Exelon Generation

Byron Generating Station
4450 North German Church Rd
Byron, IL 61010-9794
www.exeloncorp.com

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United States Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Byron Station, Units 1 and 2
Renewed Facility Operating License Nos. NPF-37 and NPF-66
NRC Docket Nos. STN 50-454 and STN 50-455

Subject: Byron Station, Units 1 and 2, Transmittal of Inservice Inspection Program for the Fourth Ten-Year Interval

Enclosed is the Byron Station, Units 1 and 2, Fourth Ten-Year Interval Inservice Inspection Program. The enclosed plan replaces the Third Ten-Year Interval Inservice Inspection Program in its entirety. The Fourth Interval began July 16, 2016 and will end July 15, 2025.

Section 8 of the enclosed plan contains the fourth interval proposed alternatives to the American Society of Mechanical Engineers, Section XI, "Rules for Inspection and Testing of Components of Light Water Cooled Plants," (ASME Code), 2007 Edition with the 2008 Addenda. In accordance with 10CFR50.55a, "Codes and Standards," paragraphs 10CFR50.55a(z)1 and 10CFR50.55a(z)2 as applicable, Byron Relief Requests I4R-01, I4R-05, I4R-06 and I4R-08 were previously submitted for NRC review by letter dated April 15, 2016, "Relief Requests Associated with the Fourth Inservice Inspection Interval" (ML16106A116). Byron Relief Request I4R-09 was previously submitted for NRC review by letters dated January 28, 2016 (ML16029A003) and supplemented by letter dated June 14, 2016 (ML16167A015). The submittal and review of submitted relief requests are addressed separately from this enclosed plan. No additional review of these relief requests is required under this submittal.

Should you have any questions concerning this matter, please contact Mr. Douglas Spitzer, Regulatory Assurance Manager, at (815) 406-2800.

Respectfully,

Mark E. Kanavos
Site Vice President
Byron Generating Station

MEK/GC/sg

Enclosure: Byron Nuclear Power Station, Units 1 & 2, Inservice Inspection Program
Fourth Ten-Year Interval

Exelon Generation Company
Byron Nuclear Power Station
Units 1 & 2

ISI Program Plan

Fourth Ten-Year Inservice Inspection Interval

Document: BYR-525537-01-RP04, Rev 0

Prepared By

Amec Foster Wheeler, Inc.
One Energy Center
40 Shuman Blvd., Suite 340
Naperville, IL 60563

Prepared For

Exelon Generation Company
Byron Nuclear Power Station
4450 North German Church Rd.
Byron, IL 61010

REVISION APPROVAL SHEET

TITLE: ISI Program Plan
Fourth Ten-Year Inspection Interval
Byron Nuclear Power Station, Units 1 & 2

DOCUMENT: BYR-525537-01-RP04 REVISION: 0

PROGRAM ACCEPTANCE

PREPARED: Robert McBride / 7/27/16
Inservice Inspection Program

REVIEWED: Joe Mergenthaler / 7/27/2016
CISI Responsible Individual

REVIEWED: BEN KHOSRAVANI / 7/29/16
CISI Responsible Engineer

REVIEWED: Scott Esposito / 8/9/16
Pressure Testing Program

REVIEWED: Peter Biederman / 8/9/16
Support/Snubber Program

*REVIEWED: James W Niemerg / 10 AUGUST 16
HSB ANII Acknowledgement

APPROVED: Donald Merkle / 8/10/16
Engineering Programs Supervisor

Each time this document is revised, the Revision Approval Sheet will be signed and the following Revision Control Sheet should be completed to provide a detailed record of the revision history. The signatures above apply only to the changes made in the revision noted. If historical signatures are required, Byron Station archives should be retrieved.

Individual programs may not be applicable to the current revision and may have NA entered.

*Signature does not constitute ANII acceptance of document, it indicates acknowledgment of a pending revision. ANII acceptance will be in a formal report to the Owner documenting review per ASME Section XI, 2007 Edition with the 2008 Addenda, Paragraph IWA-2110(a) and (b).

REVISION CONTROL SHEET

Major changes should be outlined within the table below. Minor editorial and formatting revisions are not required to be logged.

REVISION	DATE	REVISION SUMMARY
0	7/29/16	Initial issuance. Developed by Amec Foster Wheeler, Inc as part of the Byron Station Fourth Interval ISI Program Update. Prepared: S. Coleman Reviewed: M. King Approved: D. Lamond

Notes:

1. This ISI Program Plan (Sections 1 - 9 inclusive) is controlled by the Byron Nuclear Power Station Engineering Programs Group.
2. Revision 0 of this document was issued as the Fourth Interval ISI Program Plan and was submitted to the NRC for review, including approval of the initial Fourth Interval Relief Requests. Future revisions of this document made within the Fourth Interval will be maintained and controlled at Byron Station; however, they are not required to be and will not be submitted to the NRC for approval. The exception to this is that new or revised Relief Requests shall be submitted to the NRC for safety evaluation and approval.

REVISION SUMMARY

SECTION	EFFECTIVE PAGES	REVISION	DATE
Preface	i to vi	0	7/29/16
1.0	1-1 to 1-33	0	7/29/16
2.0	2-1 to 2-45	0	7/29/16
3.0	3-1 to 3-2	0	7/29/16
4.0	4-1 to 4-3	0	7/29/16
5.0	5-1	0	7/29/16
6.0	6-1 to 6-2	0	7/29/16
7.0	7-1 to 7-31	0	7/29/16
8.0	8-1 to 8-3	0	7/29/16
9.0	9-1 to 9-3	0	7/29/16

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1.0 INTRODUCTION AND BACKGROUND

1.1 INTRODUCTION

This Inservice Inspection (ISI) Program Plan details the requirements for the examination and testing of ISI Class 1, 2, 3, MC, and CC pressure retaining components, supports, containment structures, metal liners, and post-tensioning systems at Byron Nuclear Power Station (Byron Station), Units 1, 2, and Common. Unit Common components are included in the Unit 1 sections, reports, and tables. This ISI Program Plan also includes Containment Inservice Inspection (CISI), Risk-Informed Inservice Inspection (RI-ISI), Augmented Examinations (AUG), and System Pressure Testing (SPT) requirements imposed on or committed to by Byron Station. This ISI Program Plan is controlled and revised in accordance with the requirements of procedure ER-AA-330, "Conduct of Inservice Inspection Activities," which implements the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel (B&PV) Code, Section XI ISI Program. At Byron Station, the Inservice Testing (IST) Program is maintained and implemented separately from the ISI Program. The IST Basis Document and IST Program Plan contain all applicable inservice testing requirements. Procedure ER-AA-321, "Administrative Requirements for Inservice Testing," implements the IST Program. The Snubber Program is maintained and implemented separately from the ISI Program at Byron Station. The Snubber Program Document contains all of the applicable snubber visual examination, functional testing, and service life monitoring requirements. The ISI Program Plan is also credited as the existing program for Byron Station License Renewal Aging Management Programs (Reference Section 9.4).

The Steam Generator Inservice Inspection Plan is not included in this document except for applicable Code Cases and relief requests. A program addressing inspection requirements is maintained in separate documents and procedures. Eddy current examination of steam generator tubing is controlled and maintained under Byron Station Technical Specifications.

The ASME Section XI Repair/Replacement Program is not included in this document except for referenced Code Cases and relief requests. The program addressing code and regulatory requirements are maintained in separate documents and procedures.

The Byron Station Flow Accelerated Corrosion (FAC) Program is not included in this document except for referenced Code Cases and relief requests. The program addressing code and regulatory requirements are maintained in separate documents and procedures.

The Byron Station Turbine Disk and Rotor Integrity Program is not included in this document except for minor references. The program addressing regulatory requirements are maintained in separate documents and procedures.

The Fourth ISI and Third CISI Intervals are effective from July 16, 2016 through July 15, 2025 for Byron Station. (See Tables 1.1-1, 1.1-2, 1.1-3, and 1.1-4 for detailed notes regarding current extensions being taken.) With the update to the ISI Program for the Fourth ISI Interval for ISI Class 1, 2, and 3 components, including their supports, the CISI Program is also being updated to its Third CISI Interval for ISI Class MC and CC components. This update will enable all of the ISI and CISI Program components / piping structural elements (elements) to be based on the same effective Edition and Addenda of ASME Section XI, as well as share a common interval start and end date. The common ASME Code of Record for the Fourth ISI Interval and the Third CISI Interval is the 2007 Edition with the 2008 Addenda. (Note that the IST Program is in the Fourth IST Interval that is applicable from July 1, 2016 through June 30, 2026. See the IST Basis Document and IST Program Plan for further details.)

