Enclosure 2

TECHNICAL EVALUATION REPORT
FIRST INTERVAL INSERVICE INSPECTION PROGRAM
MCGUIRE NUCLEAR STATION UNITS 1 AND 2

Science Applications International Corporation

An Employee-Owned Company

8911160160 XA

SAIC-88/1943

TECHNICAL EVALUATION REPORT
FIRST INTERVAL INSERVICE INSPECTION PROGRAM
MCGUIRE NUCLEAR STATION UNITS 1 AND 2

Submitted to

U.S. Nuclear Regulatory Commission
Contract No. 03-87-029

Submitted by

Science Applications International Corporation
Idaho Falls, Idaho 83402

October 1989

SAIC

CONTENTS

TECHNICAL EVALUATION REPORT
FIRST INTERVAL INSERVICE INSPECTION PROGRAM

MCGUIRE NUCLEAR STATION UNITS 1 AND 2

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.

During the initial 10-year interval, inservice inspection examinations must comply with the requirements in the latest edition and addenda of Section XI incorporated in the regulation on the date 12 months before the date of issuance of the operating license. The program for the first interval for McGuire Nuclear Station Units 1 and 2 (MNS-1 & -2) has been written to the 1980 Edition with Addenda through Winter 1980. This is the appropriate Code edition for MNS-2, based on its operating license dated May 27, 1983. However, this represents a Code edition update for MNS-1, based on its operating license dated July 8, 1981. The first ISI interval began on December 1, 1981, for MNS-1 and March 1, 1984, for MNS-2.

Section 2 of this report evaluates the first interval ISI plan developed by the licensee, Duke Power Company, for MNS-1 and -2 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.

---

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

Based on the date the construction permit for MNS-1 and -2 was issued (February 23, 1973), the plant's Class 1 and 2 components (including supports) were to be designed and provided with access to enable performance of inservice examinations and tests and to meet the preservice examination requirements of the 1971 Edition of the Code with Addenda through Winter 1972 (10 CFR 50.55a(g)(2)). 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.

The regulation also provides that ISI programs may meet the requirements of subsequent Section XI editions and addenda, incorporated by reference in the Regulation, subject to approval by the NRC. Portions of such editions or addenda may be used, provided all related requirements of the respective editions or addenda are met. Likewise, Section XI provides that certain components and systems may be exempted from volumetric and surface requirements. In some instances, however, these exemptions are not acceptable to the NRC or are acceptable only with restrictions.

The Preservice Inspection (PSI) Program for MNS-1 and -2, a 4-loop 1180 MWe Westinghouse pressurized-water reactor (PWR), was approved by the staff. References 1 through 8 relate to review and approval of the PSI. The initial ISI program for the first 10-year inspection interval (Revision 6) was submitted to the NRC November 7, 1984.[9] First interval relief requests were submitted August 27, 1986,[10] February 9, 1987,[11] February 16, 1987,[12] April 7, 1987,[13] October 26, 1987,[14] January 19, 1988,[15] January 28, 1988,[16] March 2, 1988,[17] March 25, 1988,[18] April 27, 1988,[19] May 4, 1988,[20] May 5, 1988,[21] June 27, 1988,[22] July 1, 1988,[23] October 5, 1988,[24] November 8, 1988,[25] and November 11, 1988[26]. The NRC reviewed some of these relief requests on July 31, 1987,[27] March 14, 1988,[28] June 15, 1988,[29] June 28, 1988,[30] July 12, 1988,[31] August 3, 1988,[32] November 21, 1988,[33] and February 23, 1989.[34] Relief requests contained in References 10, 21, 22, 23, and 25 are evaluated in this report.

As a result of a preliminary review of the plan, the staff requested additional information on May 7, 1986.[35] The licensee responded to the request for additional information in a letter dated June 20, 1986.[36] The staff submitted a second request for additional information on November 15, 1988.[37] The licensee responded March 1, 1989.[38] Revision 11 of the ISI plan was included with this response. References 9, 36, and 38 form the primary basis for review of the MNS-1 and -2 ISI program.

References 39 through 49 summarize license conditions, including PSI- and ISI-augmented inspection requirements, related to MNS-1 and -2. References 2 and 6 confirm that there are no unresolved license conditions related to PSI.

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 MNS-1 and -2 PSI and ISI is given in Section 1 of this report.

The key documents that impact this ISI program evaluation are (1) Revision 11 of the ISI program,(38) (2) the licensee's responses to the staff's request for additional information,(36,38) (3) portions of SSER No's 4 and 6,(4,8) and (4) to a lesser extent, the previous submittals on the PSI program.(1,5,7).

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 MNS-1 and -2 has written the first interval program to the 1980 Edition with addenda through Winter 1980. This represents a Code edition update for MNS-1 as allowed by 10 CFR 50.55a(g)(4)(iv). 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 examination 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

The following is a list of required augmented ISI examinations resulting from license conditions for MNS-1 and -2.

