Code requirements are impractical. It is further concluded that the proposed alternative examination will provide necessary assurance of structural reliability. Therefore, relief is recommended as requested.

References

Reference 23.

3.4.3.8 Hydrostatic Testing of Class 3 Repair Welds Associated with Main Steam Check Valves 3MS-83 and 3MS-85, Unit 3, IWA-4440

Code Requirement

IWA-4440(a) states that after repairs by welding on the pressure retaining boundary, a system hydrostatic test shall be performed in accordance with IWA-5000. IWA-5214(b) requires that the test pressure and temperature for a system hydrostatic test susequent to the component repair or replacement shall comply with the system test pressures and temperatures specified in IWB-5222, IWC-5222, and IWD-5223, as applicable to the system which contains the repaired or replaced component.

Code Relief Request

Relief is requested from hydrostatic testing of repair welds associated with main steam check valves 3MS-83 and 3MS-85.

Proposed Alternative Examination

(a) The welds will be radiographed and examined for leakage at system temperature and pressure.

(b) The welds will also be inspected during the OTSG/MS line hydrostatic test as part of the ISI plan.

Licensee's Basis for Requesting Relief

To perform the required hydrostatic test would require filling the main steam line with water, as these valves cannot be isolated from the main steam line. Therefore, the licensee requests that valves 3MS-83 and 3MS-85 be considered exempt from the requirements of Paragraph IWD-5210(a)(3) and (b).

Evaluation

The only way to hydrostatically test the subject lines is to fill the main steam line with water and impose an additional hydrostatic test cycle on the main steam system. The licensee has proposed to perform a radiographic examination of the subject welds along with an examination for leakage at operating temperature and

pressure. The 10-year hydrostatic test will be performed as required as part of the ISI plan. The proposed alternative examination will provide necessary assurance of structural reliability, and relief is therefore recommended.

Conclusions and Recommendations

Based on the above evaluation, it is concluded that the Code requirements are impractical. It is further concluded that the proposed alternative examination will provide necessary assurance of structural reliability. Therefore, relief is recommended as requested.

References

Reference 26.

3.4.3.9 Hydrostatic Testing of Class 3 Repair Welds Associated with Spent Fuel Cooling System Valve 1SF-65, Unit 1, IWA-4440

Code Requirement

IWA-4440(a) states that after repairs by welding on the pressure retaining boundary, a system hydrostatic test shall be performed in accordance with IWA-5000. IWA-5214(b) requires that the test pressure and temperature for a system hydrostatic test susequent to the component repair or replacement shall comply with the system test pressures and temperatures specified in IWB-5222, IWC-5222, and IWD-5223, as applicable to the system which contains the repaired or replaced component.

Code Relief Request

Relief is requested from hydrostatic testing of repair welds associated with Spent Fuel Cooling System Valve 1SF-65.

Proposed Alternative Examination

Valve 1SF-65 will be inspected in accordance with IWA-5211(b) during the current Unit 1 refueling outage (end of Cycle 10). The inspection will be performed by draining the refueling canal to the reactor building sump.

Licensee's Basis for Requesting Relief

Valve 1SF-65 is not used during normal system operation. The required inspection cannot be performed during system operation as the refueling canal would have to be filled with water in order to put the valve in service.

Evaluation

In response to a request for additional information, the licensee stated that the valve was tested by system functional test prior to startup and was successfully hydrostatically tested during the next refueling outage. This valve was disassembled and repaired after refueling efforts were completed. At that time, it was impractical to fill the canal with water, and the licensee decided to wait until the next refueling outage to hydrostatically test the valve. Relief is required since the required examination was delayed for one fuel cycle.

Conclusions and Recommendations

Based on the above evaluation, it is concluded that the Code requirements are impractical. It is further concluded that the proposed alternative examination will provide adequate assurance of structural reliability. Therefore, relief is recommended as requested.

References

References 30 and 37.

3.4.3.10 Hydrostatic Testing of Class 3 Repair Welds Associated with Main Steam System Valves 2MS-83 and 2MS-85, Unit 2, IWA-4440

Code Requirement

IWA-4440(a) states that after repairs by welding on the pressure retaining boundary, a system hydrostatic test shall be performed in accordance with IWA-5000. IWA-5214(b) requires that the test pressure and temperature for a system hydrostatic test susequent to the component repair or replacement shall comply with the system test pressures and temperatures specified in IWB-5222, IWC-5222, and IWD-5223, as applicable to the system which contains the repaired or replaced component.

Code Relief Request

Relief is requested from hydrostatic testing of repair welds associated with Main Steam System Valves 2MS-83 and 2MS-85.

Proposed Alternative Examination

Welds will be 100% radiographed and a VT-2 inspection performed at operating temperature and pressure. In addition, the welds will be hydrostatically tested during the second 10-year interval inservice inspection hydrostatic test of the main steam lines.

Licensee's Basis for Requesting Relief

Hydrostatic testing would require filling the main steam lines with water. The piping and welds associated with installation of the 2MS-83 and 2MS-85 valves cannot be isolated from the main steam headers based on past experience using 2MS-82 and 2MS-84 as boundary valves and past experience with trying to make the main steam system watertight. In addition, the emergency feedwater pump turbine could potentially be damaged by the required hydrostatic test.

Evaluation

The licensee has stated that past experience indicates the subject welds cannot be isolated from the main steam headers. The licensee has proposed to perform a radiographic inspection of the repair weld areas and a system pressure test prior to

plant startup. These inspections, along with the Code-required hydrostatic test as part of the 10-year ISI plan, will provide necessary assurance of structural reliability. Therefore, relief is recommended.

Conclusions and Recommendations

Based on the above evaluation, it is concluded that for the hydrostatic test discussed above, the Code requirements are impractical. It is further concluded that the proposed alternative examination will provide necessary assurance of structural reliability. Therefore, relief is recommended as requested.

References

Reference 33.

3.5 GENERAL

3.5.1 Relief Request ONS-003, Ultrasonic Calibration Blocks for Reactor Coolant System Piping, Units 1, 2, and 3

Code Requirement

Calibration blocks for ASME Code Section XI examinations are required to meet Section XI, Appendix III, or Section V requirements, as specified in Section XI, IWA-2232.

Code Relief Request

Relief is requested from the requirement of ASME Section XI, Paragraph III-3410 in Appendix III that the basic calibration blocks shall be made from material of the same nominal diameter and nominal wall thickness as the pipe to be examined. This relief request is applied to main loop welds in ferritic steel piping of the Reactor Coolant System.

Proposed Alternative Examination

Calibration block 40350, used during the first 10-year interval, will be used for all ultrasonic inspection of ferritic steel reactor coolant piping welds from the OD surface. Reference levels for the inspections will be set in accordance with Article 5, Section V, of the 1980 Code. Appendix A gives criteria for determining the gain adjustment for flat calibration blocks.

Licensee's Basis for Requesting Relief

Two new calibration blocks would be required to comply with the Paragraph III-3410 requirement. This would require fabrication of two new piping sections, cladding, heat treatment, and machining the final calibration blocks.

Use of the existing block (40350) would assure that the second interval inspections are directly comparable to those done during the first interval.

Evaluation

The licensee has not provided sufficient information or justification for requesting relief. Based on problems Duke Power has had in the past with reactor vessel ultrasonic examinations and the importance of the reactor coolant piping, relief is not recommended. The licensee should demonstrate to the satisfaction of the Authorized Nuclear Inservice Inspector (ANII) and the NRC staff that the proposed calibration blocks provide ultrasonic calibration that is equivalent or superior to Code.

Conclusions and Recommendations

Based on the above evaluation, it is concluded that there is not sufficient justification for declaring the Code requirements impractical. Therefore, relief is not recommended.

References

References 9, 12, and 13.

3.5.2 Relief Request ONS-004, Ultrasonic Calibration Blocks for the Pressurizers and Steam Generators, Units 1, 2, and 3

Code Requirement

Calibration blocks for ASME Code Section XI examinations are required to meet Section XI, Appendix III, or Section V requirements, as specified in Section XI, IWA-2232.

Code Relief Request

Relief is requested from the requirement of ASME Section XI, IWA-2232(a), which refers to ASME Section V, Article 4. Paragraph T 434.1 of Article 4 requires that calibration blocks be fabricated from a nozzle dropout, prolongation, or material of the same specification, product form, and heat treatment as one of the materials being joined. This relief request is applied to the pressurizers and steam generators.

Proposed Alternative Examination

The calibration blocks used during the second 10-year interval at Oconee will be the same calibration blocks as used during the preservice and first 10-year inspection intervals. The calibration blocks are scheduled as follows:

(a) Pressurizer head to shell welds - Block 40394
(b) Steam generator head to tube sheet - Block 40305
(c) Steam generator secondary shell - Block 40394
(d) Steam generator shell to tube sheet - Block 40338
(e) Pressurizer nozzle to head welds - Block 40394
(f) Steam generator primary nozzle to head welds - Block 40305
(g) Steam generator secondary nozzle to shell welds - Block 40338

Licensee's Basis for Requesting Relief

The Class 1 pressurizer shells and heads and Class 2 steam generator shells are fabricated from A212 Grade B material, which is no longer available. The Class 1 steam generator heads are fabricated from SA 302 Grade B material which is not available in the required thickness (9 in).

These welds were examined during the preservice inspection and the first 10-year interval using calibration blocks 40305, 40338, and 40394. Continued use of these blocks would provide for direct comparison to previous inspection data.

Evaluation

The licensee has not provided sufficient information or justification for requesting relief. Based on problems Duke Power has had in the past with reactor vessel ultrasonic examinations and the importance of the pressurizer and steam generator, relief is not recommended. The licensee should demonstrate to the satisfaction of the ANII and the NRC staff that the proposed calibration blocks provide ultrasonic calibration that is equivalent or superior to Code.

Conclusions and Recommendations

Based on the above evaluation, it is concluded that there is not sufficient justification for declaring the Code requirements impractical. Therefore, relief is not recommended.

References

References 9, 12, and 13.

3.5.3 Start Date and Applicable Code for the Second Ten-Year Interval, Units 1, 2, and 3

Code Requirement

Paragraph IWA-2400(b) states that the inspection interval shall be determined by calendar years following placement of the power unit into commercial service. 10 CFR 50.55a(g)(4)(ii) requires that the inservice inspection program comply with the latest Code incorporated in the Federal Register 12 months prior to the start of the 120-month interval.

Code Relief Request

Relief is requested from the requirements of Paragraph IWA-2400(b) and from 10 CFR 50.55a(g)(4)(ii).

Proposed Alternative Examination

Instead of beginning April 1, 1984, and applying the 1980 Edition, Winter 1981 Addenda, the second interval will begin March 1, 1984, and apply the 1980 Edition, Winter 1980 Addenda.

Licensee's Basis for Requesting Relief

The April 1, 1984, common start date was previously approved. Failure to revise the common start date to March 1, 1984, would result in an unnecessary administrative burden. Specifically, it would require the update of the current ISI plan for the second 10-year interval. This requirement is deemed unnecessary due to the fact that differences in the subject codes are administrative in nature, with no substantive technical differences.

Evaluation

The licensee requested on December 2, 1983,(47) and was granted on November 7, 1984,(48) permission to establish a common start date of April 1, 1984, for the three Oconee units. The 1980 Edition of Section XI, Winter 1981 Addenda became effective on March 9, 1983. Therefore, this would be the required Code for an interval, with an April 1, 1984 start date according to 10 CFR 50.55a(g)(4)(ii). However, for an interval with a start date of March 1, 1984, the effective Code would be the 1980 Edition, Winter 1980 Addenda.

The licensee has already written his ISI program to the 1980 Edition, Winter 1980 Addenda. Failure to set the second interval start date back one month to March 1, 1984, would mean that the ISI program would have to be updated to the newer Code requirements. Based on the fact that the subject Codes are essentially the same in technical content, and the burden placed upon the licensee if the April 1, 1984, date is retained, it is recommended that the licensee be allowed to start the second interval on March 1, 1984.

Conclusions and Recommendations

Based on the above evaluation, it is concluded that the Code requirements are impractical. It is further concluded that the alternative proposed by the licensee will provide an acceptable level of safety. Therefore, relief is recommended as requested.

References

References 19, 47, and 48.

3.6 SUPPORTS

3.6.1 Snubber Functional Testing Program, IWF-5300 and IWF-5400, Units 1, 2, and 3

Code Requirements

IWF-5300: Inservice tests for snubbers 50 kips (22,680 kg) or greater:

In the course of preparation.

IWF-5400: Inservice tests for snubbers less than 50 kips (22,680 kg):

(a) Inservice tests shall be performed during normal system operation or plant outages.

(b) A representative sample of 10% of the total number of nonexempt snubbers whose rating is less than 50 kips shall be tested each inspection period. Each representative sample shall consist of previously untested snubbers. After all nonexempt snubbers in the plant have been tested, the test shall be repeated taking the same snubbers (or their replacements) in the same sequence as in the original tests. A representative sample shall include snubbers from various locations, taking into consideration service and environment.