Paragraph IWA-2430(c)(1) of ASME Section XI allows an inspection interval to be extended or decreased by as much as one year, and Paragraph IWA-2430(d) allows an inspection interval to be extended when a unit is out of service continuously for six months or more. The

extension may be taken for a period of time not to exceed the duration of the outage. See Tables 1.1-1, 1.1-2, 1.1-3, and 1.1-4 for intervals, periods, and extensions that apply to Byron Station's Fourth ISI Interval and Third CISI Interval.

The Fourth ISI Interval and the Third CISI Interval are divided into two or three inspection periods as determined by calendar years within the intervals. Tables 1.1-1, 1.1-2, 1.1-3, and 1.1-4 identify the period start and end dates for the Fourth ISI Interval and the Third CISI Interval as defined by the Inspection Program. In accordance with Paragraph IWA-2430(c)(3), the inspection periods specified in these Tables may be decreased or extended by as much as 1 year to enable inspections to coincide with Byron Station's refueling outages.

The inspection of ISI Class CC Components and Surfaces for the Third CISI Interval shall be performed in accordance with Paragraphs IWL-2410 and IWL-2420. Tables 1.1-3 and 1.1-4 identify the inspection schedule.

TABLE 1.1-1
UNIT 1 AND 2 FOURTH ISI INTERVAL/PERIOD/OUTAGE MATRIX
(FOR ISI CLASS 1, 2, AND 3 COMPONENT EXAMINATIONS)

Unit 1		Period	Interval	Period	Unit 2	
Outage Number	Projected Outage Start Date	Start Date to End Date	Start Date to End Date	Start Date to End Date	Projected Outage Start Date	Outage Number
B1R21	Spring 2017 (Start 4th ISI Interval)	1st 07/16/16 to 07/15/19	4th (Unit 1) 07/16/16 to 07/15/25[1] 4th (Unit 2) 07/16/16 to 07/15/25[1]	1st 07/16/16 to 07/15/19	Fall 2017 (Start 4th ISI Interval)	B2R20
B1R22	Fall 2018				Spring 2019	B2R21
B1R23	Spring 2020	2nd 07/16/19 to 07/15/22		2nd 07/16/19 to 07/15/22	Fall 2020	B2R22
B1R24	Fall 2021				Spring 2022	B2R23
B1R25	Spring 2023	3rd 07/16/22 to 07/15/25		3rd 07/16/22 to 07/15/25	Fall 2023	B2R24
B1R26	Fall 2024 (End 4th ISI Interval)				Spring 2025 (End 4th ISI Interval)	B2R25

Note 1: The Byron Station Units 1 and 2 Fourth ISI Interval was reduced by one year as permitted by Paragraph IWA-2430(c)(1) in order to coincide with the plant refueling outage schedule. From the Byron Station Unit 1 ISI interval history for extensions/reductions from the commercial service date (September 16, 1985) and prior ISI intervals, the July 15, 2025 planned end date will result in Unit 1 being two months prior to the rolling ten-year ISI interval date, whereas the Unit 2 ISI interval end date will be six months early from the established sequence of intervals based on the Relief Request I3R-01 ISI interval start date (January 16, 2006).

TABLE 1.1-2
UNIT 1 AND 2 THIRD CISI INTERVAL/PERIOD/OUTAGE MATRIX
(FOR ISI CLASS MC COMPONENT EXAMINATIONS)

Unit 1		Period	Interval	Period	Unit 2	
Outage Number	Projected Outage Start Date	Start Date to End Date	Start Date to End Date	Start Date to End Date	Projected Outage Start Date	Outage Number
B1R21	Spring 2017 (Start 3rd CISI Interval)	1st 07/16/16 to 07/15/19	2nd (Unit 1) 07/16/16 to 07/15/25[1] 2nd (Unit 2) 07/16/16 to 07/15/25[1]	1st 07/16/16 to 07/15/19	Fall 2017 (Start 3rd CISI Interval)	B2R20
B1R22	Fall 2018				Spring 2019	B2R21
B1R23	Spring 2020	2nd 07/16/19 to 07/15/22		2nd 07/16/19 to 07/15/22	Fall 2020	B2R22
B1R24	Fall 2021				Spring 2022	B2R23
B1R25	Spring 2023	3rd 07/16/22 to 07/15/25		3rd 07/16/22 to 07/15/25	Fall 2023	B2R24
B1R26	Fall 2024 (End 3rd CISI Interval)				Spring 2025 (End 3rd CISI Interval)	B2R25

Note 1: The Byron Station Units 1 and 2 Third CISI Interval was reduced by one year as permitted by Paragraph IWA-2430(c)(1) in order to coincide with the plant refueling outage schedule. For the Byron Station Units 1 and 2 CISI interval, the July 15, 2025 planned end date will result in the Units 1 and 2 CISI interval end date being six months early from the established sequence of intervals based on the Relief Request I3R-01 CISI interval start date (January 16, 2006).

TABLE 1.1-3
UNIT 1 AND 2 THIRD CISI INTERVAL/PERIOD/OUTAGE MATRIX
(FOR ISI CLASS CC-CONCRETE COMPONENT EXAMINATIONS)

Unit 1		5-Year Period	Interval	5-Year Period	Unit 2	
Outage Number	Projected Outage Start Date or Outage Duration	Exam # - Date (2 Year Window)	Start Date to End Date	Exam # - Date (2 Year Window)	Projected Outage Start Date or Outage Duration	Outage Number
B1R18	Fall 2012	No Section XI Exams	2nd (Unit 1) 07/16/06 to 10/15/16[4]	No Section XI Exams	Spring 2013	B2R17
B1R19	Spring 2014	No Section XI Exams		No Section XI Exams	Fall 2014	B2R18
			2nd (Unit 2) 07/16/06 to 10/15/16[4]			
B1R20	Fall 2015 (End 2nd CISI Interval)	4th - 01/16/16 (01/16/15 to 01/15/17)[1,2,3]		4th - 06/12/16 (06/12/15 to 06/11/17)[1,2,3]	Spring 2016 (End 2nd CISI Interval)	B2R19
	(Start 3rd CISI Interval)				(Start 3rd CISI Interval)	
B1R21	Spring 2017	No Section XI Exams		No Section XI Exams	Fall 2017	B2R20
B1R22	Fall 2018	No Section XI Exams		No Section XI Exams	Spring 2019	B2R21
B1R23	Spring 2020	No Section XI Exams	3rd (Unit 1) 07/16/16[4] to 07/15/25	No Section XI Exams	Fall 2020	B2R22
B1R24	Fall 2021	5th - 01/16/21 (01/16/20 to 01/15/22)[1,3]	3rd (Unit 2) 07/16/16[4] to 07/15/25	5th - 06/12/21 (06/12/20 to 06/11/22)[1,3]	Spring 2022	B2R23
B1R25	Spring 2023	No Section XI Exams		No Section XI Exams	Fall 2023	B2R24
B1R26	Fall 2024	No Section XI Exams		No Section XI Exams	Spring 2025	B2R25
	(End 3rd CISI Interval)				(End 3rd CISI Interval)	
B1R27	(Start 4th CISI Interval) Spring 2026	6th - 01/16/26 (01/16/25 to 01/15/27)[1,2,3]	4th (Unit 1) 07/16/25 to 07/15/35	6th - 06/12/26 (06/12/25 to 06/11/27)[1,2,3]	(Start 4th CISI Interval) Fall 2026	B2R26
B1R28	Fall 2027	No Section XI Exams		No Section XI Exams	Spring 2028	B2R27
B1R29	Spring 2029	No Section XI Exams	4th (Unit 2) 07/16/25 to 07/15/35	No Section XI Exams	Fall 2029	B2R28

Note 1: The Subsection IWL examination schedule for ISI Class CC concrete surfaces meets the requirements of Subarticle IWL-2400. Paragraph IWL-2510 examinations will be performed once every 5 years. They will begin not more than 1 year prior to the specified date and will be completed not more than 1 year after such date. The initial Subsection IWL concrete examinations for each unit were required to be completed between September 9, 1996 and September 8, 2001 by 10 CFR 50.55a. The rolling 5 year examination date and associated 2 year window for each unit is determined from these first examination dates (01/16/01 and 06/12/01 for Units 1 and 2, respectively). Therefore, the schedule of the concrete surface examinations is relative to the

TABLE 1.1-3
UNIT 1 AND 2 THIRD CISI INTERVAL/PERIOD/OUTAGE MATRIX
(FOR ISI CLASS CC-CONCRETE COMPONENT EXAMINATIONS)

baseline (1st 5-Year Period) concrete surface examinations that were completed when the use of the requirements of Subsection IWL of ASME Section XI was initially mandated.