(a) Special ultrasonic examination of the accumulator line for pipe rupture protection. Required by Reference 4, Appendix E.

(b) Auxiliary feedwater nozzle and all piping welds located between the steam generators and the first reducer downstream will be volumetrically examined at approximately 3-1/3 year intervals in accordance with MEB Branch Position No. 4. Committed to in Reference 45.

(c) One doghouse weld per feedwater line will be volumetrically examined at approximately 3-1/3 year intervals in accordance with MEB Branch Position No. 4. Committed to in Reference 45.

(d) The following safety injection piping welds will be ultrasonically examined at approximately 3-1/3 year intervals:

(1) penetration M-334 to pipe

(2) penetration M-349 to pipe

(3) nitrogen accumulator to pipe

(4) water accumulator to nozzle

(5) water accumulator nozzles to pipe

(6) containment sump lines from containment to containment isolation valve.

Committed to in Reference 45.

(e) Augmented volumetric and/or surface examination of accessible welds in the main steam, feedwater, RHR, and upper head injection due to containment penetration inaccessibility. Required by Reference 4, Appendix B.

(f) Augmented ultrasonic examination at areas where thermal sleeves have been removed. References 41, 42, and 43 provide a background of the thermal sleeve removal.

2.4 Compliance with Requirements

2.4.1 Applicable Code Edition

The initial inservice inspection interval examination 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 date of issuance of the operating license. Based on a July 8, 1981, operating license for MNS-1, the Code applicable to the first-interval program is the 1977 Edition with addenda through Summer 1979. In accordance with 10 CFR 50.55a(g)(4)(iv), the licensee requested by letter dated February 28, 1989,[50] to update the first-interval plan for MNS-1 to the 1980 Edition with addenda through Winter 1980. Failure to allow the licensee to update to the later Code edition for MNS-1 would place the additional burden upon the licensee of developing two separate ISI programs to two different Code editions without a compensating increase in the quality and safety of MNS-1. It is recommended that the licensee be allowed to update the MNS-1 ISI program to the 1980 Edition, Winter 1980 Addenda. Based on a May 27, 1983, operating license for MNS-2, the Code applicable to the first-interval program is the 1980 Edition with addenda through Winter 1980. The licensee prepared the first-interval program to the applicable Code.

Section 1.0 of the ISI plan states that examinations of MNS-1 and -2 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).

In response to a request for additional information by letter dated March 1, 1989,(38) the licensee has committed to select all Class 2 piping welds in residual heat removal, emergency core cooling, and containment heat removal systems for examination in accordance with the 1974 Summer 1975 Code, as required by 10 CFR 50.55a(b)(2)(iv)(A). The licensee has additionally chosen to select all other Class 2 piping welds in accordance with the 1974 Summer 1975 Code as allowed by 10 CFR 50.55a(b)(2)(iv)(B).

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 MNS-1 and -2. This Code Case extends the recertification period of Level III NDE personnel from 3 to 5 years, and is not approved for use in Regulatory Guide 1.147, Revision 6. NRC Region II reviewed use of this Code Case in IE Inspection Reports dated January 30, 1985,(51) and November 14, 1985(52); use of this Code Case at MNS therefore represents a Code update. The licensee formally requested permission to apply Code Case N-356 in a letter dated February 28, 1989.(53) By letter dated May 16, 1989,(54) the NRC granted approval to use Code Case N-356 in Duke's Section XI ISI Program. In the NRC's approval letter, they noted that Code Case N-356 has been incorporated in the 1983 Edition, Winter 1983 Addenda, and that they had approved its use in the ISI programs of several other nuclear power plants.

2.4.2 Code Requirements

The first interval ISI program of record is contained in Revision 11 of the ISI program.(38) The ISI program submitted was reviewed (exclusive of pump and valve testing) and the following observations were noted:

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

The design of the Code Class 1 components of the reactor coolant pressure boundary in MNS-1 and -2 incorporates provisions for access for inservice examination in accordance with Section XI of the ASME Code.

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). A complete set of piping isometric drawings has not been provided. However, a review of those provided indicates a weld selection program that complies with Code requirements.

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, except as indicated below.

There are numerous examinations at both units for which the scheduling requirements of Tables IWB-2412-1 and IWC-2412-1 are not met. The examination categories that are not in Code compliance are listed below.

Unit 1

1. Category B-B, pressure-retaining welds in vessels other than reactor vessels, less than the minimum allowable number of examinations performed in the first examination period (9%).

2. Category B-F, pressure-retaining dissimilar metal welds, less than the minimum allowable number of examinations performed in the first period (5%).

3. Category B-G-2, pressure-retaining bolting 2 in. and less in diameter, less than the minimum allowable number of examinations performed in the first period (13%).

4. Category C-B, pressure-retaining nozzle welds in vessels, more than the maximum allowable number of examinations completed in the second examination period (75%).

5. Category C-C, integral attachments for vessels, piping, pumps, and valves, less than the minimum allowable number of examinations performed in the first examination period (7%).