Code Relief Request

Duke requests relief from the Section XI inservice testing requirements in IWF-5300 and IWF-5400.

Proposed Alternative Examination

Hydraulic and mechanical snubbers will be tested in accordance with Technical Specification 4.18.

Licensee's Basis for Requesting Relief

There is a conflict between the Oconee Nuclear Station snubber Technical Specification 4.18 and the ASME Code concerning snubber functional test sampling methodology. The conflict occurs in the

"definition of the population" from which a 10-percent sample of the total population is to be tested. The ONS Technical Specification requires a 10-percent representative sample (representative by size, location, randomly selected) be selected from the total population of safety-related snubbers, with hydraulic and mechanical snubbers treated separately. In contrast, the ASME Code takes a representative sample which is 10% of the total population, but is selected from previously untested snubbers (until all snubbers have been tested).

Therefore, Duke contends that the Technical Specification sample method provides for superior confidence in total population quality between refueling outages, as it samples a percentage of the total population each refueling. In comparison, the ASME Code introduces population stratification based on the numbers and types of snubbers previously tested (highly dependent on failure rates in certain populations), and is not representative of the total snubber population quality during operation.

Evaluation

The ONS technical specification requires a 10-percent representative sample (representative by size, location, randomly selected) be selected from the total population of safety-related snubbers, with hydraulic and mechanical snubbers treated separately. The initially selected sample will then be tested each refueling outage. The licensee contends that the Code sampling plan introduces stratification based on the numbers and types of snubbers previously tested. However, if a representative sample is taken each inspection period as required by footnote 1 of IWF-5400(b), stratification would not result.

The licensee has not provided sufficient justification that the proposed sampling plan is equivalent or superior to Code requirements. Further, 10 CFR 50.55a(g)(5)(ii) provides for revision of technical specifications not meeting ISI program requirements.

Conclusions and Recommendations

Based on the above evaluation, it is concluded that for the snubber sampling plan discussed above, there is not sufficient justification for declaring the Code requirements impractical. Therefore, relief is not recommended, and the technical specifications should be revised to meet the Code sampling requirements.

References

Reference 20.

3.7 REFERENCES

1. Safety Evaluation Report, Oconee Unit 1, December 29, 1970.

2. Safety Evaluation Report, Oconee Unit 2 and 3, July 6, 1973.

3. NRC to W. O. Parker, Jr. (DPC), November 7, 1980; Safety Evaluation Report on the Inservice Inspection program at Oconee Units 1, 2 and 3.

4. R. W. Reid (NRC) to W. O. Parker, Jr. (DPC), January 16, 1981; safety evaluation of replacement hydrostatic test relief request.

5. P. C. Wagner (NRC) to W. O. Parker, Jr. (DPC), April 8, 1982; safety evaluation of relief requests.

6. P. C. Wagner (NRC) to W. O. Parker, Jr. (DPC), May 17, 1982; Revised evaluation of one relief request.

7. J. F. Stolz (NRC) to H. B. Tucker (DPC), February 14, 1984; evaluation of relief requests.

8. J. F. Stolz (NRC) to H. B. Tucker (DPC), February 7, 1985; evaluation of relief requests.

9. H. B. Tucker (DPC) to H. R. Denton (NRC), September 25, 1984; Oconee Unit 1 Inservice Inspection Program.

10. H. B. Tucker (DPC) to H. R. Denton (NRC), March 5, 1985; Oconee Unit 2 Inservice Inspection Program.

11. H. B. Tucker (DPC) to H. R. Denton (NRC), May 1, 1985; Oconee Unit 3 Inservice Inspection Program.

12. H. B. Tucker (Duke) to NRC, July 5, 1988; response to May 4, 1988, request for additional information, ISI Plan, Revision 5 attached.

13. H. B. Tucker (DPC) to H. R. Denton (NRC), September 13, 1984; submits five second-interval relief requests.

14. H. B. Tucker (DPC) to H. R. Denton (NRC), November 16, 1984; relief request from hydrostatic testing of system modifications.

15. H. B. Tucker (DPC) to H. R. Denton (NRC), December 11, 1984; relief request from hydrostatic testing of system modifications.

16. H. B. Tucker (DPC) to H. R. Denton (NRC), November 12, 1985; relief request from inservice inspection of containment spray piping.

17. H. B. Tucker (DPC) to H. R. Denton (NRC), November 22, 1985; relief request from hydrostatic testing requirements.

18. H. B. Tucker (DPC) to H. R. Denton (NRC), January 10, 1986; relief request from hydrostatic testing requirements.

19. H. B. Tucker (DPC) to H. R. Denton (NRC), January 23, 1986; relief request from interval start date.

20. H. B. Tucker (DPC) to H. R. Denton (NRC), January 31, 1986; relief request related to snubbers.

21. H. B. Tucker (DPC) to H. R. Denton (NRC), April 18, 1986; relief request from hydrostatic testing requirements.

22. H. B. Tucker (DPC) to H. R. Denton (NRC), May 15, 1986; relief request from hydrostatic testing requirements.

23. H. B. Tucker (DPC) to H. R. Denton (NRC), June 27, 1986; relief request from hydrostatic testing of system modifications.

24. H. B. Tucker (DPC) to H. R. Denton (NRC), December 3, 1986; relief request from hydrostatic testing of system modifications.

25. H. B. Tucker (DPC) to NRC, February 9, 1987; relief request from scheduling requirements for Unit 3 reactor coolant pump examinations.

26. H. B. Tucker (DPC) to NRC, March 2, 1987; relief request from hydrostatic testing of system modifications.

27. H. B. Tucker (DPC) to NRC, March 5, 1987; relief request from hydrostatic testing of system modifications.

28. H. B. Tucker (DPC) to NRC, April 7, 1987; relief request from inservice inspection hydrostatic testing requirements.

29. H. B. Tucker (DPC) to NRC, April 9, 1987; relief request from inservice inspection hydrostatic testing requirements.

30. H. B. Tucker (DPC) to NRC, September 25, 1987; relief requests from hydrostatic testing of system modifications.

31. H. B. Tucker (DPC) to NRC, October 29, 1987; relief requests from hydrostatic testing of system modifications.

32. H. B. Tucker (DPC) to NRC, March 7, 1988; relief requests from hydrostatic testing of system modifications.

33. H. B. Tucker (DPC) to NRC, March 15, 1988; relief requests from hydrostatic testing of system modifications (Main Steam Valves).

34. H. B. Tucker (DPC) to NRC, March 15, 1988; relief requests from hydrostatic testing of system modifications (Feedwater Valves).

35. H. B. Tucker (DPC) to NRC, March 16, 1988; relief request from scheduling requirements for Unit 2 reactor coolant pump.

36. H. B. Tucker (DPC) to H. R. Denton (NRC), November 18, 1985; withdraws relief request submitted November 16, 1984.

37. H. B. Tucker (DPC) to NRC, May 15, 1989; response to March 27, 1989, request for additional information.

38. NRC to DPC, July 22, 1985; request for additional information on the Inservice Inspection program.

39. NRC to Duke, May 4, 1988; request for additional information on the second-interval inservice inspection program.

40. D. S. Hood (NRC) to H. B. Tucker (Duke), March 27, 1989; request for additional information on the second-interval inservice inspection program.

41. H. B. Tucker (DPC) to H. R. Denton (NRC), October 8, 1985; response to request for additional information.

42. H. B. Tucker (DPC) to H. R. Denton (NRC), October 23, 1985; transmits omitted attachments to October 8, 1985 letter.

43. H. B. Tucker (DPC) to J. F. Stolz (NRC), August 28, 1986; response to several staff concerns regarding inservice inspection.

44. H. B. Tucker (DPC) to H. R. Denton (NRC), September 19, 1986; supplemental response to July 22, 1985 request for additional information.

45. H. B. Tucker (DPC) to J. F. Stolz (NRC), February 15, 1983; submittal of the final report by the B&W Owners Group concerning HPI/MU nozzle safe end cracking.

46. NRC Memo, W. V. Johnson to G. C. Lainas, November 30, 1983; review of B&W Owners Group safe end task force report.

47. H. B. Tucker (DPC) to H. R. Denton (NRC), December 2, 1983; request for common interval start date.

48. H. Nicolaras (NRC) to H. B. Tucker (DPC), November 7, 1984; approval of common interval start date.

49. H. B. Tucker (DPC) to NRC, February 28, 1989; request for approval of use of Code Case N-356.

50. D. B. Matthews (NRC) to H. B. Tucker (DPC), May 16, 1989; approval for use of Code Case N-356.

APPENDIX A

REQUIREMENTS OF SECTION XI 1980 EDITION
WITH ADDENDA THROUGH WINTER 1980

APPENDIX A

Requirements of Section XI of the American Society of Mechanical Engineers Boiler and Pressure Code, 1980 Edition with Addenda through Winter 1980

A.1 CLASS 1 REQUIREMENTS

A.1.1 CATEGORY B-A, PRESSURE-RETAINING WELDS IN REACTOR VESSEL

A.1.1.1 Shell Welds, Item B1.10

A.1.1.1.1 Circumferential and Longitudinal Welds, Items B1.11 and B1.12

All pressure-retaining circumferential and longitudinal shell welds in the reactor vessel shall be volumetrically examined in accordance with Figures IWB-2500-1 and -2 over essentially 100% of their lengths during the first inspection interval. Examinations may be performed at or near the end of the interval.

A.1.1.2 Head Welds, Item B1.20

A.1.1.2.1 Circumferential and Meridional Head Welds, Items B1.21 and B1.22

All pressure-retaining circumferential and meridional head welds in the reactor vessel head shall be volumetrically examined in accordance with Figure IWB-2500-3 over the accessible portion up to 100% of the weld length during the first inspection interval. The bottom head welds may be examined at or near the end of the interval.

A.1.1.3 Shell-to-Flange Weld, Item B1.30

Essentially 100% of the length of the shell-to-flange weld shall be volumetrically examined in accordance with Figure IWB-2500-4 during the first inspection interval. If partial examinations are conducted from the flange face, the remaining examination required to be conducted from the vessel wall may be performed at or near the end of each inspection interval. The examination of the shell-to-flange weld may be performed during the first and third inspection periods in conjunction with the nozzle examinations of Examination Category B-D (Program B). At least 50% of shell-to-flange weld shall be examined by the end of the first inspection period, and the remainder by the end of the third inspection period.

A.1.1.4 Head-to-Flange weld, Item B1.40

Essentially 100% of the length of the head-to-flange weld shall be volumetrically and surface examined in accordance with Figure IWB-2500-5 during the first inspection interval. If partial examinations are conducted from the flange face, the remaining examination required to be conducted from the vessel wall may be performed at or near the end of each inspection interval.

A.1.1.5 Repair welds, Item B1.50

A.1.1.5.1 Repair Welds in the Beltline Region, Item B1.51

All base metal weld repair areas in the beltline region where repair depth exceeds 10% nominal of the vessel wall shall be volumetrically examined in accordance with Figures IWB-2500-1 and -2 during the first inspection interval. Examinations may be performed at or near the end of the interval. The beltline region extends for the length of the vessel thermal shield, or in the absence of a thermal shield, the effective length of reactor fuel elements. If the location of the repair is not positively and accurately known, then the individual shell plate, forging, or shell course containing the repair shall be included.

A.1.2 CATEGORY B-B, PRESSURE-RETAINING WELDS IN VESSELS OTHER THAN REACTOR VESSELS

A.1.2.1 Shell-to-Head Welds in the Pressurizer, Item B2.10

A.1.2.1.1 Circumferential Shell-to-Head Welds, Item B2.11

All circumferential shell-to-head welds in the pressurizer shall be volumetrically examined in accordance with Figure IWB-2500-1 over essentially 100% of their length during the first inspection interval.

A.1.2.1.2 Longitudinal Shell Weld, Item B2.12

One foot of the selected longitudinal shell weld in the pressurizer intersecting the examined circumferential shell-to-head weld shall be volumetrically examined in accordance with Figure IWB-2500-2 during the first inspection interval.

A.1.2.2 Head Welds in Pressurizer Vessels, Item B2.20

A.1.2.2.1 Circumferential and Meridional Head Welds, Items B2.21 and B2.22

All circumferential and meridional head welds in the pressurizer shall be volumetrically examined in accordance with Figure IWB-2500-3 over essentially 100% of their lengths during the first inspection interval.

A.1.2.3 Head Welds in the Primary Side of the Steam Generators, Item B2.30

A.1.2.3.1 Circumferential and Meridional Head Welds, Items B2.31 and B2.32

All circumferential and meridional head welds in the primary side of the steam generators shall be volumetrically examined in accordance with Figure IWB-2500-3 over essentially 100% of their length during the first inspection interval.

A.1.2.4 Tubesheet-to-Head Weld, Item B2.40

The tubesheet-to-head weld in the primary side of the steam generators shall be volumetrically examined in accordance with Figure IWB-2500-6 over essentially 100% of its length during the first inspection interval.