Note 2: The ISI Class CC concrete surface examination 2 Year Window will straddle the 2nd and 3rd CISI Intervals, as well as, the 3rd and 4th CISI Intervals. Therefore, any examinations performed before or after the interval start date should coincide with the Subsection IWL requirements of the approved Code of Record for that given interval. Any outage required ISI Class CC concrete surface examinations should be performed in B1R20 (Unit 1) and B2R19 (Unit 2), and B1R27 (Unit 1) and B2R26 (Unit 2) to fall within the 2 Year Window.

Note 3 All Byron Station ISI Class CC concrete surfaces should be accessible for examination during operational periods and completion of examinations should not be outage dependent.

Note 4: The Byron Station Units 1 and 2 Second CISI Interval for IWL-concrete was extended by six months as permitted by Paragraph IWA-2430(d)(1) in order to coincide with the plant refueling outage schedule. (Note that the Byron Station Units 1 and 2 Second CISI Interval was extended three extra months to coincide with the IWL-concrete examination schedule; however, the extra three months will not roll-over to the next Third CISI Interval for IWL-concrete.)

TABLE 1.1-4
UNIT 1 AND 2 THIRD CISI INTERVAL/PERIOD/OUTAGE MATRIX
(FOR ISI CLASS CC-TENDON COMPONENT EXAMINATIONS)

Unit 1		5-Year Period	Interval	5-Year Period	Unit 2	
Outage Number	Projected Outage Start Date or Outage Duration	Exam # - Date (2 Year Window)	Start Date to End Date	Exam # - Date (2 Year Window)	Projected Outage Start Date or Outage Duration	Outage Number
B1R21	Spring 2017	No Section XI Exams	3rd (Unit 1) 07/16/16 to 07/15/25[4] 3rd (Unit 2) 07/16/16 to 07/15/25[4]	No Section XI Exams	(Start 3rd CISI Interval) Fall 2017	B2R20
	(Start 3rd CISI Interval)			No Section XI Exams	Spring 2019	B2R21
B1R22	Fall 2018	35th - 09/11/18 (09/11/17 to 09/10/19)[1,2,3]				
				35th - 05/27/20 (05/27/19 to 05/26/21)[1,2,3]	Fall 2020	B2R22
B1R23	Spring 2020	No Section XI Exams				
B1R24	Fall 2021	No Section XI Exams		No Section XI Exams	Spring 2022	B2R23
				No Section XI Exams	Fall 2023	B2R24
B1R25	Spring 2023	40th - 09/11/23 (09/11/22 to 09/10/24)[1,2,3]				
	(End 3rd CISI Interval)			40th - 05/27/25 (05/27/24 to 05/26/26)[1,2,3]	Spring 2025 (End 3rd CISI Interval)	B2R25
B1R26	Fall 2024	No Section XI Exams			(Start 4th CISI Interval)	B2R26
B1R27	Spring 2026	No Section XI Exams	4th (Unit 1) 07/16/25 to 07/15/35[4] 4th (Unit 2) 07/16/25 to 07/15/35[4]	No Section XI Exams	Fall 2026	
	(Start 4th CISI Interval)			No Section XI Exams	Spring 2028	B2R27
B1R28	Fall 2027	45th - 09/11/28 (09/11/27 to 09/10/29)[1,2,3]				
B1R29	Spring 2029			45th - 05/27/30 (05/27/29 to 05/26/31)[1,2,3]	Fall 2029	B2R28
		No Section XI Exams			Spring 2031	B2R29
B1R30	Fall 2030	No Section XI Exams		No Section XI Exams		

Note 1: The Subsection IWL examination schedule for ISI Class CC post-tensioning system meets the requirements of Subarticle IWL-2400. Paragraph IWL-2520 examinations will be performed once every 5 years based on a rolling 5 year frequency (+/- 1 year) from the date of completion of the previous examinations (09/07-11/83 and 05/23-27/85 for Units 1 and 2, respectively) under the Byron Station Tendon Surveillance program. These original dates were based on the initial Structural Integrity Tests (SIT's).

Note 2: ASME Section XI Item Number L2.10 and L2.20 physical tests and examinations are performed during this surveillance. These tests and examinations are performed every other 5-year period for each individual Unit such that the two Units alternate every five years. Byron Station meets the requirements of ASME Section XI, Paragraph IWL-2421, "Sites with Multiple Plants". The Byron Station containments utilize the same pre-stressing system, are essentially identical in design, were constructed within two years, and are similarly exposed to and protected from the outside environment.

TABLE 1.1-4
UNIT 1 AND 2 THIRD CISI INTERVAL/PERIOD/OUTAGE MATRIX
(FOR ISI CLASS CC-TENDON COMPONENT EXAMINATIONS)

Note 3: With the exception of some dome tendon anchorages, which are considered not accessible due to safety hazards, all Byron Station ISI Class CC post-tensioning systems should be accessible for examination during operational periods. In the event one or more of the inaccessible dome tendons anchorages are selected under Paragraph IWL-2521, the requirements of Paragraph IWL-2521.1, "Exemptions", shall be applied. Completion of ISI Class CC post-tensioning system examinations for Byron Station should not be outage dependent.

Note 4: The requirements of 10 CFR 50.55a(b)(2)(viii) Paragraph (E) shall be applied to examinations and tests performed in accordance with ASME Section XI, Subsection IWL.

1.2 BACKGROUND

The Commonwealth Edison Company, now known commercially as Exelon Generation Company (EGC), LLC , obtained Construction Permits to build Byron Station Units 1 and 2 on December 31, 1975, for Unit 1, CPPR-130, and for Unit 2, CPPR-131. The Docket Numbers assigned to Byron Station are 50-454 for Unit 1 and 50-455 for Unit 2. After satisfactory plant construction and pre-operational testing was completed, Byron Station was granted a full-power operating license for Unit 1, NPF-37, and subsequently commenced commercial operation on September 16, 1985; the full-power operating license for Unit 2, NPF-66, was granted and commercial operation commenced on August 21, 1987.

Byron Station's piping systems and associated components were designed and fabricated to be inspected and tested in accordance with the requirements of ASME Section XI. Although this plant was specifically designed to meet the inspection and testing requirements of ASME Section XI, literal compliance may not be feasible or practical within the limits of the current plant design. Certain limitations are likely to occur due to conditions such as accessibility, geometric configuration, and/or metallurgical characteristics. For some inspection categories, an alternate component may be selected for examination and the code statistical and distribution requirements can still be maintained. If ASME Section XI required examination criteria cannot be met, a relief request will be submitted in accordance with Code Of Federal Regulations, Title 10, Part 50, Section 55a, *Codes and standards*, (10 CFR 50.55a).

1.3 FIRST INTERVAL ISI PROGRAM

Pursuant to 10 CFR 50.55a, licensees were required to meet the requirements of Paragraph (g), *Inservice inspection requirements*, of that section.

Specifically, Paragraph 10 CFR 50.55a(g)(4)(i) called for the inservice inspection requirements of the 120-month inspection interval to comply with the requirements of the latest Edition and addenda of ASME Section XI referenced in Paragraph (b) of 10 CFR 50.55a on the date twelve months prior the date of issuance of the operating license, subject to the limitations and modifications listed in 10 CFR 50.55a(b).

The version of 10 CFR 50.55a in effect twelve months prior to the issuance of the Byron Station Unit 1 operating license referenced ASME Section XI, 1980 Edition including Addenda through the Winter 1981 ('80/W'81) in Paragraph (b)(2). Similarly, the version of 10 CFR 50.55a in effect twelve months prior to the issuance of the Byron Station Unit 2 operating license referenced ASME Section XI, 1983 Edition including Addenda through the Summer 1983 Addenda ('83/S'83) in Paragraph (b)(2). The extent of the application of ASME Section XI '81/W'81 and '83/S'83 is limited by Paragraph (2)(iv)(A) such that ASME Section XI, 1974 Edition including Addenda through the Summer 1975 Addenda ('74/S'75) must be utilized for ISI Class 2 pressure retaining welds in Residual Heat Removal Systems, Emergency Core Cooling Systems, and Containment Heat Removal Systems. Optionally, per Paragraph (2)(iv)(B), plants with Construction Permits docketed prior to July 1, 1978, such as Byron Station, may use ASME Section XI '74/S'75 to examine ISI Class 2 pressure retaining welds in systems other than those in Paragraph (2)(iv)(A).

Based on these 10 CFR 50.55a mandatory and optional requirements, the Byron Station ISI Program Plan for the First ISI Interval was developed by Ebasco Services Incorporated. As allowed by ASME Section XI, IWA-2400(c) the First ISI Interval at Byron Station Unit 1 was extended from September 15, 1995 to June 30, 1996 to include Refueling Outage B1R07. Accordingly, the Second ISI Interval at Byron Station Unit 1 commenced July 1, 1996. The First ISI Interval at Byron Station Unit 2 was also extended from August 21, 1997 to August 15, 1998 to include Refueling Outage B2R07. Accordingly, the Second ISI Interval at Byron Station Unit 2 started on August 16, 1998.