6. Category C-H, all pressure-retaining components, system pressure test; no examinations performed in the first examination period.

Unit 2

1. Category B-G-2, pressure-retaining bolting 2-in. and less in diameter, more than the maximum allowable number of examinations performed in the first (39%) and second (80%) examination periods.

2. Category B-J, pressure-retaining welds in piping, more than the maximum allowable number of examinations performed in the first (40%) and second (77%) examination periods.

3. Category C-A, pressure-retaining welds in pressure vessels, more than the maximum allowable number of examinations performed in the first (44%) examination period.

4. Category C-B, pressure-retaining welds in vessels, more than the maximum allowable number of examinations completed in the first period (73%). No examinations are scheduled for the second period, but the total completed in the first period is still over the allowable maximum for the first and second period.

The first and second inspection periods are over at MNS-1 and the first period is over at MNS-2. In cases where the number of examinations performed exceeds that allowed by Code, it is recommended that those examinations performed beyond the maximum number allowed not be credited for the period in which they were performed, and that they be reexamined later in the ten-year interval so that scheduling requirements are met. It is recommended that the licensee closely review examination schedules at MNS-1 and -2 and submit relief requests for all examinations that do not meet Code requirements, per 10 CFR 50.55a(g)(5)(iii).

2.4.3 Preservice Inspection Commitments

The first interval ISI program was reviewed for compliance with preservice inspection commitments and the following observations were noted:

(a) The licensee demonstrated by analysis in Reference 13 that welds in both ends of the first elbow off reactor coolant loops A, C, and D in the 10-in. accumulator lines are in accordance with criteria for pipe break protection. The licensee proposed special ultrasonic and surface inspection procedures for detecting intergranular stress corrosion cracking (IGSCC) on these welds, and stated that the examination would be performed while the system is pressurized to aid in the detection of small cracks. An acoustic emission leak detection system was also proposed. The NRC concluded in Appendix E of SSER No. 4[4] that since criteria for pipe break protection were being met, no augmented ISI was necesssary. The NRC goes on to state, however, that the proposed augmented ISI will provide added assurance of continuing structural integrity and that it is therefore acceptable.

In a subsequent transmittal dated November 5, 1984,[7] the licensee found that performing the examination with the systems pressurized is impractical because to satisfy the pressure-temperature limits of the reactor coolant system, to which the accumulator line is directly connected, the fluid temperature would need to be at least 180°F. The licensee states that at this this temperature in a confined area, the heat stress on inspection personnel would render the inspection inherently less, rather than more, reliable. The licensee also contends that the higher temperatures would mean that more time would be required for the inspection, and radiation exposures would increase. The proposed alternative examination is to perform the inspection with the system depressurized and at ambient temperature using modern inspection techniques developed in recent years for the detection of IGSCC. Based on the licensee's demonstration in Reference 13 that a break in the accumulator line is less severe than the limiting LOCA in the FSAR, and the NRC's acceptance of this analysis in SSER No. 4,[4] the proposed inspection with the system depressurized is acceptable provided the licensee uses inspection methods that have been demonstrated for detecting IGSCC and the acoustic emission leak detection system is monitored for leakage.

To address this issue, the ISI program examination listing contains an augmented examination titled "Pipe Rupture Protection" that is performed on eight welds in each unit. The examinations are spread out over the ten-year interval.

(b) In the FSAR, the licensee committed to an augmented examination that consists of the auxiliary feedwater nozzle and all welds located between the steam generators and the first reducer downstream and one doghouse weld per feedwater line, at 3-1/3 year intervals. Reference 47 indicates that piping to the Units 1 and 2 steam generator nozzles was removed and replaced to facilitate installation of a flow distribution manifold. Reference 49 indicates that an additional modification was performed on the Units 1 and 2 feedwater system in order to provide heatup capabilities of this same system to protect against thermal shock on the steam generator nozzle area.

The ISI program examination listing states that the ultrasonic examination will be "best-effort UT due to configuration." No explanation of this examination has been provided. A visual examination is also included in the augmented inspection. In addition, the ISI program shows that 11 welds are inspected in the first outage at Unit 1 and seven welds are inspected in the first outage at Unit 2. The scheduled examinations are not performed at 3-1/3 year intervals as committed to in the FSAR.

(c) An augmented examination of the safety injection system modifications at 3-1/3 year intervals was committed to in the FSAR. Reference 49 indicates that Unit 1 safety injection system piping was modified in order to prevent the primary and secondary check valves to the reactor coolant system from fluttering. The Unit 1 ISI program examination listing contains an augmented ultrasonic examination titled "Safety Injection System Modifications" that is performed on 11 welds.

The ISI program examination listing states that the ultrasonic examination will be "best-effort UT due to configuration." No explanation of this examination has been provided. In addition, the ISI program shows that the examination is only performed once in the first ten-year interval (first outage), not at 3-1/3 year intervals as committed to in the FSAR.