A.1.2.5 Shell (or Head) Welds in the Primary Side of the Heat Exchangers, Item B2.50

A.1.2.5.1 Circumferential Welds, Item B2.51

All circumferential shell (or head) welds in the primary side of the heat exchangers shall be volumetrically examined in accordance with Figures IWB-2500-1 and -3 over essentially 100% of their length during the first inspection interval.

A.1.2.5.2 Longitudinal (or Meridional) Welds, Item B2.52

All longitudinal (or meridional) welds in the primary side of the heat exchangers shall be volumetrically examined in accordance with Figures IWB-2500-2 and -3 over essentially 100% of their length during the first inspection interval.

A.1.2.6 Tubesheet-to-Shell (or Head) Welds, Item B2.60

The tubesheet-to-shell (or head) welds shall be volumetrically examined in accordance with Figure IWB-2500-6 over essentially 100% of its length during the first interval.

A.1.3 CATEGORY B-D, FULL PENETRATION WELDS OF NOZZLES IN VESSELS (INSPECTION PROGRAM B)

A.1.3.1 Reactor Vessel Nozzle-to-Vessel Welds, Items B3.90 and B3.100

All nozzle-to-vessel welds and inside radius sections in the reactor vessel shall be volumetrically examined in accordance with Figures IWB-2500-7(a) through (d) during the first interval of operation. The nozzle-to-vessel weld and adjacent areas of the nozzle and vessel are included. At least 25% but not more than 50% (credited) of the nozzles shall be examined by the end of the first inspection period and the remainder by the end of the inspection interval. If examinations are conducted from inside the component and the nozzle weld is examined by straight beam ultrasonic method from the nozzle bore, the remaining examinations required to be conducted from the shell may be performed at or near the end of each inspection interval.

A.1.3.2 Pressurizer Nozzle-to-Vessel Welds, Items B3.110 and B3.120

All nozzle-to-vessel welds and inside radius sections in the pressurizer shall be volumetrically examined in accordance with Figures IWB-2500-7(a) through (d) during the first interval of operation. The nozzle-to-vessel weld and adjacent areas of the nozzle and vessel are included. At least 25% but not more than 50% (credited) of the nozzles shall be examined by the end of the first inspection period and the remainder by the end of the inspection interval.

A.1.3.3 Steam Generator Nozzle-to-Vessel Welds, Items B3.130 and B3.140

All nozzle-to-vessel welds and inside radius sections in the primary side of the steam generator shall be volumetrically examined in accordance with Figures IWB-2500-7(a) through (d) during the first interval of operation. The nozzle-to-vessel weld and adjacent areas of the nozzle and vssel are included. At least 25% but not more than 50% (credited) of the nozzles shall be examined by the end of the first inspection period and the remainder by the end of the inspection interval.

A.1.3.4 Heat Exchanger Nozzle-to-Vessel Welds, Items B3.150 and B3.160

All nozzle-to-vessel welds and inside radius sections in the primary side of the heat exchanger shall be volumetrically examined in accordance with Figures IWB-2500-7(a) through (d) during the first interval of operation. The nozzle-to-vessel weld and adjacent areas of the nozzle and vessel are included. At least 25% but not more than 50% (credited) of the nozzles shall be examined by the end of the first inspection period and the remainder by the end of the inspection interval.

A.1.4 CATEGORY B-E, PRESSURE-RETAINING PARTIAL PENETRATION WELDS IN VESSELS

A.1.4.1 Reactor Vessel Partial Penetration Welds, Item B4.10

A.1.4.1.1 Vessel Nozzles, Item B4.11

The external surfaces of partial penetration welds on 25% of reactor vessel nozzles shall be visually examined (VT-2) during the first inspection interval. The examinations shall cumulatively cover the specified percentage among each group of penetrations of comparable size and function.

A.1.4.1.2 Control Rod Drive Nozzles, Item B4.12

The external surfaces of partial penetration welds on 25% of the control rod drive nozzles shall be visually examined (VT-2) during the first inspection interval. The examinations shall cumulatively cover the specified percentage among each group of penetrations of comparable size and function.

A.1.4.1.3 Instrumentation Nozzles, Item B4.13

The external surfaces of partial penetration wel[illegible] 25% of the instrumentation nozzles shall be visually examined [illegible]ing the first inspection interval. The examinations shall cumula[illegible] cov[illegible] the specified percentage among each group of penetrations o[illegible]omparable size and function.

A.1.4.2 Heater Penetration Welds on the Pressurizer, Item B4.20

The external surfaces of 25% of the heater penetration welds on the pressurizer shall be visually examined (VT-2) during the first inspection interval. The examinations shall cumulatively cover the specified percentage among each group of penetrations of comparable size and function.

A.1.5 CATEGORY B-F, PRESSURE-RETAINING DISSIMILAR METAL WELDS

A.1.5.1 Reactor Vessel Nozzle-to-Safe End Butt Welds, Item B5.10

All nozzle-to-safe end butt welds in nominal pipe size greater than 4 in. in the reactor vessel shall be surface and volumetrically examined in accordance with Figure IWB-2500-8 during the first inspection interval. The examinations may be performed coincident with the vessel nozzle examinations required by Examination Category B-D. Dissimilar metal welds between combinations of (a) carbon or low alloy steels to high alloy steels, (b) carbon or low alloy steels to high nickel alloys, and (c) high alloy steel to high nickel alloys are included.

A.1.5.2 Reactor Vessel Nozzle-to-Safe End Butt Welds, Item B5.11

The surfaces of all nozzle-to-safe end butt welds in nominal pipe size less than 4 in. in the reactor vessel shall be examined in accordance with Figure IWB-2500-8 during the first inspection interval. The examinations may be performed coincident with the vessel nozzle examinations required by Examination Category B-D. Dissimilar metal welds between combinations of (a) carbon or low alloy steels to high alloy steels, (b) carbon or low alloy steels to high nickel alloys, and (c) high alloy steel to high nickel alloys are included.

A.1.5.3 Reactor Vessel Nozzle-to-Safe End Socket Welds, Item B5.12

The surfaces of all nozzle-to-safe end socket welds in the reactor vessel shall be examined in accordance with Figure IWB-2500-8 during the first inspection interval. The examinations may be performed coincident with the vessel nozzle examinations required by Examination Category B-D. Dissimilar metal welds between combinations of (a) carbon or low alloy steels to high alloy steels, (b) carbon or low alloy steels to high nickel alloys, and (c) high alloy steel to high nickel alloys are included.

A.1.5.4 Pressurizer Nozzle-to-Safe End Butt Welds, Item B5.20

All nozzle-to-safe end butt welds in nominal pipe size greater than 4 in. in the pressurizer shall be surface and volumetrically examined in accordance with Figure IWB-2500-8 during the first inspection interval. Dissimilar metal welds between combinations of (a) carbon or low alloy steels to high alloy steel, (b) carbon or low alloy steel to high nickel alloys, and (c) high alloy steel to high nickel alloys are included.

A.1.5.5 Pressurizer Nozzle-to-Safe End Butt Welds, Item B5.21

The surfaces of all nozzle-to-safe end butt welds in nominal pipe size less than 4 in. in the pressurizer shall be examined in accordance with Figure IWB-2500-8 during the first inspection interval. Dissimilar metal

welds between combinations of (a) carbon or low alloy steels to high alloy steel, (b) bon or low alloy steel to high nickel alloys, and (c) high alloy steel .. high nickel alloys are included.

A.1.5.6 Pressurizer Nozzle-to-Safe End Socket Welds, Item B5.22

The surfaces of all nozzle-to-safe end socket welds in the pressurizer shall be examined in accordance with Figure IWB-2500-8 during the first inspection interval. Dissimilar metal welds between combinations of (a) carbon or low alloy steels to high alloy steel, (b) carbon or low alloy steel to high nickel alloys, and (c) high alloy steel to high nickel alloys are included.

A.1.5.7 Steam Generator Nozzle-to-Safe End Butt Welds, Item B5.30

All nozzle-to-safe end butt welds in nominal pipe size greater than 4 in. in the steam generator shall be surface and volumetrically examined in accordance with Figure IWB-2500-8 during the first inspection interval. Dissimilar metal welds between combinations of (a) carbon or low alloy steels to high alloy steel, (b) carbon or low alloy steel to high nickel alloys, and (c) high alloy steel to high nickel alloys are included.

A.1.5.8 Steam Generator Nozzle-to-Safe End Butt Welds, Item B5.31

The surfaces of all nozzle-to-safe end butt welds in nominal pipe size less than 4 in. in the steam generator shall be examined in accordance with Figure IWB-2500-8 during the first inspection interval. Dissimilar metal welds between combinations of (a) carbon or low alloy steels to high alloy steel, (b) carbon or low alloy steel to high nickel alloys, and (c) high alloy steel to high nickel alloys are included.

A.1.5.9 Steam Generator Nozzle-to-Safe End Socket Welds, Item B5.32

The surfaces of all nozzle-to-safe end socket welds in the steam generator shall be examined in accordance with Figure IWB-2500-8 during the first inspection interval. Dissimilar metal welds between combinations of (a) carbon or low alloy steels to high alloy steel, (b) carbon or low alloy steel to high nickel alloys, and (c) high alloy steel to high nickel alloys are included.

A.1.5.10 Heat Exchanger Nozzle-to-Safe End Butt Welds, Item B5.40

All nozzle-to-safe end butt welds in nominal pipe size greater than 4 in. in the heat exchangers shall be surface and volumetrically examined in accordance with Figure IWB-2500-8 during the first inspection interval. Dissimilar metal welds between combinations of (a) carbon or low alloy steels to high alloy steel, (b) carbon or low alloy steel to high nickel alloys, and (c) high alloy steel to high nickel alloys are included.

A.1.5.11 Heat Exchanger Nozzle-to-Safe End Butt Welds, Item B5.41

All nozzle-to-safe end butt welds in nominal pipe size less than 4 in. in the heat exchangers shall be surface and volumetrically examined in accordance with Figure IWB-2500-8 during the first inspection interval. Dissimilar metal welds between combinations of (a) carbon or low alloy steels to high alloy steel, (b) carbon or low alloy steel to high nickel alloys, and (c) high alloy steel to high nickel alloys are included.

A.1.5.12 Heat Exchanger Nozzle-to-Safe End Socket Welds, Item B5.42

All nozzle-to-safe end socket welds in the heat exchangers shall be surface and volumetrically examined in accordance with Figure IWB-2500-8 during the first inspection interval. Dissimilar metal welds between combinations of (a) carbon or low alloy steels to high alloy steel, (b) carbon or low alloy steel to high nickel alloys, and (c) high alloy steel to high nickel alloys are included.

A.1.5.13 Piping Safe End Butt Welds, Item B5.50

All dissimilar metal safe end butt welds in piping greater than 4 in. shall be surface and volumetrically examined in accordance with Figure IWB-2500-8 during the first inspection interval. Dissimilar metal welds between combinations of (a) carbon or low alloy steels to high alloy steel, (b) carbon or low alloy steel to high nickel alloys, and (c) high alloy steel to high nickel alloys are included.

A.1.5.14 Piping Safe End Butt Welds, Item B5.51

All dissimilar metal safe end butt welds in piping less than 4 in. shall be surface and volumetrically examined in accordance with Figure IWB-2500-8 during the first inspection interval. Dissimilar metal welds between combinations of (a) carbon or low alloy steels to high alloy steel, (b) carbon or low alloy steel to high nickel alloys, and (c) high alloy steel to high nickel alloys are included.

A.1.5.15 Piping Safe End Socket Welds, Item B5.52

All dissimilar metal safe end socket welds in piping shall be surface and volumetrically examined in accordance with Figure IWB-2500-8 during the first inspection interval. Dissimilar metal welds between combinations of (a) carbon or low alloy steels to high alloy steel, (b) carbon or low alloy steel to high nickel alloys, and (c) high alloy steel to high nickel alloys are included.

A.1.6 CATEGORY B-G-1, PRESSURE-RETAINING BOLTING LARGER THAN 2 INCHES IN DIAMETER

A.1.6.1 Reactor Closure Head Nuts, Item B6.10

The surfaces of all reactor closure head nuts larger than 2 in. in diameter shall be examined during the first inspection interval. Bolting may be examined (a) in place under tension, (b) when the connection is disassembled, or (c) when the bolting is removed. Examinations may be performed at or near the end of the inspection interval.

A.1.6.2 Reactor Closure Studs, in Place, Items B6.20 and B6.30

All closure studs in the reactor vessel larger than 2 in. in diameter shall be volumetrically examined in accordance with Figure IWB-2500-12 during the first inspect on interval. A surface examination is also required when the studs are removed. Examinations may be performed at or near the end of the inspection interval.

A.1.6.3 Threads in the Flange in the Reactor Vessel, Item B6.40

All threads in the flange in the reactor vessel shall be volumetrically examined in accordance with IWB-2500-12 during the first inspection interval. Examination includes threads in base metal and is required only when the connection is disassembled. Examinations may be performed at or near the end of the inspection interval.