The Byron Station First Interval ISI Program started on September 16, 1985 and ended on June 29, 1996 for Unit 1, and started on August 22, 1987 and ended on August 15, 1998 for Unit 2.

Augmented ISI of Byron Station Unit 1 Reactor Vessel shell welds as mandated by 10 CFR 50.55a(g)(6)(ii)(A), was completed during the last period of First ISI Interval. Volumetric examination of greater than 90% of the weld volume was completed, except as detailed in Relief Request NR-20 of the First Interval ISI Program Plan.

Augmented ISI of Byron Station Unit 2 Reactor Vessel shell welds as mandated by 10 CFR 50.55a(g)(6)(ii)(A), was completed during the last period of First ISI Interval. Volumetric examination of greater than 90% of the weld volume was completed, except as detailed in Relief Request NR-27 of the First Interval ISI Program Plan.

1.4 SECOND INTERVAL ISI PROGRAM

Pursuant to 10 CFR 50.55a(g), licensees were required to update their ISI Programs at the end of the First ISI Interval. The ISI Program was required to comply with the latest Edition and Addenda of ASME Section XI incorporated by reference in 10 CFR 50.55a twelve months prior to the start of the Second ISI Interval per 10 CFR 50.55a(g)(4)(ii).

The Byron Station Second Interval ISI Program Plan was initially developed in accordance with the requirements of 10 CFR 50.55a including all published changes through June 30, 1995 and September 15, 1997 for Units 1 and 2 respectively, and the 1989 Edition, No Addenda of ASME Section XI. This Second Interval ISI Program Plan addressed Subsections IWA, IWB, IWC, IWD, IWF, and Mandatory Appendices of ASME Section XI, approved ASME Code Cases, approved alternatives through relief requests and Safety Evaluation Reports (SERs), and utilized Inspection Program B.

As an alternative to the full ten-year interval duration requirements of Paragraphs IWA-2430(b) and (d) and Paragraph IWA-2432 for the Unit 2 Second ISI Interval and for the Units 1 and 2 First CISI Intervals, Byron Station proposed Relief Request I3R-01 to modify the interval dates of the Unit 2 Second ISI Interval and of the Units 1 and 2 First CISI Intervals. This permitted the subsequent ISI and CISI Programs to share a common inspection interval start and end date and implemented common Code Editions for ISI Class 1, 2, 3, MC, and CC components. As such, the Second ISI Interval was effective from June 30, 1996 through January 15, 2006 for Byron Station Unit 1 and effective from August 16, 1998 through January 15, 2006 for Byron Station Unit 2.

1.5 THIRD INTERVAL ISI PROGRAM

Pursuant to 10 CFR 50.55a(g), licensees were required to update their ISI Programs at the end of the Second ISI Interval. The ISI Program was required to comply with the latest Edition and Addenda of ASME Section XI incorporated by reference in 10 CFR 50.55a twelve months prior to the start of the Third ISI Interval per 10 CFR 50.55a(g)(4)(ii). As discussed in Section 1.4 above, the start of the Third ISI Interval was on January 16, 2006 for Byron Station Units 1 and 2. Based on this date, the latest Edition and Addenda of ASME Section XI referenced in 10 CFR 50.55a twelve months prior to the start of the Third ISI Interval per was the 2001 Edition through the 2003 Addenda.

The Byron Station Third Interval ISI Program Plan was developed in accordance with the requirements of 10 CFR 50.55a including all published changes through November 1, 2004 for Units 1 and 2 respectively, and the 2001 Edition through the 2003 Addenda of ASME Section XI, subject to the limitations and modifications contained within Paragraph (b) of the regulation. This Third Interval ISI Program Plan addressed Subsections IWA, IWB, IWC, IWD,

IWF, Mandatory Appendices of ASME Section XI, approved ASME Code Cases, approved alternatives through relief requests and SERs, and utilized Inspection Program B.

Byron Station adopted the EPRI Topical Report TR-112657, Rev. B-A methodology, which was supplemented by ASME Code Case N-578-1 (N-578-1), for implementing risk-informed inservice inspections during the Third ISI Interval. The RI-ISI Program continued for the Third ISI Interval. This approach replaced the categorization, selection, and examination volume requirements of ASME Section XI Examination Categories B-F, B-J, C-F-1, and C-F-2 applicable to Byron Station with the associated requirements of TR-112657, Rev. B-A for the associated requirements of TR-112657, Rev. B-A for Examination Category R-A as defined in N-578-1. Implementation of the RISI Program was in accordance with Relief Request I3R-02.

Byron Station also adopted the EPRI Topical Report TR-1006937, Rev. 0-A, methodology for additional guidance for adaptation of the RI-ISI evaluation process to Break Exclusion Region (BER) piping, also referred to as the High Energy Line Break (HELB) region. This change to the BER program was made under 10 CFR 50.59 evaluation criteria. The BER Program continued for the Third ISI Interval.

The Byron Station Third ISI Interval was originally effective from January 16, 2006 through January 15, 2016 for Units 1 and 2, respectively. The Byron Station Units 1 and 2 First Period was extended by nine months as permitted by Paragraph IWA-2430(d)(3) in order to coincide with the plant refueling outage schedule. The Byron Station Units 1 and 2 Third ISI Interval was also extended by six months as permitted by Paragraph IWA-2430(d)(1) in order to coincide with the plant refueling outage schedule.

Therefore, the Byron Station Third ISI Interval was effective from January 16, 2006 through July 15, 2016 for Units 1 and 2, respectively.

1.6 FOURTH INTERVAL ISI PROGRAM

Pursuant to 10 CFR 50.55a(g), licensees are required to update their ISI Programs to meet the requirements of ASME Section XI once every ten years or inspection interval. The ISI Program is required to comply with the latest Edition and Addenda of the Code incorporated by reference in 10 CFR 50.55a twelve months prior to the start of the Fourth ISI Interval per 10 CFR 50.55a(g)(4)(ii). As discussed in Section 1.4 above, the start of the Fourth ISI Interval will be on July 16, 2016, for Byron Station Units 1 and 2. Based on this date, the latest Edition and Addenda of the Code referenced in 10 CFR 50.55a(b)(2) twelve months prior to the start of the Fourth ISI Interval was the 2007 Edition with the 2008 Addenda.

The Byron Station Fourth Interval ISI Program Plan was developed in accordance with the requirements of 10 CFR 50.55a, and the 2007 Edition with the 2008 Addenda of ASME Section XI, subject to the limitations and modifications contained within Paragraph (b) of the regulation. These limitations and modifications are detailed in Table 1.10-1 of this section. This ISI Program Plan addresses Subsections IWA, IWB, IWC, IWD, IWF, Mandatory Appendices of ASME Section XI, approved Code Cases, approved alternatives through relief requests and SE's, and utilizes the Inspection Program as defined therein.

Byron Station adopted the EPRI Topical Report TR-112657, Rev. B-A methodology, which was supplemented by N-578-1, for implementing risk-informed inservice inspections during the Third ISI Interval. The RISI Program will continue for the Fourth ISI Interval. Implementation of the RISI Program is in accordance with Relief Request I4R-01.

Byron Station also adopted the EPRI Topical Report TR-1006937, Rev. 0-A, methodology for additional guidance for adaptation of the RI-ISI evaluation process to BER piping, also referred to as the HELB region. The BER Program will continue for the Fourth ISI Interval.

The Byron Station Fourth ISI Interval is effective from July 16, 2016, through July 15, 2025, for Units 1 and 2, respectively.

[Note that the start and end dates for the Third ISI Interval and Second CISI Interval were aligned, as well as subsequent intervals per the wording in previous Third ISI Interval and Second CISI Interval Relief Request I3R-01 that was authorized by the NRC per SER dated September 7, 2006. Therefore, a Fourth ISI Interval and Third CISI Interval relief request is not required. Previous Relief Request I3R-01 stated "Relief is requested to modify the end dates of the Byron Station Unit 2 Second ISI Interval and of the Byron Station Units 1 and 2 First CISI Intervals and the start and end dates of all subsequent ISI and CISI Intervals for Byron Station Units 1 and 2." I3R-01 also stated that "All inspection periods for Class 1, 2, 3, and MC components will commence for the next interval based on the modified common interval start date. Any examination methods unique to and specifically required in the third period under the previous interval, that will likewise be required in the next interval, will be scheduled and completed in the first period of the subsequent interval. The examinations will be conducted and credited under the rules of the new Code of Record (i.e., 2001 Edition through the 2003 Addenda of ASME Section XI). These examinations originally unique to the third period of the previous interval will henceforth be conducted in the first period of all subsequent ISI intervals, and deferral to the end of future intervals will not be available. In addition, the rolling five-year IWL frequency applicable to Class CC components that are subject to Subsection IWL requirements will be maintained as currently scheduled."] Thus, the Byron Station Unit 2 end of interval examinations will be conducted at the end of the first period of the Fourth ISI Interval using the 2007 Edition with the 2008 Addenda of ASME Section XI.