(d) In SSER No. 4, Appendix B,[4] the NRC staff required an augmented examination of accessible welds in the main steam, feedwater, RHR, and upper head injection piping due to containment penetration inaccessibility. This augmented examination is not addressed in the ISI program.

(e) The Unit 1 ISI program examination listing contains an augmented ultrasonic examination titled "Thermal Sleeves Removal" that is performed on 14 areas in the first outage. The ISI program examination listing states that the ultrasonic examination will be "best-effort UT due to configuration."

2.5 Conclusions and Recommendations

Based on the preceding evaluation, it is concluded that the McGuire Nuclear Station Units 1 and 2 ISI program meets the requirements of (1) the Code and (2) NRC regulations, with the exceptions detailed below.

A review of the examination listings and drawings provided with the ISI plan indicates that some Code requirements are not being met. Specifically, scheduling requirements are not met for the various examination categories listed in Section 2.4.2 of this report. The licensee should be aware that compliance with ASME Section XI is required unless relief has been granted by the NRC staff. It is recommended that the licensee review those examinations pointed out in Section 2.4.2 of this report and submit relief requests for any and all examination requirements that cannot be met in the first ten-year interval.

It is unclear that all augmented inspection requirements are being met (Section 2.4.3 of this report). Some inspections are indicated as a "best-effort UT due to configuration," and some inspections are not spread over the interval as required. The ISI plan does not address the augmented inspection of welds in main steam, feedwater, RHR, and upper head injection piping as required by SSER No. 4, Appendix B.[4] Concerns regarding the licensee's augmented ISI program detailed in Section 2.4.3 above, should be reviewed by the NRC staff.

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

The licensee requested in a letter dated February 28, 1989,[57] to update the MNS-1 ISI plan from the 1977 Summer 1979 Code to the same Code edition as MNS-2, the 1980 Winter 1980 Code. Such an update would result in a higher degree of consistency between plans and increase the overall reliability of ISI examinations, as well as decreasing the burden upon the licensee and NRC staff of developing and reviewing an ISI plan to separate

Code editions. It is therefore recommended that permission to update the MNS-1 ISI plan to the 1980 Edition, Winter 1980 Addenda, be granted, per 10 CFR 50.55a(g)(4)(iv).

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 second letter dated February 28, 1989,(53) the licensee requested permission to apply Code Case N-356 to the ISI plan for MNS-1 and -2. N-356 is not approved for use in Regulatory Guide 1.147, Revision 6, but is incorporated in Section XI in the Winter 1983 Addenda and later editions. It is recommended that the licensee be allowed to update the portion of the ISI plan covering the recertification period for Level III NDE personnel to the Winter 1983 Addenda per 10 CFR 50.55a(g)(4)(iv). As required in 10 CFR 50.55a(g)(4)(iv), all related requirements under IWA-2300 of the later edition must also be met (i.e., specific examination requirements).

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

Four first-interval relief requests submitted August 27, 1986,(10) May 5, 1988,(21) June 27, 1988,(22) July 1, 1988,(23) and November 8, 1988,(24) have been identified that require review. The following sections evaluate these pending relief requests. The relief request submitted in Reference 21 (88-04) was subsequently evaluated by the NRC and with the SSER transmitted to Duke Power Company on February 23, 1989.(54) Relief Request 88-04 is evaluated herein and is basically a paraphrase of the SSER.

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 1 Components (no relief requests)

3.2 Class 2 Components

3.2.1 Pressure Vessel and Heat Exchangers

3.2.1.1 Relief Request No. 88-08, Safety Injection Accumulator Tank Shell-to-Lower Head Weld, Category C-A, Item C1.10

Code Requirement

Essentially 100% of the circumferential head-to-shell welds in each vessel or heat exchanger 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 (i.e., the upper head-to-shell weld could be performed on one vessel and the lower head-to-shell weld could be performed on a separate, but similar, vessel).

Code Relief Request

Relief is requested from ultrasonic examination of the shell-to-lower head weld on one accumulator tank at each unit.

Proposed Alternative Examination

The licensee proposes to perform ultrasonic examination of an additional accumulator tank shell-to-upper head weld at each unit.

Licensee's Basis for Requesting Relief

The Unit 1 and 2 Safety Injection Accumulator Tanks are designed such that the shell-to-lower head welds are inaccessible to prepare the surface for ultrasonic examination. The weld on each tank is located approximately 1 inch from where the support skirt is welded to the tank. This situation exists for all Unit 1 and 2 accumulator tanks. The Safety Injection Accumulator Tank shell-to-upper head welds have the same geometric design and thickness as the shell-to-lower head welds. The shell-to-upper head weld and shell-to-lower head welds are identical in size, material, and type of weld.

Evaluation

The shell-to-lower head weld is enclosed within the accumulator tank support skirt and it appears from drawings that very little clearance exists between the support skirt and the weld. It is agreed that an ultrasonic examination is impractical on this configuration. A surface examination also appears impractical.