A.1.6.4 Reactor Closure Washers and Bushings, Item B6.50

The surfaces of all closure washers and bushings on bolting larger than 2 in. in diameter in the reactor vessel shall be visually examined (VT-1) during the first inspection interval. Bushings in base material of flanges are required to be examined only when the connections are disassembled; bushings may be examined in place. The examinations may be performed at or near the end of the inspection interval.

A.1.6.5 Pressurizer Bolts, Studs, and Flange Surfaces, Items B6.60 and B6.70

All bolts and studs larger than 2 in. in diameter in the pressurizer shall be volumetrically examined in accordance with IWB-2500-12 during the first inspection interval. Bolting may be examined (a) in place under tension, (b) when the connection is disassembled, or (c) when the bolting is removed. The flange surfaces shall also be visually examined (VT-1) when the connection is disassembled. The examination includes 1 in. of the annular surface surrounding each stud. Examinations may be performed at or near the end of the inspection interval.

A.1.6.6 Pressurizer Nuts, Bushings, and Washers, Item B6.80

The surfaces of all nuts, bushings, and washers on bolting larger than 2 in. in diameter shall be visually examined (VT-1) during the first inspection interval. Bushings in the base material of flanges are required to be examined only when the connections are disassembled; bushings may be inspected in place. Bolting may be examined (a) in place under tension, (b) when the connection is disassembled, or (c) when the bolting is removed. Examinations may be performed at or near the end of the inspection interval.

A.1.6.7 Bolts, Studs, and Flange Surfaces in Steam Generators, Items B6.90 and B6.100

All bolts and studs larger than 2 in. in diameter in steam generators shall be volumetrically examined in accordance with IWB-2500-12 during the first inspection interval. Bolting may be examined (a) in place under tension, (b) when the connection is disassembled, or (c) when the bolting is removed. The flange surfaces shall also be visually examined (VT-1) when the connection is disassembled. The examination includes 1 in. of the annular surface surrounding each stud. Examinations may be performed at or near the end of the inspection interval.

A.1 6.8 Nuts, Bushings, and Washers in Steam Generators, Item B6.110

The surfaces of all nuts, bushings, and washers on bolting larger than 2 in. in diameter in steam generators shall be visually examined (VT-1) during the first inspection interval. Bushings in the base material of flanges are required to be examined only when the connections are disassembled; bushings may be inspected in place. Bolting may be examined (a) in place under tension, (b) when the connection is disassembled, or (c) when the bolting is removed. Examinations may be performed at or near the end of the inspection interval.

A.1.6.9 Bolts, Studs, and Flange Surfaces in Heat Exchangers, Items B6.120 and B6.130

All bolts and studs larger than 2 in. in diameter in heat exchangers shall be volumetrically examined in accordance with IWB-2500-12 during the first inspection interval. Bolting may be examined (a) in place under tension, (b) when the connection is disassembled, or (c) when the bolting is removed. The flange surfaces shall also be visually examined (VT-1) when the connection is disassembled. The examination includes 1 in. of the annular surface surrounding each stud. Examinations may be performed at or near the end of the inspection interval. Examinations are limited to bolts and studs on components selected for examination under Examination Categories B-B, B-J, B-L-1, and B-M-1, as applicable.

A.1.6.10 Nuts, Bushings, and Washers in Heat Exchangers, Item B6.140

The surfaces of all nuts, bushings, and washers on bolting larger than 2 in. in diameter in heat exchangers shall be visually examined (VT-1) during the first inspection interval. Bushings in the base material of flanges are required to be examined only when the connections are disassembled; bushings may be inspected in place. Bolting may be examined (a) in place under tension, (b) when the connection is disassembled, or (c) when the bolting is removed. Examinations may be performed at or near the end of the inspection interval. Examinations are limited to bolts and studs on components selected for examination under Examination Categories B-B, B-J, B-L-1, and B-M-1, as applicable.

A.1.6.11 Bolts, Studs, and Flange Surfaces in Piping, Items B6.150 and B6.160

All bolts and studs larger than 2 in. in diameter in piping shall be volumetrically examined in accordance with IWB-2500-12 during the first inspection interval. Bolting may be examined (a) in place under tension, (b) when the connection is disassembled, or (c) when the bolting is removed. The flange surfaces shall also be visually examined (VT-1) when the connection is disassembled. The examination includes 1 in. of the annular surface surrounding each stud. Examinations may be performed at or near the end of the inspection interval.

A.1.6.12 Nuts, Bushings, and Washers in Piping, Item B6.170

The surfaces of all nuts, bushings, and washers on bolting larger than 2 in. in diameter in piping shall be visually examined (VT-1) during the first inspection interval. Bushings in the base material of flanges are required to be examined only when the connections are disassembled; bushings may be inspected in place. Bolting may be examined (a) in place under tension, (b) when the connection is disassembled, or (c) when the bolting is removed. Examinations may be performed at or near the end of the inspection interval.

A.1.6.13 Bolts, Studs, and Flange Surfaces in Pumps, Items B6.180 and B6.190

All bolts and studs larger than 2 in. in diameter in pumps shall be volumetrically examined in accordance with IWB-2500-12 during the first inspection interval. Bolting may be examined (a) in place under tension, (b) when the connection is disassembled, or (c) when the bolting is removed. The flange surfaces shall also be visually examined (VT-1) when the connection is disassembled. The examination includes 1 in. of the annular surface surrounding each stud. Examinations may be performed at or near the end of the inspection interval. Examinations are limited to bolts and studs on components selected for examination under Examination Categories B-B, B-J, B-L-1, and B-M-1, as applicable.

A.1.5.14 Nuts, Bushings, and Washers in Pumps, Item B6.200

The surfaces of all nuts, bushings, and washers in bolting larger than 2 in. in diameter in pumps shall be visually examined (VT-1) during the first inspection interval. Bushings in the base material of flanges are required to be examined only when the connections are disassembled; bushings may be inspected in place. Bolting may be examined (a) in place under tension, (b) when the connection is disassembled, or (c) when the bolting is removed. Examinations may be performed at or near the end of the inspection interval. Examinations are limited to bolts and studs on components selected for examination under Examination Categories B-B, B-J, B-L-1, and B-M-1, as applicable.

A.1.6.15 Bolts, Studs, and Flange Surfaces in Valves, Items B6.210 and B6.220

All bolts and studs larger than 2 in. in diameter in valves shall be volumetrically examined in accordance with IWB-2500-12 during the first inspection interval. Bolting may be examined (a) in place under tension, (b) when the connection is disassembled, or (c) when the bolting is removed. The flange surfaces shall also be visually examined (VT-1) when the connection is disassembled. The examination includes 1 in. of the annular surface surrounding each stud. Examinations may be performed at or near the end of the inspection interval. Examinations are limited to bolts and studs on components selected for examination under Examination Categories B-B, B-J, B-L-1, and B-M-1, as applicable.

A.1.6.16 Nuts, Bushings, and Washers in Valves, Item B6.230

The surfaces of all nuts, bushings, and washers on bolting larger than 2 in. in diameter in valves shall be visually examined (VT-1) during the first inspection interval. Bushings in the base material of flanges are required to be examined only when the connections are disassembled, but bushings may be inspected in place. Bolting may be examined (a) in place under tension, (b) when the connection is disassembled, or (c) when the bolting is removed. Examinations may be performed at or near the end of the inspection interval. Examinations are limited to bolts and studs on components selected for examination under Examination Categories B-B, B-J, B-L-1, and B-M-1, as applicable.

A.1.7 CATEGORY B-G-2, PRESSURE-RETAINING BOLTING 2 INCHES AND SMALLER IN DIAMETER

A.1.7.1 Bolts, Studs, and Nuts in Reactor Vessel, Item B7.10

The surfaces of all bolts, studs, and nuts 2 in. or less in diameter in the reactor vessel shall be visually examined (VT-1) during the first inspection interval. Bolting may be examined (a) in place under tension, (b) when the connection is disassembled, or (c) when the bolting is removed.

A.1.7.2 Bolts, Studs, and Nuts in Pressurizer, Item B7.20

The surfaces of all bolts, studs, and nuts 2 in. or less in diameter in the pressurizer shall be visually examined (VT-1) during the first inspection interval. Bolting may be examined (a) in place under tension, (b) when the connection is disassembled, or (c) when the bolting is removed.

A.1.7.3 Bolts, Studs, and Nuts in Steam Generators, Item B7.30

The surfaces of all bolts, studs, and nuts 2 in. or less in diameter in the steam generators shall be visually examined (VT-1) during the first inspection interval. Bolting may be examined (a) in place under tension, (b) when the connection is disassembled, or (c) when the bolting is removed.

A.1.7.4 Bolts, Studs, and Nuts in Heat Exchangers, Item B7.40

The surfaces of all bolts, studs, and nuts 2 in. or less in diameter in the heat exchangers shall be visually examined (VT-1) during the first inspection interval. Bolting may be examined (a) in place under tension, (b) when the connection is disassembled, or (c) when the bolting is removed.

A.1.7.5 Bolts, Studs, and Nuts in Piping, Item B7.50

The surfaces of all bolts, studs, and nuts 2 in. or less in diameter in piping shall be visually examined (VT-1) during the first inspection interval. Bolting may be examined (a) in place under tension, (b) when the connection is disassembled, or (c) when the bolting is removed.

A.1.7.6 Bolts, Studs, and Nuts in Pumps, Item B7.60

The surfaces of all bolts, studs, and nuts 2 in. or less in diameter in pumps shall be visually examined (VT-1) during the first inspection interval. Bolting may be examined (a) in place under tension, (b) when the connection is disassembled, or (c) when the bolting is removed.

A.1.7.7 Bolts, Studs, and Nuts in Valves, Item B7.70

The surfaces of all bolts, studs, and nuts 2 in. or less in diameter in valves shall be visually examined (VT-1) during the first inspection interval. Bolting may be examined (a) in place under tension, (b) when the connection is disassembled, or (c) when the bolting is removed.

A.1.7.8 Bolts, Studs, and Nuts in Control Rod Drive Housings, Item B7.80

The surfaces of all bolts, studs, and nuts 2 in. or less in diameter in control rod drive housings shall be visually examined (VT-1) during the first inspection interval when disassembled.

A.1.8 CATEGORY B-H, VESSEL SUPPORTS

A.1.8.1 Integrally Welded Attachments in Reactor Vessel, Item B8.10

The attachment weld joining the reactor vessel support to the pressure-retaining membrane of the reactor vessel where the support base material design thickness is 5/8 in. or greater shall be surface or volumetrically examined, as applicable, in accordance with Figures IWB-2500-13, -14, and -15 during the first inspection interval. Weld buildups on nozzles that serve as supports are excluded. The examination includes essentially 100% of the length of the weld to the reactor vessel and the integral attachment weld to a cast or forged integral attachment to the reactor vessel, as applicable. One hundred percent of the welding of each lug on the vessel is included in the examination.

A.1.8.2 Integrally Welded Attachments in Pressurizer, Item B8.20

The attachment weld joining the pressurizer vessel support to the pressure-retaining membrane of the reactor vessel where the support base material design thickness is 5/8 in. or greater shall be surface or volumetrically examined, as applicable, in accordance with Figures IWB-2500-13, -14, and -15 during the first inspection interval. Weld buildups on nozzles that serve as supports are excluded. The examination includes essentially 100% of the length of the weld to the pressurizer and the integral attachment weld to a cast or forged integral attachment to the pressurizer, as applicable. One hundred percent of the welding of each lug on the vessel is included in the examination.

A.1.8.3 Integrally Welded Attachments in Steam Generators, Item B8.30

The attachment weld joining the steam generator support to the pressure-retaining membrane of the generator where the support base material design thickness is 5/8 in. or greater shall be surface or volumetrically examined, as applicable, in accordance with Figures IWB-2500-13, -14, and -15 during the first inspection interval. Weld buildups on nozzles that serve as supports are excluded. The examination includes essentially 100% of the length of the weld to the steam generator and the integral attachment weld to a cast or forged integral attachment to the steam generator, as applicable. One hundred percent of the welding of each lug on the vessel is included in the examination. The examination is limited to the attachment weld on one steam generator.

A.1.8.4 Integrally Welded Attachments in Heat Exchangers, Item B8.40

The attachment weld joining the heat exchanger support to the pressure-retaining membrane of the heat exchanger where the support base material design thickness is 5/8 in. or greater shall be surface or volumetrically examined, as applicable, in accordance with Figures IWB-2500-13, -14, and -15 during the first inspection interval. Weld buildups on nozzles that serve as supports are excluded. The examination includes essentially 100% of the length of the weld to the heat exchanger and the integral attachment weld to a cast or forged integral attachment to the heat exchanger, as applicable. One hundred percent of the welding of each lug on the heat exchanger is included in the examination. The examination is limited to the attachment weld on one heat exchanger.