1.7 First Interval CISI Program

CISI examinations were originally invoked by amended regulations contained within a Final Rule issued by the Nuclear Regulatory Commission (NRC). The amended regulation incorporated the requirements of the 1992 Edition with the 1992 Addenda of the ASME Section XI, Subsections IWE and IWL, subject to specific modifications that were included in Paragraphs 10 CFR 50.55a(b)(2)(ix) and 10 CFR 50.55a(b)(2)(x). Relief from the examination requirements of Subsections IWE and IWL of the 1992 Edition with the 1992 Addenda of ASME Section XI was granted by the NRC to allow Byron Station to use the 1998 Edition, No Addenda of Subsections IWE and IWL of ASME Section XI for inspection of containment components.

The final rulemaking was published in the Federal Register on August 8, 1996 and specified an effective date of September 9, 1996. Implementation of the Subsection IWE and IWL Program from a scheduling standpoint was driven by the five year expedited implementation period per 10 CFR 50.55a(g)(6)(ii)(B), which specified that the examinations required to be completed by the end of the First Period of the First CISI Interval (per Table IWE-2412-1) be completed by the effective date (by September 9, 2001).

ASME Section XI Subsections IWE, IWL, Mandatory Appendices, approved ASME Code Cases, and approved alternatives through relief requests and SER's were added to the ISI Program midway through the Second CISI Interval to address CISI. The CISI Program Plan was developed and implemented prior to the required date, and examinations for the first and second periods were performed in accordance with the First CISI Interval schedule.

As an alternative to the full ten-year interval duration requirements of Paragraphs IWA-2430(b) and (d) and Paragraph IWA-2432 for the Unit 2 Second ISI Interval and for the Units 1 and 2 First CISI Intervals, Byron Station proposed Relief Request I3R-01 to modify the interval dates of the Unit 2 Second ISI Interval and of the Units 1 and 2 First CISI Intervals. This permitted the subsequent ISI and CISI Programs to share a common inspection interval

start and end date and implemented common Code Editions for ISI Class 1, 2, 3, MC, and CC components. As such, the First CISI Interval occurred approximately three years early and was effective from September 9, 1996 through January 15, 2006 for Byron Station Units 1 and 2.

1.8 SECOND INTERVAL CISI PROGRAM

Pursuant to 10 CFR 50.55a(g), licensees were required to update their CISI Programs at the end of the First CISI Interval. The CISI Program was required to comply with the latest Edition and Addenda of ASME Section XI incorporated by reference in 10 CFR 50.55a twelve months prior to the start of the Second CISI Interval per 10 CFR 50.55a(g)(4)(ii). As discussed in Section 1.7 above, the start of the Second CISI Interval was on January 16, 2006 for Byron Station Units 1 and 2. Based on this date, the latest Edition and Addenda of the referenced Code twelve months prior to the start of the Second CISI Interval was the 2001 Edition through the 2003 Addenda.

The Byron Station Second Interval CISI Program Plan was developed in accordance with the requirements of 10 CFR 50.55a including all published changes through November 1, 2004, and the 2001 Edition through the 2003 Addenda of ASME Section XI, subject to the limitations and modifications contained within Paragraph (b) of the regulation. This Second Interval CISI Program Plan addressed Subsections IWE, IWL, Mandatory Appendices, approved ASME Code Cases, approved alternatives through relief requests and SER's, and utilized Inspection Program B.

The Byron Station Second CISI Interval was originally effective from January 16, 2006 through January 15, 2016 for Units 1 and 2, respectively. The Byron Station Units 1 and 2 Second Period was extended by nine months as permitted by Paragraph IWA-2430(d)(3) in order to coincide with the plant refueling outage schedule. The Byron Station Units 1 and 2 Second CISI Interval was also extended by six months as permitted by Paragraph IWA-2430(d)(1) in order to coincide with the plant refueling outage schedule.

Therefore, the Byron Station Second CISI Interval was effective from January 16, 2006 through July 15, 2016 for Units 1 and 2, respectively. (Note that the Byron Station Second CISI Interval was extended three extra months to coincide with the IWL-concrete examination schedule effective from January 16, 2006 through October 15, 2016 for Units 1 and 2, respectively. However, the extra three months will not roll-over to the next Third CISI Interval for IWL-concrete.)

1.9 THIRD INTERVAL CISI PROGRAM

Pursuant to 10 CFR 50.55a(g), licensees were required to update their CISI Programs to meet the requirements of ASME Section XI once every ten years or inspection interval. The CISI Program is required to comply with the latest Edition and Addenda of ASME Section XI incorporated by reference in 10 CFR 50.55a twelve months prior to the start of the Third CISI Interval per 10 CFR 50.55a(g)(4)(ii). As discussed in Section 1.8 above, the start of the Third CISI Interval will be on July 16, 2016 for Byron Station Units 1 and 2. Based on this date, the latest Edition and Addenda of the referenced Code twelve months prior to the start of the Third CISI Interval was the 2007 Edition with the 2008 Addenda.

The Byron Station Third Interval CISI Program Plan was developed in accordance with the requirements of 10 CFR 50.55a including all published changes through December 11, 2014, and the 2007 Edition with the 2008 Addenda of ASME Section XI, subject to the limitations and modifications contained within Paragraph (b) of the regulation. These limitations and modifications are detailed in Table 1.10-1 of this section. This Third Interval CISI Program Plan addresses Subsections IWE, IWL, Mandatory Appendices, approved ASME Code Cases,

approved alternatives through relief requests and SE's, and utilizes Inspection Program as defined therein.

The Byron Station Third CISI Interval is effective from July 16, 2016 through July 15, 2025 for Units 1 and 2, respectively. (Note that the Byron Station Units 1 and 2 Second CISI Interval end dates for IWL-concrete were modified by the extensions shown in Section 1.8; however, the Third CISI Interval start date remains unchanged.)

[Note that the start and end dates for the Third ISI Interval and Second CISI Interval were aligned, as well as subsequent intervals per the wording in previous Third ISI Interval and Second CISI Interval Relief Request I3R-01 that was authorized by the NRC per SER dated September 7, 2006. Therefore, a Fourth ISI Interval and Third CISI Interval relief request is not required. Previous Relief Request I3R-01 stated "Relief is requested to modify the end dates of the Byron Station Unit 2 Second ISI Interval and of the Byron Station Units 1 and 2 First CISI Intervals and the start and end dates of all subsequent ISI and CISI Intervals for Byron Station Units 1 and 2." I3R-01 also stated that "All inspection periods for Class 1, 2, 3, and MC components will commence for the next interval based on the modified common interval start date. Any examination methods unique to and specifically required in the third period under the previous interval, that will likewise be required in the next interval, will be scheduled and completed in the first period of the subsequent interval. The examinations will be conducted and credited under the rules of the new code of record (i.e., 2001 Edition through the 2003 Addenda of ASME Section XI). These examinations originally unique to the third period of the previous interval will henceforth be conducted in the first period of all subsequent ISI intervals, and deferral to the end of future intervals will not be available. In addition, the rolling five-year IWL frequency applicable to Class CC components that are subject to Subsection IWL requirements will be maintained as currently scheduled."] Thus, the Byron Station Unit 2 end of interval CISI examinations will be conducted at the end of the first period of the Fourth ISI Interval using the 2007 Edition with the 2008 Addenda of ASME Section XI.

NOTE: This document is credited for meeting commitments associated with the Byron Station License Renewal Project for Aging Management Programs (AMP).

CM-1: AMP XI.S1 - ASME Section XI, Subsection IWE.

CM-2: AMP XI.S2 - ASME Section XI, Subsection IWL.

CM-3: AMP XI.S3 - ASME Section XI, Subsection IWF.

1.10 CODE OF FEDERAL REGULATIONS 10 CFR 50.55A REQUIREMENTS

There are certain Paragraphs in 10 CFR 50.55a that list the limitations, modifications, and/or clarifications to the implementation requirements of ASME Section XI. These Paragraphs in 10 CFR 50.55a, including all published changes through December 11, 2014 (79 FR 73462), that are applicable to Byron Station are detailed in Table 1.10-1.