As an alternative, the licensee has proposed to examine an additional accumulator tank upper head-to-shell weld at each unit. Assuming materials, configuration, weld procedures, and quality assurance are the same for all accumulator shell-to-head welds, the proposed alternative examination would give an indication of structural reliability similar to that required by Code.

Conclusions and Recommendations

Based on the above evaluation, it is concluded that for the shell-to-lower head welds 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 23 and 25.

3.2.2 Piping Pressure Boundary (no relief requests)

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 Hydrostatic Testing of Class 1 Repair Welds Associated with the Unit 1 and Unit 2 Safety Injection System, 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 of repair welds associated with the Unit 1 and 2 Safety Injection System.

Proposed Alternative Examination

A 100% radiographic examination plus 100% PT examination are required upon completion of all pressure boundary welds. An additional PT examination of all root pass welds will also be performed.

Also, a hydrostatic test will be performed at the 10-year inspection interval per Section XI of the ASME Code. An inservice leak test cannot be performed on this system because if the check valves hold, the system will not see system pressure. In addition, a UT examination will be performed on the welds for Preservice Baseline Inspection per ASME Section XI.

Licensee's Basis for Requesting Relief

There are no isolation valves downstream of these primary and secondary check valves to the NC system; therefore it is impossible to isolate these portions of systems. However, there are several approaches to partially pressurizing the system.

The first approach would be to pressurize the Reactor Coolant System (NC) to 2235 pounds, and then use the Safety Injection (NI) pumps to pressurize the NI systems against one of the check valves. However, this pump pressure is only 1600 pounds, which falls far short of the required test pressure.

The second approach would be to remove the internals from the primary check valves, which go to the NC system, and then pressurize the NC system to 1.02 of 2236 pounds at 500°F temperature. However, this method would still not achieve the desired test pressure per the Code because this would be a dead leg pipe with no flow, and the convective and conductive effect of heat transfer possibly would not reach the 500°F temperature minimum, as this portion of the system is uninsulated. This would also require draining the system in order to replace the internals into the check valve, a very timely and costly procedure.

Therefore, due to orientation of the valves within the system, it is not possible to hydrostatically test the system. However, the proposed alternate examinations are equal to or better than the required testing per the Code.

Evaluation

The licensee has explored several options for partially pressurizing the piping containing the repair welds and found all to be impractical. An inservice leak test is also impractical. As an alternative, the repair weld areas will be 100% radiographically and 100% dye-penetrant examined, with an additional dye-penetrant examination of the root pass welds.

The proposed alternative examination, along with the Code-required hydrostatic test as part of the 10-year ISI plan, will provide necessary assurance of structural reliability.

Conclusions and Recommendations

Based on the above evaluation, it is concluded that for the hydrostatic tests 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 10.

3.4.2 Hydrostatic Testing of Class 3 Repair Welds in Containment Spray and Component Cooling Systems, 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 of repair welds associated with the below listed valves in the Containment Spray and Component Cooling Systems:

1RN-134A	2RN-134A
1RN-235B	2RN-235B
1RN-86A	2RN-86A
1RN-187B	2RN-187B

Proposed Alternative Examination

All welds will be subjected to a PT or MT examination on root pass and also final welding pass. An inservice leak test at system pressure and temperature will also be performed for all welds involved.

Licensee's Basis for Requesting Relief

The modifications listed in this request will be performed during refueling outages. During each refueling outage there are certain periods of time each train of the RN system can be drained. The RN system provides cooling for the Residual Heat Removal (ND) system and the Spent Fuel Cooling (KF) system, both of which are needed for the majority of the outage. Based on a typical outage, the RN Supply and Discharge Header for either A or B Train can be drained and available for work for approximately 6 days on Unit 1 and 10 days on Unit 2. Unit 1 is more restricted due to the fact that the Control Room Ventilation/Chilled Water (VC/YC) system Chillers discharge to the Unit 1 RN Discharge Header only; therefore, when the Unit 1 RN Discharge Header is drained, VC/YC is inoperable, which places Unit 2 in a 7-day Technical Specification operability constraint per Technical Specification 3.7.6. These short time periods allow barely enough time to perform the actual modifications to the RN system. Attempting a hydrostatic test on the large portions of the RN system involved with the subject welds would involve significant planning, manpower, and equipment, (high capacity, high head pump). A hydrostatic test on this large a section of RN piping would add days to the outage schedule even if the hydro pump was staged ahead of time.

Most of the time needed would be comprised of valve alignments to fill and vent the system. Since isolation valves on the system are 36" butterfly valves, the valves would most likely leak by at hydrostatic test pressure. Even with a high capacity pump, hydrostatic test pressure may not be obtained due to this leakage. Also, the leakage past these valves could potentially overpressurize other vital equipment such as critical instrumentation. To repair the 36" butterfly valves would involve a major undertaking and again present similar hydro problems due to the 36" valves being weld-end valves which would also require hydrostatic testing following replacement.