A.1.9 CATEGORY B-J, PRESSURE-RETAINING WELDS IN PIPING

A.1.9.1 Nominal Pipe Size 4 In. and Greater, Item B9.10

A.1.9.1.1 Circumferential Welds, Item B9.11

For circumferential welds in pipe of nominal pipe size 4 in. and greater, surface plus volumetric examinations shall be performed in accordance with Figure IWB-2500-8 over essentially 100% of the weld length during each inspection interval. The examination 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 the following limits under loads associated with specific seismic events and operational conditions.

(1) primary plus secondary stress intensity of $2.4S_m$ for ferritic steel and austenitic steel, and

(2) cumulative usage factor U of 0.4.

(c) All dissimilar metal welds between combinations of

(a) carbon or low alloy steels to high alloy steels;
(b) carbon or low alloy steels to high nickel alloys; and
(c) high alloy steels to high nickel alloys.

(d) Additional piping welds so that the total number of circumferential butt welds selected for examination equals 25% of the circumferential butt welds in the reactor coolant piping system. This total does not include welds excluded by IWB-1220. These additional welds may be located in one loop (one loop is currently defined for both PWR and BWR plants in the 1980 Edition).

For welds in carbon or low alloy steels, only those welds showing reportable preservice transverse indications need be examined for transverse reflectors.

A.1.9.1.2 Longitudinal Welds, Item B9.12

For longitudinal welds in pipe of nominal pipe size 4 in. and greater, surface plus volumetric examinations shall be performed in accordance with Figure IWB-2500-8 for at least a pipe-diameter length, but not more than 12 in. of each longitudinal weld intersecting the circumferential welds required to be examined by Examination Categories B-F and B-J. For welds in carbon or low alloy steels, only those welds showing reportable preservice transverse indications need be examined for transverse reflectors.

A.1.9.2 Nominal Pipe Size Less Than 4 In., Item B9.20

A.1.9.2.1 Circumferential Welds, Item B9.21

For circumferential welds in pipe of nominal pipe size less than 4 in., surface examinations shall be performed in accordance with Figure IWB-2500-8 over essentially 100% of the weld length during each inspection interval. The examination 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 the following limits under loads associated with specific seismic events and operational conditions.

(1) primary plus secondary stress intensity of $2.4S_m$ for ferritic steel and austenitic steel, and

(2) cumulative usage factor U of 0.4.

(c) All dissimilar metal welds between combinations of:

(a) carbon or low alloy steels to high alloy steels;
(b) carbon or low alloy steels to high nickel alloys; and
(c) high alloys steels to high nickel alloys.

(d) Additional piping welds so that the total number of circumferential butt welds selected for examination equals 25% of the circumferential butt welds in the reactor coolant piping system. This total does not include welds excluded by IWB-1220. These additional welds may be located in one loop (one loop is currently defined for both PWR and BWR plants in the 1980 Edition).

A.1.9.2.2 Longitudinal Welds, Item B9.22

For longitudinal welds in pipe of nominal pipe size less than 4 in., surface examinations shall be performed in accordance with Figure IWB-2500-8 for at least a pipe-diameter length, but not more than 12 in. of each longitudinal weld intersecting the circumferential welds required to be examined by Examination Categories B-F and B-J.

A.1.9.3 Branch Pipe Connection Welds, Item B9.30

A.1.9.3.1 Nominal Pipe Size 4 Inches and Greater, Item B9.31

For welds in branch connections 4 in. and greater, surface plus volumetric examinations shall be performed in accordance with Figures IWB-2500-9, -10 and -11 over essentially 100% of the weld length during each inspection interval. The 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 the following limits under loads associated with specific seismic events and operational conditions.

(1) primary plus secondary stress intensity of $2.4S_m$ for ferritic steel and austenitic steel, and

(2) cumulative usage factor U of 0.4.

(c) All dissimilar metal welds between combinations of:

(a) carbon or low alloy steels to high alloy steels;
(b) carbon or low alloy steels to high nickel alloys; and
(c) high alloy steels to high nickel alloys.

(d) Additional piping welds so that the total number of circumferential butt welds selected for examination equals 25% of the circumferential butt welds in the reactor coolant piping system. This total does not include welds excluded by IWB-1220. These additional welds may be located in one loop (one loop is currently defined for both PWR and BWR plants in the 1980 Edition).

For welds in carbon or low alloy steels, only those welds showing reportable preservice transverse indications need be examined for transverse reflectors.

A.1.9.3.2 Nominal Pipe Size Less Than 4 Inches, Item B9.32

For welds in branch pipe connections less than 4 in., surface examinations shall be performed in accordance with Figures IWB-2500-9, -10, and -11 over essentially 100% of the weld length during each inspection interval. The 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 the following limits under loads associated with specific seismic events and operational conditions.

(1) primary plus secondary stress intensity of $2.4S_m$ for ferritic steel and austenitic steel, and

(2) cumulative usage factor U of 0.4.

(c) All dissimilar metal welds between combinations of:

(a) carbon or low alloy steels to high alloy steels;
(b) carbon or low alloy steels to high nickel alloys; and
(c) high alloy steels to high nickel alloys.

(d) Additional piping welds so that the total number of circumferential butt welds selected for examination equals 25% of the circumferential butt welds in the reactor coolant piping system. This total does not include welds excluded by IWB-1220. These additional welds may be located in one loop (one loop is currently defined for both PWR and BWR plants in the 1980 Edition).

A.1.9.4 Socket Welds, Item B9.40

Socket welds shall be surface examined in accordance with Figure IWB-2500-8 over essentially 100% of the weld length during each inspection interval. The 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 the following limits under loads associated with specific seismic events and operational conditions.

(1) primary plus secondary stress intensity of $2.4S_m$ for ferritic steel and austenitic steel, and

(2) cumulative usage factor U of 0.4.

(c) All dissimilar metal welds between combinations of:

(a) carbon or low alloy steels to high alloy steels;
(b) carbon or low alloy steels to high nickel alloys; and
(c) high alloy steels to high nickel alloys.

(d) Additional piping welds so that the total number of circumferential butt welds selected for examination equals 25% of the circumferential butt welds in the reactor coolant piping system. This total does not include welds excluded by IWB-1220. These additional welds may be located in one loop (one loop is currently defined for both PWR and BWR plants in the 1980 Edition).

A.1.10 CATEGORY B-K-1, INTEGRAL ATTACHMENTS FOR PIPING, PUMPS, AND VALVES

A.1.10.1 Integrally Welded Attachments on Piping, Item B10.10

Volumetric or surface examinations, as applicable, per Figures IWB-2500-13, -14, and -15 of essentially 100% of the weld length are required for all integrally welded support attachments of piping. Includes the welded attachments of piping required to be examined by Examination Category B-J and the weld attachments of associated pumps and valves integral to such piping. Includes those attachments whose base material design thickness is 5/8 in. or greater.

A.1.10.2 Integrally Welded Attachments on Pumps, Item B10.20

Volumetric or surface examinations, as applicable, per Figures IWB-2500-13, -14, and -15 of essentially 100% of the weld length are required for all integrally welded support attachments of pumps. Includes the welded attachments of piping required to be examined by Examination

Category B-J and the weld attachments of associated pumps and valves integral to such piping. Includes those attachments whose base material design thickness is 5/8 in. or greater.

A.1.10.3 Integrally welded Attachments on Valves, Item B10.30

Volumetric or surface examinations, as applicable, per Figures IWB-2500-13, -14, and -15 of essentially 100% of the weld length are required for all integrally welded support attachments of valves. Includes the welded attachments of piping required by Examination Category B-J and the weld attachments of associated pumps and valves integral to such piping. Includes those attachments whose base material design thickness is 5/8 in. or greater.

A.1.11 CATEGORIES B-L-1 AND B-M-1, PRESSURE-RETAINING WELDS IN PUMP CASINGS AND VALVE BODIES, AND B-L-2 AND B-M-2, PUMP CASINGS AND VALVE BODIES

A.1.11.1 Pump Casing Welds, Item B12.10

Essentially 100% of the pressure-retaining welds in at least one pump in each group of pumps performing similar functions in the system (e.g., recirculating coolant pumps) shall be volumetrically examined in accordance with Figure IWB-2500-16 during each inspection interval. The examinations may be performed at or near the end of the inspection interval.

A.1.11.2 Pump Casings, Item B12.20

The internal surfaces of at least one pump in each group of pumps performing similar functions in the system (e.g., recirculating coolant pumps) shall be visually examined (VT-3) during each inspection interval. The examination may be performed on the same pump selected for volumetric examination of welds. The examinations may be performed at or near the end of the inspection interval.

A.1.11.3 Valve Body Welds Nominal Pipe Size Less than 4 in., Item B12.30

The surfaces of essentially 100% of the body welds (nominal pipe size less than 4 in.) in at least one valve in each group of valves with the same construction design (e.g., globe, gate, or check valve) and manufacturing method that perform similar functions in the system (e.g., containment isolation and system overpressure protection) shall be examined in accordance with Figure IWB-2500-17 during each inspection interval. The examinations may be performed at or near the end of the inspection interval.

A.1.11.3.1 Valve Body Welds, Nominal Pipe Size 4 In. and Greater, Item B12.31

Essentially 100% of the body welds (nominal pipe size 4 in. and greater) in at least one valve in each group of valves with the same construction design (e.g., globe, gate, or check valve) and manufacturing method that perform similar functions in the system (e.g., containment isolation and system over-pressure protection) shall be volumetrically examined in accordance with Figure IWB-2500-17 during each inspection interval. A supplementary surface examination may be performed as required in IWB-3518.1(d). The examinations may be performed at or near the end of the inspection interval.

A.1.11.4 Valve Body Exceeding 4 In. Nominal Pipe Size, Item B12.40

The internal surfaces of at least one valve in each group of valves with the same construction design (e.g., globe, gate, or check valve) and manufacturing method that perform similar functions that exceed 4-inch diameter in the system (e.g., containment isolation and system overpressure protection) shall be visually examined (VT-3) during each inspection interval. The examination may be performed on the same valve selected for volumetric examination of welds. The examinations may be performed at or near the end of the inspection interval.

A.1.12 CATEGORIES B-N-1, INTERIOR OF REACTOR VESSEL; B-N-2, INTEGRALLY WELDED CORE SUPPORT STRUCTURES AND INTERIOR ATTACHMENTS TO REACTOR VESSELS; and B-N-3, REMOVABLE CORE SUPPORT STRUCTURES

A.1.12.1 Reactor Vessel Interior, Item B13.10

The accessible areas of the reactor vessel interior, including the spaces above and below the reactor core that are made accessible by removing components during normal refueling outages, shall be visually examined (VT-3) during the first refueling outage and subsequent refueling outages at approximately 3-year intervals.

A.1.12.2 Boiling Water Reactor Vessel Interior Attachments, Item B13.20

The accessible welds in the reactor vessel interior attachments shall be visually examined (VT-1) during each inspection interval. The examinations may be performed at or near the end of the inspection interval.

A.1.12.2.1 Boiling Water Reactor Core Support Structure, Item B13.21

The accessible surfaces of the core support structure shall be visually examined (VT-1) during each inspection interval. The examinations may be performed at or near the end of the inspection interval.

A.1.12.3 Core Support Structure for Pressurized Water Reactor Vessels, Item B13.30

The accessible welds and surfaces of the core support structure shall be visually examined (VT-3) each inspection interval. The structure shall be removed from the reactor vessel for examination. The examinations may be performed at or near the endof the inspection interval.

A.1.13 CATEGORY B-O, PRESSURE-RETAINING WELDS IN CONTROL ROD HOUSINGS

A.1.13.1 Welds in Control Rod Drive Housings, Item B14.10

The welds in 10% of the peripheral control rod drive housings shall be surface or volumetrically examined in accordance with Figure IWB-2500-18 during each inspection interval. The examinations may be performed at or near the end of the inspection interval.

A.1.14 CATEGORY B-P, ALL PRESSURE-RETAINING COMPONENTS

A.1.14.1 Reactor Vessel Pressure-Retaining Boundary, Item B15.10

The reactor vessel pressure-retaining boundary shall be visually examined (VT-2) during the system leakage test performed in accordance with IWB-5221 during each refueling outage. System pressure tests of the reactor coolant system shall be conducted in accordance with IWA-5000. System pressure tests for repaired, replaced, or altered components shall be governed by IWA-5214(c). The pressure-retaining boundary during the system leakage test shall correspond to the reactor coolant system boundary with all valves in the normal position which is required for normal reactor operation startup. The VT-2 examination shall, however, extend to and include the second closed valve at the boundary extremity. A system hydrostatic test (IWB-5222) and the accompanying VT-2 examination are acceptable in lieu of the system leakage test (IWB-5221) and VT-2 examination.