TABLE 1.10-1
CODE OF FEDERAL REGULATIONS 10 CFR 50.55a REQUIREMENTS
LIMITATIONS, MODIFICATIONS, AND CLARIFICATIONS

(a) *Documents approved for incorporation by reference*. The standards listed in this paragraph have been approved for incorporation by reference by the Director of the Federal Register pursuant to 5 U.S.C. 552(a) and 1 CFR part 51. The standards are available for inspection at the NRC Technical Library, 11545 Rockville Pike, Rockville, Maryland 20852; telephone: 301-415-6239; or at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202-741-6030 or go to *http://www.archives.gov/federal-register/cfr/ibr-locations.html*.

(1) *American Society of Mechanical Engineers (ASME)*, ...

(i) *ASME Boiler and Pressure Vessel Code, Section III*. The editions and addenda for Section III of the ASME Boiler and Pressure Vessel Code are listed below, but limited to those provisions identified in paragraph (b)(1) of this section.

(A) "Rules for Construction of Nuclear Vessels:"

(*1*) 1963 Edition,	(*2*) Summer 1964 Addenda,	(*3*) Winter 1964 Addenda,
(*4*) 1965 Edition,	(*5*) 1965 Summer Addenda,	(*6*) 1965 Winter Addenda,
(*7*) 1966 Summer Addenda,	(*8*) 1966 Winter Addenda,	(*9*) 1967 Summer Addenda,
(*10*) 1967 Winter Addenda,	(*11*) 1968 Edition,	(*12*) 1968 Summer Addenda,
(*13*) 1968 Winter Addenda,	(*14*) 1969 Summer Addenda,	(*15*) 1969 Winter Addenda,
(*16*) 1970 Summer Addenda, and	(*17*) 1970 Winter Addenda.	

(B) "Rules for Construction of Nuclear Power Plant Components:"

(*1*) 1971 Edition,	(*2*) 1971 Summer Addenda,	(*3*) 1971 Winter Addenda,
(*4*) 1972 Summer Addenda,	(*5*) 1972 Winter Addenda,	(*6*) 1973 Summer Addenda, and
(*7*) 1973 Winter Addenda.		

(C) "Division 1 Rules for Construction of Nuclear Power Plant Components:"

(*1*) 1974 Edition,	(*2*) 1974 Summer Addenda,	(*3*) 1974 Winter Addenda,
(*4*) 1975 Summer Addenda,	(*5*) 1975 Winter Addenda,	(*6*) 1976 Summer Addenda, and
(*7*) 1976 Winter Addenda;		

(D) "Rules for Construction of Nuclear Power Plant Components—Division 1";

(*1*) 1977 Edition,	(*2*) 1977 Summer Addenda,	(*3*) 1977 Winter Addenda,
(*4*) 1978 Summer Addenda,	(*5*) 1978 Winter Addenda,	(*6*) 1979 Summer Addenda,
(*7*) 1979 Winter Addenda,	(*8*) 1980 Edition,	(*9*) 1980 Summer Addenda,
(*10*) 1980 Winter Addenda,	(*11*) 1981 Summer Addenda,	(*12*) 1981 Winter Addenda,
(*13*) 1982 Summer Addenda,	(*14*) 1982 Winter Addenda,	(*15*) 1983 Edition,
(*16*) 1983 Summer Addenda,	(*17*) 1983 Winter Addenda,	(*18*) 1984 Summer Addenda,
(*19*) 1984 Winter Addenda,	(*20*) 1985 Summer Addenda,	(*21*) 1985 Winter Addenda,
(*22*) 1986 Edition,	(*23*) 1986 Addenda,	(*24*) 1987 Addenda,
(*25*) 1988 Addenda,	(*26*) 1989 Edition,	(*27*) 1989 Addenda,
(*28*) 1990 Addenda,	(*29*) 1991 Addenda,	(*30*) 1992 Edition,
(*31*) 1992 Addenda,	(*32*) 1993 Addenda,	(*33*) 1994 Addenda,
(*34*) 1995 Edition,	(*35*) 1995 Addenda,	(*36*) 1996 Addenda, and
(*37*) 1997 Addenda.		

(E) "Rules for Construction of Nuclear Facility Components—Division 1:"

(*1*) 1998 Edition,	(*2*) 1998 Addenda,	(*3*) 1999 Addenda,
(*4*) 2000 Addenda,	(*5*) 2001 Edition,	(*6*) 2001 Addenda,
(*7*) 2002 Addenda,	(*8*) 2003 Addenda,	(*9*) 2004 Edition,
(*10*) 2005 Addenda,	(*11*) 2006 Addenda,	(*12*) 2007 Edition, and
(*13*) 2008 Addenda.		

(ii) *ASME Boiler and Pressure Vessel Code, Section XI*. The editions and addenda for Section XI of the ASME Boiler and Pressure Vessel Code are listed below, but limited to those provisions identified in paragraph (b)(2) of this section.

TABLE 1.10-1
CODE OF FEDERAL REGULATIONS 10 CFR 50.55a REQUIREMENTS
LIMITATIONS, MODIFICATIONS, AND CLARIFICATIONS

(A) "Rules for Inservice Inspection of Nuclear Reactor Coolant Systems:"

(*1*) 1970 Edition,	(*2*) 1971 Edition,	(*3*) 1971 Summer Addenda,
(*4*) 1971 Winter Addenda,	(*5*) 1972 Summer Addenda,	(*6*) 1972 Winter Addenda,
(*7*) 1973 Summer Addenda, and	(*8*) 1973 Winter Addenda.	

(B) "Rules for Inservice Inspection of Nuclear Power Plant Components:"

(*1*) 1974 Edition,	(*2*) 1974 Summer Addenda,	(*3*) 1974 Winter Addenda, and
(*4*) 1975 Summer Addenda.	(*5*) 1975 Winter Addenda,	(*6*) 1976 Summer Addenda, and
(*7*) 1976 Winter Addenda.		

(C) "Rules for Inservice Inspection of Nuclear Power Plant Components—Division 1:"

(*1*) 1977 Edition,	(*2*) 1977 Summer Addenda,	(*3*) 1977 Winter Addenda,
(*4*) 1978 Summer Addenda,	(*5*) 1978 Winter Addenda,	(*6*) 1979 Summer Addenda,
(*7*) 1979 Winter Addenda,	(*8*) 1980 Edition,	(*9*) 1980 Winter Addenda,
(*10*) 1981 Summer Addenda,	(*11*) 1981 Winter Addenda,	(*12*) 1982 Summer Addenda,
(*13*) 1982 Winter Addenda,	(*14*) 1983 Edition,	(*15*) 1983 Summer Addenda,
(*16*) 1983 Winter Addenda,	(*17*) 1984 Summer Addenda,	(*18*) 1984 Winter Addenda,
(*19*) 1985 Summer Addenda,	(*20*) 1985 Winter Addenda,	(*21*) 1986 Edition,
(*22*) 1986 Addenda,	(*23*) 1987 Addenda,	(*24*) 1988 Addenda,
(*25*) 1989 Edition,	(*26*) 1989 Addenda,	(*27*) 1990 Addenda,
(*28*) 1991 Addenda,	(*29*) 1992 Edition,	(*30*) 1992 Addenda,
(*31*) 1993 Addenda,	(*32*) 1994 Addenda,	(*33*) 1995 Edition,
(*34*) 1995 Addenda,	(*35*) 1996 Addenda,	(*36*) 1997 Addenda,
(*37*) 1998 Edition,	(*38*) 1998 Addenda,	(*39*) 1999 Addenda,
(*40*) 2000 Addenda,	(*41*) 2001 Edition,	(*42*) 2001 Addenda,
(*43*) 2002 Addenda,	(*44*) 2003 Addenda,	(*45*) 2004 Edition,
(*46*) 2005 Addenda,	(*47*) 2006 Addenda,	(*48*) 2007 Edition, and
(*49*) 2008 Addenda.		

(iii) *ASME Code Cases: Nuclear Components-(A) ASME Code Case N-722-1.* ASME Code Case N-722-1, "Additional Examinations for PWR Pressure Retaining Welds in Class 1 Components Fabricated with Alloy 600/82/182 Materials, Section XI, Division 1" (Approval Date: January 26, 2009), with the conditions in paragraph (g)(6)(ii)(E) of this section.

(B) *ASME Code Case N-729-1.* ASME Code Case N-729-1, "Alternative Examination Requirements for PWR Reactor Vessel Upper Heads With Nozzles Having Pressure-Retaining Partial-Penetration Welds, Section XI, Division 1" (Approval Date: March 28, 2006), with the conditions in paragraph (g)(6)(ii)(D) of this section.