Therefore, the licensee believes the additional manpower, planning, execution expense, and burden of time placed on Duke to perform the required hydrostatic testing does not provide a commensurate increase in operational quality. Additionally, the licensee believes that the alternative testing that is planned is more than adequate to ensure safe and consistent reliability of the system.

Evaluation

It is agreed that the required hydrostatic test may not be possible due to probable leakage of isolation valves. As an alternative, the repair weld areas will be dye penetrant or magnetic particle examined on the weld root pass and final weld surface. An inservice leak test at system pressure and temperature will be performed on the repair weld areas prior to plant startup.

The proposed alternative examination, 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 22.

3.4.3 Relief Request 88-04, Hydrostatic Testing of Class 3 Repair Welds to the Containment Spray Heat Exchanger 1A, 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 of a modification which adds a 6-in. inspection port on the side of Containment Spray Heat Exchanger 1A.

Proposed Alternative Examination

A. A pneumatic test will be performed on the subject welds, prior to drilling a hole in the vessel, at 110% of 200 psig, or 220 psig to assure weld integrity.

B. An inservice inspection at system pressure will be performed following the return of the vessel to service.

Licensee's Basis for Requesting Relief

Hydrostatic testing of welds referenced in this request would be impractical based on the following reason:

The inlet and outlet isolation valves are 18" valves and are a butterfly type design. Historically, these butterfly valves have not held design hydro pressures without significant leakage. It is believed that additional hydro pump capacity would not result in the desired pressure due to leakage past these valves. The installation of blind flanges upstream and downstream of the outlet isolation valves would require complete drain-down of the RN Supply and Return Header. This task could not be accomplished within the 72-hour Technical Specification limit. The RN system is a low pressure, low temperature (135 psig, 95^{O}F) system, while the heat exchanger vessel is designed for 200 psig. Therefore, the hydrostatic pressure would be limited to 1.1 times 135 psig or 149 psig, due to limiting RN system design parameters.

Evaluation

The NS Heat Exchanger is of the shell and tube type for which ECCS water from either the Refueling Water Storage Tank or the containment sump circulates through the tubes while Nuclear Service Water (RN) circulates through the shell side. The NS system is an engineered safety feature which, in the event of a LOCA, removes thermal energy from the Containment Building, transferring it through the NS heat exchanger to the Ultimate Heat Sink by way of the RN system. The RN system is designed as a low pressure (135 psig), low temperature (95°F) system, while the NS heat exchanger vessel is designed for 200 psig.

10 CFR 50.55a(g) requires each licensee to develop and implement a program for ISI and testing of systems and components classified as ASME Code Class 1, Class 2, and Class 3. Consistent with the guidance in Regulatory Guide 1.26, the tube side of the heat exchanger is classified as ASME Section III Class 3 and the shell side is classified as ASME Section VIII. Thus, in a literal reading of 10 CFR 50.55a(g)(4), the shell side of the heat exchanger would not fall within the scope of the McGuire ISI program. However, 10 CFR 50.55a(g)(6)(ii) states "The Commission may require the licensee to follow an augmented inspection program for systems and components for which the Commission deems that added assurance of structural reliability is necessary." Consistent with 10 CFR 50.55a(g)(6)(ii), the NS and RN systems are safety related systems, and the heat exchangers are appropriately included in McGuire's ISI program.

In its submittal, Duke Power Company (DPC) considers the work performed to be an "alteration," rather than a "repair," and to involve the "National Board Inspection Code Book." The NRC does not recognize such a document, and takes no position on its relevance or appropriateness. Because the subject component is included in the McGuire ISI program, our evaluation is based upon Section XI (1980 Edition with Winter 1980 Addenda).

Section XI of the ASME Code does not directly address "alterations or modifications." However, the rules of Articles IWA-4000, Repair Procedures, and IWA-7000, Replacements, are relevant. Section XI does not provide explicit rules for design or installation of new or replacement parts, but generally defers to the "Original Code for Construction," in this case Section VIII, Division I. Section VIII Division 1, as compared to Section III, has simplified rules for design and construction of pressure vessels. In recognition of this fact, Section VIII requires hydrostatic testing of the pressure boundary at 150% of design pressure.

Thus, the pressure test on the "alteration" should have been conducted at 150% of design pressure or 300 psig, not 220 psig. By testing only to the lower pressure, DPC has, in effect, derated the heat exchanger (shell side) from 200 psig to two-thirds of 220 psig, or 147 psig. Because the test was completed and the shell penetrated prior to submittal of the request for relief, retesting at the higher test pressure is no longer practical. Thus, DPC's relief request is viewed as a request for NRC acceptance of the derated heat exchanger. In this respect, it is noted that the derated pressure (147 psig) still exceds the RN system design pressure of 135 psig and provides a reasonable level of structural integrity. Replacing the heat exchanger or reworking the alteration to achieve a proper test pressure would cause considerable hardship without a compensating increase in the level of quality and safety.