A.1.14.1.1 Reactor Vessel Pressure-Retaining Boundary, Item B15.11

The reactor vessel pressure-retaining boundary shall be visually examined (VT-2) during the system hydrostatic test performed in accordance with IWB-5222 once per inspection interval. The pressure-retaining boundary during the test shall include all Class 1 components within the system boundary. The examinations may be performed at or near the end of the inspection interval. System pressure tests of the reactor coolant system shall be conducted in accordance with IWA-5000. System pressure tests for repaired, replaced, or altered components shall be governed by IWA-5214(c).

A.1.14.2 Pressurizer Pressure-Retaining Boundary, Item B15.20

The pressurizer pressure-retaining boundary shall be visually examined (VT-2) during the system leakage test performed in accordance with IWB-5221 during each refueling outage. System pressure tests for the reactor coolant system shall be conducted in accordance with IWA-5000. System pressure tests for repaired, replaced, or altered components shall be governed by IWA-5214(c). The pressure-retaining boundary during the system leakage test shall correspond to the reactor coolant system boundary with all valves in the normal position which is required for normal reactor operation startup. The VT-2 examination shall, however, extend to and include the second closed valve at the boundary extremity. A system hydrostatic test (IWB-5222) and the accompanying VT-2 examination are acceptable in lieu of the system leakage test (IWB-5221) and VT-2 examination.

A.1.14.2.1 Pressurizer Pressure-Retaining Boundary, Item B15.21

The pressurizer pressure-retaining boundary shall be visually examined (VT-2) during the system hydrostatic test performed in accordance with IWB-5222 once per inspection interval. The pressure-retaining boundary during the test shall include all Class 1 components within the system boundary. The examinations may be performed at or near the end of the inspection interval. System pressure tests of the reactor coolant system shall be conducted in accordance with IWA-5000. System pressure tests for repaired, replaced, or altered components shall be governed by IWA-5214(c).

A.1.14.3 Steam Generator Pressure-Retaining Boundary, Item B15.30

The steam generator pressure-retaining boundary shall be visually examined (VT-2) during the system leakage test performed in accordance with IWB-5221 during each refueling outage. System pressure tests of the reactor coolant system shall be conducted in accordance with IWA-5000. System pressure tests for repaired, replaced, or altered components shall be governed by IWA-5214(c). The pressure-retaining boundary during the system leakage test shall correspond to the reactor coolant system boundary with all valves in the normal position which is required for normal reactor operation startup. The VT-2 examination shall, however, extend to and include the second closed valve at the boundary extremity. A system hydrostatic test (IWB-5222) and the accompanying VT-2 examination are acceptable in lieu of the system leakage test (IWB-5221) and VT-2 examination.

A.1.14.3.1 Steam Generator Pressure-Retaining Boundary, Item B15.31

The steam generator pressure-retaining boundary shall be visually examined (VT-2) during the system hydrostatic test performed in accordance with IWB-5222 during each refueling outage. The examinations may be

performed at or near the end of the inspection interval. The pressure-retaining boundary during the test shall include all Class I components within the system boundary. System pressure tests of the reactor coolant system shall be conducted in accordance with IWA-5000. System pressure tests for repaired, replaced, or altered components shall be governed by IWA-5214(c).

A.1.14.4 Heat Exchanger Pressure-Retaining Boundary, Item B15.40

The heat exchanger pressure-retaining boundary shall be visually examined (VT-2) during the system leakage test performed in accordance with IWB-5221 during each refueling outage. System pressure tests of the reactor coolant system shall be conducted in accordance with IWA-5000. System pressure tests for repaired, replaced, or altered components shall be governed by IWA-5214(c). The pressure-retaining boundary during the system leakage test shall correspond to the reactor coolant system boundary with all valves in the normal position which is required for normal reactor operation startup. The VT-2 examination shall, however, extend to and include the second closed valve at the boundary extremity. A system hydrostatic test (IWB-5222) and the accompanying VT-2 examination are acceptable in lieu of the system leakage test (IWB-5221) and VT-2 examination.

A.1.14.4.1 Heat Exchanger Pressure-Retaining Boundary, Item B15.41

The heat exchanger pressure-retaining boundary shall be visually examined (VT-2) during the system hydrostatic test performed in accordance with IWB-5222 once per inspection interval. The pressure-retaining boundary during the test shall include all Class 1 components within the system boundary. The examinations may be performed at or near the end of the inspection interval. System pressure tests of the reactor coolant system shall be conducted in accordance with IWA-5000. System pressure tests for repaired, replaced, or altered components shall be governed by IWA-5214(c).

A.1.14.5 Piping Pressure-Retaining Boundary, Item B15.50

The piping pressure-retaining boundary shall be visually examined (VT-2) during the system leakage test performed in accordance with IWB-5221 during each refueling outage. System pressure tests of the reactor coolant system shall be conducted in accordance with IWA-5000. System pressure tests for repaired, replaced, or altered components shall be governed by IWA-5214(c). The pressure-retaining boundary during the system leakage test shall correspond to the reactor coolant system boundary with all valves in the normal position which is required for normal reactor operation startup. The VT-2 examination shall, however, extend to and include the second closed valve at the boundary extremity. A system hydrostatic test (IWB-5222) and the accompanying VT-2 examination are acceptable in lieu of the system leakage test (IWB-5221) and VT-2 examination.

A.1.14.5.1 Piping Pressure-Retaining Boundary, Item B15.51

The piping pressure-retaining boundary shall be visually examined (VT-2) during the system hydrostatic test performed in accordance with IWB-5222 once per inspection interval. The pressure-retaining boundary during the test shall include all Class 1 components within the system boundary. The examinations may be performed at or near the end of the inspection interval. System pressure tests of the reactor coolant system shall be conducted in accordance with IWA-5000. System pressure tests for repaired, replaced, or altered components shall be governed by IWA-5214(c).

A.1.14.6 Pump Pressure-Retaining Boundary, Item B15.60

The pump pressure-retaining boundary shall be visually examined (VT-2) during the system leakage test performed in accordance with IWB-5221 during each refueling outage. System pressure tests of the reactor coolant system shall be conducted in accordance with IWA-5000. System pressure tests for repaired, replaced, or altered components shall be governed by IWA-5214(c). System pressure tests of the reactor coolant system shall be conducted in accordance with IWA-5000. System pressure tests for repaired, replaced, or altered components shall be governed by IWA-5214(c). The pressure-retaining boundary during the system leakage test shall correspond to the reactor coolant system boundary with all valves in the normal position which is required for normal reactor operation startup. The VT-2 examination shall, however, extend to and include the second closed valve at the boundary extremity. A system hydrostatic test (IWB-5222) and the accompanying VT-2 examination are acceptable in lieu of the system leakage test (IWB-5221) and VT-2 examination.

A.1.14.6.1 Pump Pressure-Retaining Boundary, Item B15.61

The pump pressure-retaining boundary shall be visually examined (VT-2) during the system hydrostatic test performed in accordance with IWB-5222 once per inspection interval. The pressure-retaining boundary during the test shall include all Class 1 components within the system boundary. The examinations may be performed at or near the end of the inspection interval. System pressure tests of the reactor coolant system shall be conducted in accordance with IWA-5000. System pressure tests for repaired, replaced, or altered components shall be governed by IWA-5214(c).

A.1.14.7 Valve Pressure-Retaining Boundary, Item B15.70

The valve pressure-retaining boundary shall be visually examined (VT-2) during the system leakage test performed in accordance with IWB-5221 during each refueling outage. System pressure tests of the reactor coolant system shall be conducted in accordance with IWA-5000. System pressure tests for repaired, replaced, or altered components shall be governed by IWA-5214(c). The pressure-retaining boundary during the system leakage test shall

correspond to the reactor coolant system boundary with all valves in the normal position which is required for normal reactor operation startup. The VT-2 examination shall, however, extend to and include the second closed valve at the boundary extremity. A system hydrostatic test (IWB-5222) and the accompanying VT-2 examination are acceptable in lieu of the system leakage test (IWB-5221) and VT-2 examination.

A.1.14.7.1 Valve Pressure-Retaining Boundary, B15.71

The valve pressure-retaining boundary shall be visually examined (VT-2) during the system hydrostatic test performed in accordance with IWB-5222 once per inspection interval. The pressure-retaining boundary during the test shall include all Class 1 components within the system boundary. The examinations may be performed at or near the end of the inspection interval. System pressure tests of the reactor coolant system shall be conducted in accordance with IWA-5000. System pressure tests for repaired, replaced, or altered components shall be governed by IWA-5214(c).

A.1.15 CATEGORY B-Q, STEAM GENERATOR TUBING

A.1.15.1 Steam Generator Tubing, Straight Tube Design, Item B16.10

The entire length of the steam generator tubing shall be volumetrically examined in 3% of the heating surface in each generator during the first inspection interval. The heat transfer surface is specified in terms of the number of tubes to be examined.

A.1.15.2 Steam Generator Tubing, U-Tube Design, Item B16.20

Steam generator tubing (hot leg side), U-bend portion, and cold leg side (optional) shall be volumetrically examined in 3% of the heating surface in each generator during the first inspection interval.

A.2 CLASS 2 REQUIREMENTS

A.2.1 CATEGORY C-A, PRESSURE-RETAINING WELDS IN PRESSURE VESSELS

A.2.1.1 Shell Circumferential Welds, Item C1.10

Essentially 100% of the shell circumferential welds at gross structural discontinuities shall be volumetrically examined in accordance with Figure IWC-2520-1 during each inspection interval. A gross structural discontinuity is defined in NB-3213.2. Examples are junctions between shells of different thicknesses, cylindrical shell-to-conical shell junctions, and shell (or head)-to-flange welds and head-to-shell welds. For multiple vessels with similar design, size, and service (such as steam generators and heat exchangers), the required examinations may be limited to one vessel or distributed among the vessels.

A.2.1.2 Head Circumferential Weld, Item C1.20

Essentially 100% of the circumferential head-to-shell weld shall be volumetrically examined in accordance with Figure IWC-2520-1 during each inspection interval. For multiple vessels with similar design, size, and service (such as steam generators and heat exchangers), the required examinations may be limited to one vessel or distributed among the vessels.

A.2.1.3 Tubesheet-to-Shell Weld, Item C1.30

Essentially 100% of the tubesheet-to-shell weld shall be volumetrically examined in accordance with Figure IWC-2520-2 during each inspection interval. For multiple vessels with similar design, size, and service (such as steam generators and heat exchangers), the required examinations may be limited to one vessel or distributed among the vessels.

A.2.2 CATEGORY C-B, PRESSURE-RETAINING NOZZLE WELDS IN VESSELS

A.2.2.1 Nozzles in Vessels 1/2 In. or Less in Nominal Thickness, Item C2.10

All nozzles in vessels 1/2 in. or less in nominal thickness at terminal ends of piping runs shall be surface examined in accordance with Figure IWC-2520-3 during each inspection interval. Terminal ends include nozzles welded to or integrally cast in vessels that connect to piping runs (manways and handholes are excluded). Only those piping runs selected for examination under Examination Category C-F are included.

A.2.2.2 Nozzles in Vessels Over 1/2 In. in Nominal Thickness, Item C2.20

A.2.2.2.1 Nozzle-to-Shell (or Head) Weld, Item C2.21

The nozzle-to-shell (or head) welds of all nozzles in vessels over 1/2 in. in nominal thickness at terminal ends of piping runs shall be surface and volumetrically examined in accordance with Figure IWC-2520-4 during each inspection interval. Terminal ends include nozzles welded to or integrally cast in vessels that connect to piping runs (manways and handholes are excluded). Only those piping runs selected for examination under Examination Category C-F are included.

A.2.2.2.2 Nozzle Inside Radius Section, Item C2.22

The inside radius sections of all nozzles in vessels over 1/2 in. in nominal thickness at terminal ends of piping runs shall be volumetrically examined in accordance with Figure IWC-2520-4 during each inspection interval. Terminal ends include nozzles welded to or integrally cast in vessels that connect to piping runs (manways and handholes are excluded). Only those piping runs selected for examination under Examination Category C-F are included.

A.2.3 CATEGORY C-C, SUPPORT MEMBERS

A.2.3.1 Integrally Welded Support Attachments in Pressure Vessels, Item C3.10

The surfaces of 100% of each integrally welded attachment in pressure vessels shall be surface examined in accordance with Figure IWC-2500-5 during each inspection interval. Examination is limited to integrally welded attachments whose base material design thickness is 3/4 in. or greater. For multiple vessels of similar design and service, the required examinations may be conducted on only one vessel. Where multiple vessels are provided with a number of similar supporting elements, the examination of the support elements may be distributed among the vessels.

A.2.3.2 Integrally Welded Attachments in Piping, Item C3.40

The surfaces of 100% of each integrally welded attachment in piping shall be surface examined in accordance with Figure IWC-2500-5. Examination is limited to integrally welded attachments whose base material design thickness is 3/4 in. or greater. In addition, examinations are limited to attachments of those components required to be examined under Examination Categories C-F and C-G.