(C) *ASME Code Case N-770-1.* ASME Code Case N-770-1, "Additional Examinations for PWR Pressure Retaining Welds in Class 1 Components Fabricated with Alloy 600/82/182 Materials, Section XI, Division 1" (Approval Date: December 25, 2009), with the conditions in paragraph (g)(6)(ii)(F) of this section.

(iv) *ASME Operation and Maintenance Code.* The editions and addenda for the ASME Code for Operation and Maintenance of Nuclear Power Plants are listed below, but limited to those provisions identified in paragraph (b)(3) of this section.

(A) "Code for Operation and Maintenance of Nuclear Power Plants:"

(*1*) 1995 Edition,	(*2*) 1996 Addenda,	(*3*) 1997 Addenda,
(*4*) 1998 Edition,	(*5*) 1999 Addenda,	(*6*) 2000 Addenda,
(*7*) 2001 Edition,	(*8*) 2002 Addenda,	(*9*) 2003 Addenda,
(*10*) 2004 Edition,	(*11*) 2005 Addenda, and	(*12*) 2006 Addenda.

(B) [Reserved]

(2) (i) (ii) (iii) ...

(3) ...

TABLE 1.10-1
CODE OF FEDERAL REGULATIONS 10 CFR 50.55a REQUIREMENTS
LIMITATIONS, MODIFICATIONS, AND CLARIFICATIONS

(i) *NRC Regulatory Guide 1.84, Revision 36.* NRC Regulatory Guide 1.84, Revision 36, "Design, Fabrication, and Materials Code Case Acceptability, ASME Section III," dated August 2014, with the requirements in paragraph (b)(4) of this section.

(ii) *NRC Regulatory Guide 1.147, Revision 17.* NRC Regulatory Guide 1.147, Revision 17, "Inservice Inspection Code Case Acceptability, ASME Section XI, Division 1," dated August 2014, which lists ASME Code Cases that the NRC has approved in accordance with the requirements in paragraph (b)(5) of this section.

(iii) *NRC Regulatory Guide 1.192, Revision 1.* NRC Regulatory Guide 1.192, Revision 1, "Operation and Maintenance Code Case Acceptability, ASME OM Code," dated August 2014, which lists ASME Code Cases that the NRC has approved in accordance with the requirements in paragraph (b)(6) of this section.

(b) *Use and conditions on the use of standards.* Systems and components of boiling and pressurized water-cooled nuclear power reactors must meet the requirements of the ASME Boiler and Pressure Vessel Code (BPV Code) and the ASME Code for Operation and Maintenance of Nuclear Power Plants (OM Code) as specified in this paragraph. Each combined license for a utilization facility is subject to the following conditions.

(1) *Conditions on ASME BPV Code Section III.* Each manufacturing license, standard design approval, and design certification under part 52 of this chapter is subject to the following conditions. As used in this section, references to Section III refer to Section III of the ASME Boiler and Pressure Vessel Code and include the 1963 Edition through 1973 Winter Addenda and the 1974 Edition (Division 1) through the 2008 Addenda (Division 1), subject to the following conditions:

(i) *Section III condition: Section III materials.* When applying the 1992 Edition of Section III, applicants or licensees must apply the 1992 Edition with the 1992 Addenda of Section II of the ASME Boiler and Pressure Vessel Code.

(ii) *Section III condition: Weld leg dimensions.* When applying the 1989 Addenda through the latest edition and addenda, applicants or licensees may not apply subparagraphs NB-3683.4(c)(1) and NB-3683.4(c)(2) or Footnote 11 from the 1989 Addenda through the 2003 Addenda, or Footnote 13 from the 2004 Edition through the 2008 Addenda to Figures NC-3673.2(b)-1 and ND-3673.2(b)-1 for welds with leg size less than 1.09 t_n.

(iii) *Section III condition: Seismic design of piping.* Applicants or licensees may use Subarticles NB-3200, NB-3600, NC-3600, and ND-3600 for seismic design of piping, up to and including the 1993 Addenda, subject to the condition specified in paragraph (b)(1)(ii) of this section. Applicants or licensees may not use these subarticles for seismic design of piping in the 1994 Addenda through the 2005 Addenda incorporated by reference in paragraph (a)(1) of this section, except that Subarticle NB-3200 in the 2004 Edition through the 2008 Addenda may be used by applicants and licensees, subject to the condition in paragraph (b)(1)(iii)(A) of this section. Applicants or licensees may use Subarticles NB-3600, NC-3600, and ND-3600 for the seismic design of piping in the 2006 Addenda through the 2008 Addenda, subject to the conditions of this paragraph corresponding to those subarticles.

(A) *Seismic design of piping: First provision.* When applying Note (1) of Figure NB-3222-1 for Level B service limits, the calculation of P_b stresses must include reversing dynamic loads (including inertia earthquake effects) if evaluation of these loads is required by NB-3223(b).

(B) *Seismic design of piping: Second provision.* For Class 1 piping, the material and D_o/t requirements of NB-3656(b) must be met for all Service Limits when the Service Limits include reversing dynamic loads, and the alternative rules for reversing dynamic loads are used.

(iv) *Section III condition: Quality assurance.* When applying editions and addenda later than the 1989 Edition of Section III, the requirements of NQA-1, "Quality Assurance Requirements for Nuclear Facilities," 1986 Edition through the 1994 Edition, are acceptable for use, provided that the edition and addenda of NQA-1 specified in NCA-4000 is used in conjunction with the administrative, quality, and technical provisions contained in the edition and addenda of Section III being used.

(v) *Section III condition: Independence of inspection.* Applicants or licensees may not apply NCA-4134.10(a) of Section III, 1995 Edition through the latest edition and addenda incorporated by reference in paragraph (a)(1) of this section.

(vi) *Section III condition: Subsection NH.* The provisions in Subsection NH, "Class 1 Components in Elevated Temperature Service," 1995 Addenda through the latest edition and addenda incorporated by reference in paragraph (a)(1) of this section, may only be used for the design and construction of Type 316 stainless steel pressurizer heater sleeves where service conditions do not cause the components to reach temperatures exceeding 900 °F.

(vii) *Section III condition: Capacity certification and demonstration of function of incompressible-fluid pressure-relief valves.* When applying the 2006 Addenda through the 2007 Edition up to and including the 2008 Addenda, applicants and licensees may use paragraph NB-7742, except that paragraph NB-7742(a)(2) may not be used. For a valve design of a single size to be certified over a range of set pressures, the demonstration of function tests under paragraph NB-7742 must be conducted as prescribed in NB-7732.2 on two valves covering the minimum set pressure for the design and the maximum set pressure that can be accommodated at the demonstration facility selected for the test.

(2) *Conditions on ASME BPV Code Section XI.* As used in this section, references to Section XI refer to Section XI, Division 1, of the ASME Boiler and Pressure Vessel Code, and include the 1970 Edition through the 1976 Winter Addenda and the 1977 Edition through the 2007 Edition with the 2008 Addenda, subject to the following conditions:

TABLE 1.10-1
CODE OF FEDERAL REGULATIONS 10 CFR 50.55a REQUIREMENTS
LIMITATIONS, MODIFICATIONS, AND CLARIFICATIONS

(i) [Reserved]

(ii) *Section XI condition: Pressure-retaining welds in ASME Code Class 1 piping (applies to Table IWB-2500 and IWB-2500-1 and Category B-J).* If the facility's application for a construction permit was docketed prior to July 1, 1978, the extent of examination for Code Class 1 pipe welds may be determined by the requirements of Table IWB-2500 and Table IWB-2600 Category B-J of Section XI of the ASME BPV Code in the 1974 Edition and Addenda through the Summer 1975 Addenda or other requirements the NRC may adopt.

(iii) [Reserved]

(iv) [Reserved]

(v) [Reserved]

(vi) *Section XI condition: Effective edition and addenda of Subsection IWE and Subsection IWL.* Applicants or licensees may use either the 1992 Edition with the 1992 Addenda or the 1995 Edition with the 1996 Addenda of Subsection IWE and Subsection IWL, as conditioned by the requirements in paragraphs (b)(2)(viii) and (ix) of this section, when implementing the initial 120-month inspection interval for the containment inservice inspection requirements of this section. Successive 120-month interval updates must be implemented in accordance with paragraph (g)(4)(ii) of this section.

(vii) *Section XI condition: Section XI references to OM Part 4, OM Part 6, and OM Part 10 (Table IWA-1600-1).* When using Table IWA-1600-1, "Referenced Standards and Specifications," in the Section XI, Division 1, 1987 Addenda, 1988 Addenda, or 1989 Edition, the specified "Revision Date or Indicator" for ASME/ANSI OM part 4, ASME/ANSI part 6, and ASME/ANSI part 10 must be the OMa-1988 Addenda to the OM-1987 Edition. These requirements have been incorporated into the OM Code, which is incorporated by reference in paragraph (a)(1)(iv) of this section.