Conclusions and Recommendations

Based on the above evaluation, it is concluded that for the hydrostatic test discussed, 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.

References

Reference 21 and 54.

4. REFERENCES

1. W. O. Parker, Jr. (Duke) to H. R. Denton (NRC), February 1, 1979; Unit 1 preservice inspection relief request and preliminary inservice inspection relief request.

2. W. O. Parker (Duke) to H. R. Denton (NRC), December 15, 1980; revised PSI relief requests.

3. B. J. Youngblood (NRC) to W. O. Parker (Duke), February 17, 1981; review of December 15, 1980 revised relief requests.

4. Safety Evaluation Report, Unit 1 ISI/PSI Approval of Unit 1, NUREG-0422, Supp. 4, January 1981.

5. Letter, H. B. Tucker (Duke) to H. R. Denton (NRC), December 22, 1982; preliminary inservice inspection and preservice inspection relief requests, Units 1 and 2.

6. Letter, H. B. Tucker (Duke) to H. R. Denton (NRC), January 11, 1983; Unit 2 hydro testing relief request.

7. Letter, H. B. Tucker (Duke) to H. R. Denton (NRC), January 19, 1983; Unit 2 preservice inspection relief request.

8. Safety Evaluation Report, Unit 2 ISI - PSI Approval of Unit 2, NUREG-0422, Supp. 6, February 1983.

9. H. B. Tucker (Duke) to H. R. Denton and E. G. Adensam (NRC), November 7, 1984; submittal of Inservice Inspection Plan: Vols. I, II, III (Revision 6).

10. H. B. Tucker (Duke) to B. J. Youngblood (NRC), August 27, 1986; request for relief from hydrostatic testing following repairs.

11. H. B. Tucker (Duke) to NRC, February 9, 1987; request for relief from hydrostatic testing following repairs.

12. H. B. Tucker (Duke) to NRC, February 16, 1987; request for relief from hydrostatic testing following repairs.

13. H. B. Tucker (Duke) to NRC, April 7, 1987; request for relief from hydrostatic testing following repairs.

14. H. B. Tucker (Duke) to NRC, October 26, 1987; request for relief from hydrostatic testing following repairs.

15. H. B. Tucker (Duke) to NRC, January 19, 1988; response to request for additional information concerning October 26, 1987 relief request.

16. H. B. Tucker (Duke) to NRC, January 28, 1988; request for relief from hydrostatic testing following repairs.

17. H. B. Tucker (Duke) to NRC, March 2, 1988; Code Case applicability for ISI.

18. H. B. Tucker (Duke) to NRC, March 25, 1988; additional information on February 9, 1987 relief request.

19. H. B. Tucker (Duke) to NRC, April 27, 1988; request for relief from hydrostatic testing following repairs.

20. H. B. Tucker (Duke) to NRC, May 4, 1988; additional information on October 26, 1987 relief request.

21. H. B. Tucker (Duke) to NRC, May 5, 1988; request for relief from hydrostatic testing following repairs.

22. H. B. Tucker (Duke) to NRC, June 27, 1988; request for relief from hydrostatic testing following repairs.

23. H. B. Tucker (Duke) to NRC, July 1, 1988; request for relief from examination of Unit 2 Safety Injection Accumulator Tank.

24. H. B. Tucker (Duke) to NRC, October 5, 1988; repeat of modification for which relief was requested February 9, 1987, and granted July 12, 1988.

25. H. B. Tucker (Duke) to NRC, November 8, 1988; revision of July 1, 1988 relief request.

26. H. B. Tucker (Duke) to NRC, November 11, 1988; request for relief from hydrostatic testing following repairs.

27. B. J. Youngblood (NRC) to H. B. Tucker (Duke), July 31, 1987; Safety Evaluation of relief request submitted April 7, 1987.

28. D. Hood (NRC) to H. B. Tucker (Duke), March 14, 1988; Safety Evaluation of relief request submitted January 28, 1988.

29. D. B. Matthews (NRC) to H. B. Tucker (Duke), June 15, 1988; Safety Evaluation of relief request submitted April 27, 1988.

30. NRC internal memo, C. Y. Cheng to H. Pastis, D. Hood, and K. Jabbour, June 28, 1988; review of Code Case use for ISI.

31. D. B. Matthews (NRC) to H. B. Tucker (Duke), July 12, 1988; Safety Evaluation of a relief request submitted February 9, 1987, February 16, 1987, and March 25, 1988.

32. D. B. Matthews (NRC) to H. B. Tucker (Duke), August 3, 1988; Safety Evaluation of relief requests submitted October 26, 1987, January 19, 1988, and May 4, 1988.

33. D. B. Matthews (NRC) to H. B. Tucker (Duke), November 21, 1988; Safety Evaluation of relief request submitted November 11, 1988.