A.2.3.3 Integrally Welded Pump Attachments, Item C3.70

The surfaces of 100% of each integrally welded attachment in pumps shall be examined in accordance with Figure IWC-2500-5. Examination is limited to integrally welded attachments whose base material design thickness is 3/4 in. or greater. Examinations are limited to attachments of those components required to be examined under Examination Categories C-F and C-G.

A.2.3.4 Integrally Welded Valve Support Attachments, Item C3.100

The surfaces of 100% of each integrally welded valve attachment shall be examined in accordance with Figure IWC-2500-5 during each inspection interval. Examination is limited to integrally welded attachments whose base material design thickness is 3/4 in. or greater. Examinations are limited to attachments of those components required to be examined under Examination Categories C-F and C-G.

A.2.4 CATEGORY C-D, PRESSURE-RETAINING BOLTING GREATER THAN 2 INCHES IN DIAMETER

A.2.4.1 Bolts and Studs in Pressure Vessels, Item C4.10

For bolts and studs in pressure vessels, 100% of the bolts and studs at each bolted connection of components required to be inspected shall be volumetrically examined in accordance with Figure IWC-2520-6 during each inspection interval. Bolting may be examined on one vessel in each system required to be examined that is similar in design, size, function, and service. In addition, where the vessel contains a group of bolted connections of similar design and size (such as flange connections and manway covers), only one bolted connection among the group need be examined. Bolting may be examined in place under load or upon disassembly of the connection.

A.2.4.2 Bolts and Studs in Piping, Item C4.20

One hundred percent of the bolts and studs at each bolted piping connection shall be volumetrically examined in accordance with Figure IWC-2520-6. The examination of flange bolting in piping systems required to be examined may be limited to the flange connections in pipe runs selected for examination under Examination Category C-F. Bolting may be examined in place under load or upon disassembly of the connection.

A.2.4.3 Bolts and Studs in Pumps, Item C4.30

For pumps, 100% of the bolts and studs at each bolted connection of pumps shall be volumetrically examined in accordance with Figure IWC-2520-6. Bolting on only one pump among a group of pumps in each system required to be examined that have similar designs, sizes, functions, and service is required to be examined. In addition, where one pump contains a group of bolted connections of similar design and size (such as flange connections and manway covers), the examination may be conducted on one bolted connection among the group. Bolting may be examined in place under load and upon disassembly of the connection.

A.2.4.4 Bolts and Studs in Valves, Item C4.40

For valves, 100% of the bolts and studs at each bolted connection of valves shall be volumetrically examined in accordance with Figure IWC-2520-6. Bolting on only one valve among a group of valves in each system required to be examined that have similar designs, sizes, functions, and service is required to be examined. In addition, where one valve contains a group of bolted connections of similar design and size (such as flange connections and manway covers), the examination may be conducted on one bolted connection among the group. Bolting may be examined in place under load and upon disassembly of the connection.

A.2.5 CATEGORY C-F, PRESSURE-RETAINING WELDS IN PIPING

A.2.5.1 Piping Welds 1/2 In. or Less Nominal Wall Thickness, Item C5.10

A.2.5.1.1 Circumferential Welds, Item C5.11

The surfaces of 100% of each circumferential weld 1/2 in. or less nominal wall thickness shall be examined in accordance with Figure IWC-2520-7 during each inspection interval. The welds selected for examination shall include

a. all welds at locations where the stresses under the loadings resulting from Normal and Upset plant conditions as calculated by the sum of Equations 9 and 10 in NC-3652 exceed the specified value;

b. all welds at terminal ends (see (e) below) of piping or branch runs;

c. all dissimilar metal welds;

d. additional welds, at structural discontinuities (see (f) below) such that the total number of welds selected for examination includes the following percentages of circumferential piping welds;

For boiling water reactors:

1. none of the welds exempted by IWC-1220;
2. none of the welds in residual heat removal and emergency core cooling systems (see (g) below);
3. 50% of the main steam system welds;
4. 25% of the welds in all other systems.

For pressurized water reactors:

1. none of the welds exempted by IWC-1220;
2. none of the welds in residual heat removal and emergency core cooling systems;
3. 10% of the main steam system welds 8 in. nominal pipe size and smaller;
4. 25% of the welds in all other systems.

e. terminal ends are the extremities of piping runs that connect to structures, components (such as vessels, pumps, and valves) or pipe anchors, each of which act as rigid restraints or provide at least two degrees of restraint to piping thermal expansion;

f. structural discontinuities include pipe weld joints to vessel nozzles, valve bodies, pump casings, pipe fittings (such as, elbows, tees, reducers, and flanges conforming to ANSI Standard B16.9), and nine branch connections and fittings;

g. examination requirements are under development.

For welds in carbon or low alloy steels, only those welds showing reportable preservice transverse indications need to be examined for transverse reflectors.

A.2.5.1.2 Longitudinal Welds, Item C5.12

Longitudinal welds 1/2 in. or less nominal wall thickness shall be surface examined in accordance with IWC-2520-7 (2.5 t at the intersecting circumferential weld) during each inspection interval.

A.2.5.2 Piping Welds Over 1/2 In. Nominal Wall Thickness, Item C5.20

A.2.5.2.1 Circumferential Welds, Item C5.21

One hundred percent of each circumferential weld over 1/2 in. nominal wall thickness shall be surface and volumetrically examined in accordance with Figure IWC-2520-7 during each inspection interval. The welds selected for examination shall include

a. all welds at locations where the stresses under the loadings resulting from Normal and Upset plant conditions as calculated by the sum of Equations 9 and 10 in NC-3652 exceed the specified value;

b. all welds at terminal ends (see (e) below) of piping or branch runs;

c. all dissimilar metal welds;

d. additional welds, at structural discontinuities (see (f) below) such that the total number of welds selected for examination includes the following percentages of circumferential piping welds;

For boiling water reactors:

1. none of the welds exempted by IWC-1220;
2. none of the welds in residual heat removal and emergency core cooling systems (see (g) below);
3. 50% of the main steam system welds;
4. 25% of the welds in all other systems.

For pressurized water reactors:

1. none of the welds exempted by IWC-1220;
2. none of the welds in residual heat removal and emergency core cooling systems;
3. 10% of the main steam system welds 8 in. nominal pipe size and smaller;
4. 25% of the welds in all other systems.

e. terminal ends are the extremities of piping runs that connect to structures, components (such as vessels, pumps, and valves) or pipe anchors, each of which act as rigid restraints or provide at least two degrees of restraint to piping thermal expansion;

f. structural discontinuities include pipe weld joints to vessel nozzles, valve bodies, pump casings, pipe fittings (such as, elbows, tees, reducers, and flanges conforming to ANSI Standard B16.9), and nine branch connections and fittings;

g. examination requirements are under development.

For welds in carbon or low alloy steels, only those welds showing reportable preservice transverse indications need to be examined for transverse reflectors.

A.2.5.2.2 Longitudinal Welds, Item C5.22

Longitudinal welds over 1/2 in. nominal wall thickness shall be surface and volumetrically examined in accordance with Figure IWC-2520-7 (2.5 t at the intersecting circumferential weld) during each inspection interval.

A.2.5.3 Pipe Branch Connections, Item C5.30

A.2.5.3.1 Circumferential Welds, Item C5.31

The surfaces of 100% of each circumferential weld in pipe branch connections shall be examined in accordance with Figure IWC-2520-9 during each inspection interval. The welds selected for examination shall include

a. all welds at locations where the stresses under the loadings resulting from Normal and Upset plant conditions as calculated by the sum of Equations 9 and 10 in NC-3652 exceed the specified value;

b. all welds at terminal ends (see (e) below) of piping or branch runs;

c. all dissimilar metal welds;

d. additional welds, at structural discontinuities (see (f) below) such that the total number of welds selected for examination includes the following percentages of circumferential piping welds;

For boiling water reactors:

1. none of the welds exempted by IWC-1220;
2. none of the welds in residual heat removal and emergency core cooling systems (see (g) below);
3. 50% of the main steam system welds 8 in;
4. 25% of the welds in all other systems.

For pressurized water reactors:

1. none of the welds exempted by IWC-1220;
2. none of the welds in residual heat removal and emergency core cooling systems;
3. 10% of the main steam system welds 8 in. nominal pipe size and smaller;
4. 25% of the welds in all other systems.

e. terminal ends are the extremities of piping runs that connect to structures, components (such as, vessels, pumps, and valves) or pipe anchors, each of which act as rigid restraints or provide at least two degrees of restraint to piping thermal expansion;

f. structural discontinuities include pipe weld joints to vessel nozzles, valve bodies, pump casings, pipe fittings (such as, elbows, tees, reducers, and flanges conforming to ANSI Standard B16.9), and nine branch connections and fittings;

g. examination requirements are under development.

For welds in carbon or low alloy steels, only those welds showing reportable preservice transverse indications need to be examined for transverse reflectors.

A.2.5.3.2 Longitudinal Welds, Item C5.32

Longitudinal welds in pipe branch connections shall be surface examined in accordance with Figure IWC-2520-7 (2.5 t at the intersecting circumferential weld) during each inspection interval.

A.2.6 CATEGORY C-G, PRESSURE-RETAINING WELDS IN PUMPS AND VALVES

A.2.6.1 Pump Casing Welds, Item C6.10

One hundred percent of all pump casing welds in each piping run examined under Examination Category C-F shall be surface examined in accordance with Figure IWC-2520-8 during each inspection interval. For multiple pumps of similar design, size, function, and service in a system, only one pump among each group of multiple pumps is required to be examined. The examination may be performed from either the inside or outside surface.

A.2.6.2 Valve Body Welds, Item C6.20

One hundred percent of all valve body welds in each piping run examined under Examination Category C-F shall be surface examined in accordance with Figure IWC-2520-8 during each inspection interval. For multiple valves of similar design, size, function, and service in a system, only one valve among each group of multiple valves is required to be examined. The examination may be performed from either the inside or outside surface.

A.2.7 CATEGORY C-H, ALL PRESSURE-RETAINING COMPONENTS

A.2.7.1 Pressure Vessels, Item C7.10

Pressure vessel pressure-retaining boundaries (other than open-ended portions of systems) shall be visually examined (VT-2) during the system leakage test performed in accordance with IWC-5221 during each inspection. No components within the pressure retaining boundary are exempt or excluded from the examination requirements, except as specified in IWA-5214(c) for repairs and replacements. Where portions of a system are subject to system pressure tests associated with two different system functions, the VT-2 examination need only be performed during the test conducted at the higher of the test pressures of the respective system function. The pressure retaining boundary includes only those portions of the system required to operate or support the safety system function up to and including the first normally closed valve (including a safety or relief valve) or valve capable of automatic closure when the safety function is required. A system hydrostatic test (IWC-5222) and accompanying VT-2 examination are acceptable in lieu of the system pressure test (IWC-5221) and VT-2 examination.

A.2.7.1.1 Pressure Vessels, Item C7.11

Pressure vessel pressure-retaining boundaries (other than open-ended portions of systems) shall be visually examined (VT-2) during the system hydrostatic test performed in accordance with IWC-5222 during each inspection period. No components within the pressure retaining boundary [as defined by Note (7)] are exempt or excluded from the examination requirements, except as specified in IWA-5214(c) for repairs and replacements. The system hydrostatic test (IWC-5222) shall be conducted at or near the end of each inspection interval or during the same inspection period of each inspection interval of Inspection Program B. The pressure retaining boundary includes only those portions of the system required to operate or support the safety system function up to and including the first normally closed valve (including a safety or relief valve) or valve capable of automatic closure when the safety function is required.

A.2.7.2 Piping, Item C7.20

Piping pressure-retaining boundaries (other than open-ended portions of systems) shall be visually examined (VT-2) during the system leakage test performed in accordance with IWC-5221 during each inspection period. No components within the pressure-retaining boundary are exempt or excluded from the examination requirements, except as specified in IWA-5214(c) for repairs and replacements. Where portions of a system are subject to system pressure tests associated with two different system functions, the VT-2 examination need only be performed during the test conducted at the higher of the test pressures of the respective system function. The pressure retaining boundary includes only those portions of the system required to operate or support the safety system function up to and including the first normally closed valve (including a safety or relief valve) or valve capable of automatic closure when the safety function is required. A system hydrostatic test (IWC-5222) and accompanying VT-2 examination are acceptable in lieu of the system pressure test (IWC-5221) and VT-2 examination.

A.2.7.2.1 Piping, Item C7.21

Piping pressure-retaining boundaries (other than open-ended portions of systems) shall be visually examined (VT-2) during the system hydrostatic test performed in accordance with IWC-5222 during each inspection period. No components within the pressure-retaining boundary [as defined by Note (7)] are exempt or excluded from the examination requirements, except as specified in IWA-5214(c) for repairs and replacements. The system hydrostatic test (IWC-5222) shall be conducted at or near the end of each inspection interval or during the same inspection period of each inspection interval of Inspection Program B. The pressure-retaining boundary includes only those portions of the system required to operate or support the safety system function up to and including the first normally closed valve (including a safety or relief valve) or valve capable of automatic closure when the safety function is required.

A.2.7.3 Pumps, Item C7.30

Pump pressure-retaining boundaries (other than open-ended portions of systems) shall be visually examined (VT-2) during the system leakage test performed in accordance with IWC-5221 during each inspection period. No components within the pressure-retaining boundary are exempt or excluded from the examination requirements, except as specified in IWA-5214(c) for repairs and replacements. Where portions of a system are subject to system pressure tests associated with two different system functions, the VT-2 examination need only be performed during the test conducted at the higher of the test pressures of the respective system function. The pressure-retaining boundary includes only those portions of the system required to operate or support the safety system function up to and including the first normally closed valve (including a safety or relief valve) or valve capable of automatic closure when the safety function is required. A system hydro-hydrostatic test (IWC-5222) and accompanying VT-2 examination are acceptable in lieu of the system pressure test (IWC-5221) and VT-2 examination.

A.2.7.3.1 Pumps, Item C7.31

Pump pressure-retaining boundaries (other than open-ended portions of systems) shall be visually examined (VT-2) during the system hydrostatic test performed in accordance with IWC-5222 during each inspection period. No components within the pressure-retaining boundary [as defined by Note (7)] are exempt or excluded from the examination requirements, except as specified in IWA-5214(c) for repairs and replacements. The system hydrostatic test (IWC-5222) shall be conducted at or near the end of each inspection interval or during the same inspection period of each inspection interval of Inspection Program B. The pressure-retaining boundary includes only those portions of the system required to operate or support the safety system function up to and including the first normally closed valve (including a safety or relief valve) or valve capable of automatic closure when the safety function is required.

A.2.7.4 Valves, Item C7.40

Valve pressure-retaining boundaries other than open-ended portions of systems) shall be visually examined (VT-2) during the system leakage test in accordance with IWC-5221 during each inspection period. No components within the pressure-retaining boundary are exempt or excluded from the examination requirements, except as specified in IWA-5214(c) for repairs and replacements. Where portions of a system are subject to system pressure tests associated with two different system functions, the VT-2 examination need only be performed during the test conducted at the higher of the test pressures of the respective system function. The pressure-retaining boundary includes only those portions of the system required to operate or support the safety system function up to and including the first normally closed valve (including a safety or relief valve) or valve capable of automatic closure when the safety function is required. A system

hydrostatic test (IWC-5222) and accompanying VT-2 examination are acceptable in lieu of the system pressure test (IWC-5221) and VT-2 examination.

A.2.7.4.1 Valves, Item C7.41

Valve pressure-retaining boundaries (other than open-ended portions of systems) shall be visually examined (VT-2) during the system hydrostatic test performed in accordance with IWC-5222 during each inspection period. No components within the pressure-retaining boundary [as defined by Note (7)] are exempt or excluded from the examination requirements, except as specified in IWA-5214(c) for repairs and replacements. The system hydrostatic test (IWC-5222) shall be conducted at or near the end of each inspection interval or during the same inspection period of each inspection interval of Inspection Program B. The pressure-retaining boundary includes only those portions of the system required to operate or support the safety system function up to and including the first normally closed valve (including a safety or relief valve) or valve capable of automatic closure when the safety function is required.

A.3 CLASS 3 REQUIREMENTS

A.3.1 CATEGORY D-A, SYSTEMS IN SUPPORT OF REACTOR SHUTDOWN FUNCTION

A.3.1.1 Pressure-Retaining Components, Item D1.10

The pressure-retaining components in the pressure-retaining boundary shall be visually examined (VT-2) during the system pressure test IWA-5000/IWD-5221 each inspection period. A system hydrostatic test (IWD-5223) and accompanying VT-2 examination are acceptable in lieu of the system pressure test and VT-2 examination. The system hydrostatic test shall be conducted at or near the end of each inspection interval or during the same inspection period of each inspection interval for Inspection Program B. The system boundary extends up to and including the first normally closed valve or valve capable of automatic closure as required to perform the safety-related system function. There are no exemptions or exclusions from these requirements except as specified in IWA-5214(c).

A.3.1.2 Integral Attachment--Component Supports and Restraints, Item D1.20

Component supports and restraints shall be visually examined (VT-3) in accordance with IWD-2500-1 during each inspection interval. For multiple components within a system of similar design, function, and service, the integral attachment of only one of the multiple components shall be examined. The integral attachments selected for examination shall correspond to those component supports selected by IWF-2510(b).

A.3.1.3 Integral Attachment--Mechanical and Hydraulic Snubbers, Item D1.30

Mechanical and hydraulic snubbers shall be visually examined (VT-3) in accordance with IWD-2500-1 during each inspection interval. For multiple components within a system of similar design, function, and service, the integral attachment of only one of the multiple components shall be examined. The integral attachments selected for examination shall correspond to those component supports selected by IWF-2510(b).

A.3.1.4 Integral Attachment--Spring Type Supports, Item D1.40

Spring type supports shall be visually examined (VT-3) in accordance with IWD-2500-1 during each inspection interval. For multiple components within a system of similar design, function, and service, the integral attachment of only one of the multiple components shall be examined. The integral attachments selected for examination shall correspond to those component supports selected by IWF-2510(b).

A.3.1.5 Integral Attachment--Constant Load Type Supports, Item D1.50

Constant load type supports shall be visually examined (VT-3) in accordance with IWD-2500-1 during each inspection interval. For multiple components within a system of similar design, function, and service, the integral attachment of only one of the multiple components shall be examined. The integral attachments selected for examination shall correspond to those component supports selected by IWF-2510(b).

A.3.1.6 Integral Attachment--Shock Absorbers, Item D1.60

Shock absorbers shall be visually examined (VT-3) in accordance with IWD-2500-1 during each inspection interval. For multiple components within a system of similar design, function, and service, the integral attachment of only one of the multiple components shall be examined. The integral attachments selected for examination shall correspond to those component supports selected by IWF-2510(b).

A.3.2 CATEGORY D-B, SYSTEMS IN SUPPORT OF EMERGENCY CORE COOLING, CONTAINMENT HEAT REMOVAL, ATMOSPHERIC CLEANUP, AND REACTOR RESIDUAL HEAT REMOVAL

A.3.2.1 Pressure-Retaining Components, Item D2.10

The pressure-retaining components in the pressure-retaining boundary shall be visually examined (VT-2) during the system pressure test IWA-5000/IWD-5221 each inspection period. A system hydrostatic test (IWD-5223) and accompanying VT-2 examination are acceptable in lieu of the system pressure test and VT-2 examination. The system hydrostatic test shall be conducted at or near the end of each inspection interval or during the same inspection period of each inspection interval for Inspection Program B. The system boundary extends up to and including the first normally closed valve or valve capable of automatic closure as required to perform the safety-related system function. There are no exemptions or exclusions from these requirements except as specified in IWA-5214(c).

A.3.2.2 Integral Attachment--Component Supports and Restraints Item D2.20

Component supports and restraints shall be visually examined (VT-3) in accordance with IWD-2500-1 during each inspection interval. For multiple components within a system of similar design, function, and service, the integral attachments selected for examination shall correspond to those component supports selected by IWF-2510(b).

A.3.2.3 Integral Attachment--Mechanical and Hydraulic Snubbers, Item D2.30

Mechanical and hydraulic snubbers shall be visually examined (VT-3) in accordance with IWD-2500-1 during each inspection interval. For multiple components within a system of similar design, function, and service, the integral attachment of only one of the multiple components shall be examined. The integral attachments selected for examination shall correspond to those component supports selected by IWF-2510(b).

A.3.2.4 Integral Attachment--Spring Type Supports, Item D2.40

Spring type supports shall be visually examined (VT-3) in accordance with IWD-2500-1 during each inspection interval. For multiple components within a system of similar design, function, and service, the integral attachment of only one of the multiple components shall be examined. The integral attachments selected for examination shall correspond to those component supports selected by IWF-2510(b).

A.3.2.5 Integral Attachment--Constant Load Type Supports, Item D2.50

Constant load type supports shall be visually examined (VT-3) in accordance with IWD-2500-1 during each inspection interval. For multiple components within a system of similar design, function, and service, the integral attachment of only one of the multiple components shall be examined. The integral attachments selected for examination shall correspond to those component supports selected by IWF-2510(b).

A.3.2.6 Integral Attachment--Shock Absorbers, Item D2.60

Shock absorbers shall be visually examined (VT-3) in accordance with IWD-2500-1 during each inspection interval. For multiple components within a system of similar design, function, and service, the integral attachment of only one of the multiple components shall be examined. The integral attachments selected for examination shall correspond to those component supports selected by IWF-2510(b).

A.3.3 CATEGORY D-C, SYSTEMS IN SUPPORT OF RESIDUAL HEAT REMOVAL FROM SPENT FUEL STORAGE POOL

A.3.3.1 Pressure-Retaining Components, Item D3.10

The pressure-retaining components in the pressure-retaining boundary shall be visually examined (VT-2) during the system pressure test IWA-5000/ IWD-5221 each inspection period. A system hydrostatic test (IWD-5223) and accompanying VT-2 examination are acceptable in lieu of the system pressure test and VT-2 examination. The system hydrostatic test shall be conducted at or near the end of each inspection interval or during the same inspection

period of each inspection interval for Inspection Program B. The system boundary extends up to and including the first normally closed valve or valve capable of automatic closure as required to perform the safety-related system function. There are no exemptions or exclusions from these requirements except as specified in IWA-5214(c).

A.3.3.2 Integral Attachment--Component Supports and Restraints, Item D3.20

Component supports and restraints shall be visually examined (VT-3) in accordance with IWD-2500-1 during each inspection interval. For multiple components within a system of similar design, function, and service, the integral attachment of only one of the multiple components shall be examined. The integral attachments selected for examination shall correspond to those component supports selected by IWF-2510(b).

A.3.3.3 Integral Attachment--Mechanical and Hydraulic Snubbers, Item D3.30

Mechanical and hydraulic snubbers shall be visually examined (VT-3) in accordance with IWD-2500-1 during each inspection interval. For multiple components within a system of similar design, function, and service, the integral attachment of only one of the multiple components shall be examined. The integral attachments selected for examination shall correspond to those component supports selected by IWF-2510(b).

A.3.3.4 Integral Attachment--Spring Type Supports Item D3.40

Spring type supports shall be visually examined (VT-3) in accordance with IWD-2500-1 during each inspection interval. For multiple components within a system of similar design, function, and service, the integral attachment of only one of the multiple components shall be examined. The integral attachments selected for examination shall correspond to those component supports selected by IWF-2510(b).

A.3.3.5 Integral Attachment--Constant Load Type Supports, Item D3.50

Constant load type supports shall be visually examined (VT-3) in accordance with IWD-2500-1 during each inspection interval. For multiple components within a system of similar design, function, and service, the integral attachment of only one of the multiple components shall be examined. The integral attachments selected for examination shall correspond to those component supports selected by IWF-2510(b).

A.3.3.6 Integral Attachment--Shock Absorbers, Item D3.60

Shock absorbers shall be visually examined (VT-3) in accordance with IWD-2500-1 during each inspection interval. For multiple components within a system of similar design, function, and service, the integral attachment of only one of the multiple components shall be examined. The integral attachments selected for examination shall correspond to those component supports selected by IWF-2510(b).

A.4 COMPONENT SUPPORTS

A.4.1 CATEGORY F-A, PLATE AND SHELL TYPE SUPPORTS, ITEMS F-1, F-2, AND F-3

All supports within the examination boundaries of IWF-1300 having components and piping required to be examined during the first inspection interval by IWB-2500, IWC-2500, and IWD-2500 shall be visually examined (VT-3) each inspection interval. The areas subject to examination are mechanical connections to the pressure-retaining component; weld and mechanical connections to the building structure; and weld and mechanical connections at intermediate joints in a multiconnected integral and non-integral support.

A.4.2 CATEGORY F-B, LINEAR TYPE SUPPORTS, ITEMS F-1, F-2, AND F-3

All supports within the examination boundaries of IWF-1300 having components and piping required to be examined during the first inspection interval by IWB-2500, IWC-2500, and IWD-2500 shall be visually examined (VT-3) each inspection interval. The areas subject to examination are mechanical connections to the pressure-retaining component; weld and mechanical connections to the building structure; and weld and mechanical connections at intermediate joints in a multiconnected integral and non-integral support.

A.4.3 CATEGORY F-C, COMPONENT STANDARD SUPPORTS, ITEMS F-1, F-2, F-3, AND F-4

All supports within the examination boundaries of IWF-1300 having components and piping required to be examined during the first inspection interval by IWB-2500, IWC-2500, and IWD-2500 shall be visually examined (VT-4) each inspection interval. The areas subject to examination are mechanical connections to the pressure-retaining component; weld and mechanical connections to the building structure; weld and mechanical connections at intermediate joints in multiconnected integral and non-integral support; and spring-type supports, constant load-type supports, snubbers, and shock absorbers.