34. D. B. Matthews (NRC) to H. B. Tucker (Duke), February 23, 1989; safety evaluation of Relief Request 88-04.

35. D. Hood (NRC) to H. B. Tucker (Duke), May 7, 1986; request for additional information.

36. H. B. Tucker (Duke) to H. R. Denton (NRC), June 20, 1986; response to request for additional information.

37. D. S. Hood (NRC) to H. B. Tucker (Duke), November 15, 1988; request for additional information regarding ISI program.

38. H. B. Tucker (Duke) to NRC, March 1, 1989; response to November 15, 1988, request for additional information, including Rev. 11 of ISI Plan.

39. Letter, R. S. Boyd (NRC) to W. O. Parker, Jr. (Duke), February 9, 1979; augmented inservice inspection for pipe rupture protection.

40. Letter, W. O. Parker, Jr. (Duke) to H. R. Denton (NRC), March 22, 1979; augmented inservice inspection for pipe rupture protection.

41. W. O. Parker, Jr. (Duke) to H. R. Denton (NRC), July 13, 1982; submittal of thermal sleeve evaluation report.

42. NRC Memo, R. Bosnak (NRC) to E. G. Adensam (NRC), December 27, 1982; McGuire 1 and 2 thermal sleeves.

43. NRC Memo, E. G. Adensam (NRC) to R. Bosnak (NRC), January 11, 1983; McGuire 1 and 2 thermal sleeves.

44. Letter, H. B. Tucker (Duke) to H. R. Denton (NRC), November 5, 1984; augmented inservice inspection for accumulator injection line welds.

45. McGuire FSAR Q-121-7 to Q-121-13; submittal of preservice inspection and inservice inspection questions and responses.

46. H. B. Tucker (Duke) to H. R. Denton (NRC), September 14, 1982; relief request from hydrostatic testing of feedwater and safety injection piping modifications.

47. H. B. Tucker (Duke) to H. R. Denton (NRC), October 19, 1982; revision of September 14, 1982, hydrostatic testing relief request.

48. T. M. Novak (NRC) to H. B. Tucker (Duke), December 29, 1982; review of September 14, 1982, and October 19, 1982, relief requests.

49. H. B. Tucker (Duke) to H. R. Denton (NRC), March 11, 1983; relief request from hydrostatic testing of feedwater piping modifications.

50. H. B. Tucker (Duke) to NRC, February 28, 1989; request to update MNS-1 to the 1980 Winter 1980 Code Edition for ISI.

51. V. L. Brownlee (NRC) to H. B. Tucker (Duke), January 30, 1985; IE Inspection Report Nos. 50-369/84-41 and 50-370/84-38.

52. V. L. Brownlee (NRC) to H. B. Tucker (Duke), November 14, 1985; IE Inspection Report Nos. 50-369/85-37 and 50-370/85-38.

53. H. B. Tucker (Duke) to NRC, February 28, 1989; Use of Code Case N-356.

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

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 welds on 25% of the instrumentation 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.1.4.2 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) carbon or low alloy steel to high nickel alloys, and (c) high alloy steel to 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 inspection 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.1.6.14 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 <u>Pressurizer Pressure-Retaining Boundary, Item B15.20</u>

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 <u>Steam Generator Pressure-Retaining Boundary, Item B15.30</u>

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 <u>Heat Exchanger Pressure-Retaining Boundary, Item B15.40</u>

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 <u>Piping Pressure-Retaining Boundary, Item B15.50</u>

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 <u>Piping Welds Over 1/2 In. Nominal Wall Thickness, Item C5.20</u>

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.

Enclosure 3

TABLE 1

SUMMARY OF RELIEF REQUESTS

Relief Request Number	Date of Request	Date of NRC Approval	Subject
None	08/27/86	12/29/86	NI system discharge check valve repair welds
None	04/07/87	07/31/87	Hydro testing for removal of Upper Head Injection system
None	02/09/87, 02/16/87, 03/25/88	07/12/88 (See also Duke letter of 10/05/88)	Hydro testing of Nuclear Service Water (RN) system welds
None	10/26/87, 01/19/88, 05/04/88	08/03/88	RN and Ground Water Monitoring system welds
88-01 (Unit 1)	01/28/88	03/14/88	Hydro testing of RN system repair welds
None	03/02/88	12/01/88	Code Cases N-401, N-416, N-426, and N-427
88-02 (Unit 2)	04/27/88	06/15/88	Valves 2RN134 and 2RN135
88-04	05/05/88	02/23/89	Containment Spray Heat Exchanger
88-05 and 89-0206	06/27/88, 02/16/89 01/22/90	06/29/89, 04/04/90	RN modification
88-08 (supersedes 88-06)	11/08/88	Herein	Safety Injection (NI) Tank
88-09 (Unit 1)	11/11/88	11/21/88	Welds from RTD system modification due to NI line interference
88-10 (Unit 1)	12/19/88, 12/20/88	12/22/88	Check Valve 1NI-160 replacement
None	02/28/89	05/16/89	Code Case N-356