(viii) Section XI condition: Concrete containment examinations. ... Applicants or licensees applying Subsection IWL, 2007 Edition through the latest edition and addenda incorporated by reference in paragraph (a)(1)(ii) of this section, must apply paragraph (b)(2)(viii)(E) of this section. (A) (B) (C) (D) *(1)* *(2)* *(3)* ...

(E) *Concrete containment examinations: Fifth provision.* For Class CC applications, the applicant or licensee must evaluate the acceptability of inaccessible areas when conditions exist in accessible areas that could indicate the presence of or the result in degradation to such inaccessible areas. For each inaccessible area identified, the applicant or licensee must provide the following in the ISI Summary Report required by IWA-6000:

(1) A description of the type and estimated extent of degradation, and the conditions that led to the degradation;

(2) An evaluation of each area, and the result of the evaluation; and

(3) A description of necessary corrective actions.

(F) (G)

(ix) Section XI condition: Metal containment examinations. ... Applicants or licensees applying Subsection IWE, 2007 Edition through the latest addenda incorporated by reference in paragraph (a)(1)(ii) of this section, must satisfy the requirements of paragraphs (b)(2)(ix)(A)(2) and (b)(2)(ix)(B) and (J) of this section. (A) *Metal containment examinations: First provision.* For Class MC applications, the following apply to inaccessible areas.

(1) ...

(2) For each inaccessible area identified for evaluation, the applicant or licensee must provide the following in the ISI Summary Report as required by IWA-6000:

(i) A description of the type and estimated extent of degradation, and the conditions that led to the degradation;

(ii) An evaluation of each area, and the result of the evaluation; and

(iii) A description of necessary corrective actions.

(B) *Metal containment examinations: Second provision.* When performing remotely the visual examinations required by Subsection IWE, the maximum direct examination distance specified in Table IWA-2210-1 may be extended and the minimum illumination requirements specified in Table IWA-2210-1 may be decreased provided that the conditions or indications for which the visual examination is performed can be detected at the chosen distance and illumination.

(C) (D) (1) (i) (ii) (iii) (2) (E) (F) (G) (H) (I) ... (J) Metal containment examinations: Tenth provision. In general, a repair/replacement activity such as replacing a large containment penetration, cutting a large construction opening in the containment pressure boundary to replace steam generators, reactor vessel heads, pressurizers, or other major equipment; or other similar modification is considered a major containment modification. When applying IWE-5000 to Class MC pressure-retaining components, any major containment modification or repair/replacement must be followed by a Type A test to provide assurance of both containment structural integrity and leak-tight integrity prior to returning to service, in accordance with 10 CFR part 50, Appendix J, Option A or Option B on which the applicant's or licensee's Containment Leak-Rate Testing Program is based. When applying IWE-5000, if a Type A, B, or C Test is performed, the test pressure and acceptance standard for the test must be in accordance with 10 CFR part 50, Appendix J. (x) *Section XI condition:*

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Quality assurance. When applying Section XI editions and addenda later than the 1989 Edition, the requirements of NQA-1, "Quality Assurance Requirements for Nuclear Facilities," 1979 Addenda through the 1989 Edition, are acceptable as permitted by IWA-1400 of Section XI, if the licensee uses its 10 CFR part 50, Appendix B, quality assurance program, in conjunction with Section XI requirements. Commitments contained in the licensee's quality assurance program description that are more stringent than those contained in NQA-1 must govern Section XI activities. Further, where NQA-1 and Section XI do not address the commitments contained in the licensee's Appendix B quality assurance program description, the commitments must be applied to Section XI activities.

(xi) [Reserved]

(xii) *Section XI condition: Underwater welding*. The provisions in IWA-4660, "Underwater Welding," of Section XI, 1997 Addenda through the latest edition and addenda incorporated by reference in paragraph (a)(1)(ii) of this section, are not approved for use on irradiated material.

(xiii) [Reserved]

(xiv) *Section XI condition: Appendix VIII personnel qualification*. All personnel qualified for performing ultrasonic examinations in accordance with Appendix VIII must receive 8 hours of annual hands-on training on specimens that contain cracks. Licensees applying the 1999 Addenda through the latest edition and addenda incorporated by reference in paragraph (a)(1)(ii) of this section may use the annual practice requirements in VII-4240 of Appendix VII of Section XI in place of the 8 hours of annual hands-on training provided that the supplemental practice is performed on material or welds that contain cracks, or by analyzing prerecorded data from material or welds that contain cracks. In either case, training must be completed no earlier than 6 months prior to performing ultrasonic examinations at a licensee's facility.

(xv) *Section XI condition: Appendix VIII specimen set and qualification requirements*. Licensees using Appendix VIII in the 1995 Edition through the 2001 Edition of the ASME Boiler and Pressure Vessel Code may elect to comply with all of the provisions in paragraphs (b)(2)(xv)(A) through (M) of this section, except for paragraph (b)(2)(xv)(F) of this section, which may be used at the licensee's option. Licensees using editions and addenda after 2001 Edition through the 2006 Addenda must use the 2001 Edition of Appendix VIII and may elect to comply with all of the provisions in paragraphs (b)(2)(xv)(A) through (M) of this section, except for paragraph (b)(2)(xv)(F) of this section, which may be used at the licensee's option.

(A) *Specimen set and qualification: First provision*. When applying Supplements 2, 3, and 10 to Appendix VIII, the following examination coverage criteria requirements must be used:

(*1*) Piping must be examined in two axial directions, and when examination in the circumferential direction is required, the circumferential examination must be performed in two directions, provided access is available. Dissimilar metal welds must be examined axially and circumferentially.

(*2*) Where examination from both sides is not possible, full coverage credit may be claimed from a single side for ferritic welds. Where examination from both sides is not possible on austenitic welds or dissimilar metal welds, full coverage credit from a single side may be claimed only after completing a successful single-sided Appendix VIII demonstration using flaws on the opposite side of the weld. Dissimilar metal weld qualifications must be demonstrated from the austenitic side of the weld, and the qualification may be expanded for austenitic welds with no austenitic sides using a separate add-on performance demonstration. Dissimilar metal welds may be examined from either side of the weld.

(B) *Specimen set and qualification: Second provision*. The following conditions must be used in addition to the requirements of Supplement 4 to Appendix VIII:

(*1*) Paragraph 3.1, Detection acceptance criteria—Personnel are qualified for detection if the results of the performance demonstration satisfy the detection requirements of ASME Section XI, Appendix VIII, Table VIII-S4-1, and no flaw greater than 0.25 inch through-wall dimension is missed.

(*2*) Paragraph 1.1(c), Detection test matrix—Flaws smaller than the 50 percent of allowable flaw size, as defined in IWB-3500, need not be included as detection flaws. For procedures applied from the inside surface, use the minimum thickness specified in the scope of the procedure to calculate a/t. For procedures applied from the outside surface, the actual thickness of the test specimen is to be used to calculate a/t.

(C) *Specimen set and qualification: Third provision*. When applying Supplement 4 to Appendix VIII, the following conditions must be used:

(*1*) A depth sizing requirement of 0.15 inch RMS must be used in lieu of the requirements in Subparagraphs 3.2(a) and 3.2(c), and a length sizing requirement of 0.75 inch RMS must be used in lieu of the requirement in Subparagraph 3.2(b).

(*2*) In lieu of the location acceptance criteria requirements of Subparagraph 2.1(b), a flaw will be considered detected when reported within 1.0 inch or 10 percent of the metal path to the flaw, whichever is greater, of its true location in the X and Y directions.

(*3*) In lieu of the flaw type requirements of Subparagraph 1.1(e)(1), a minimum of 70 percent of the flaws in the detection and sizing tests must be cracks. Notches, if used, must be limited by the following:

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(*i*) Notches must be limited to the case where examinations are performed from the clad surface.

(*ii*) Notches must be semielliptical with a tip width of less than or equal to 0.010 inches.

(*iii*) Notches must be perpendicular to the surface within ±2 degrees.

(*4*) In lieu of the detection test matrix requirements in paragraphs 1.1(e)(2) and 1.1(e)(3), personnel demonstration test sets must contain a representative distribution of flaw orientations, sizes, and locations.

(D) *Specimen set and qualification: Fourth provision*. The following conditions must be used in addition to the requirements of Supplement 6 to Appendix VIII:

(*1*) Paragraph 3.1, Detection Acceptance Criteria—Personnel are qualified for detection if:

(*i*) No surface connected flaw greater than 0.25 inch through-wall has been missed.

(*ii*) No embedded flaw greater than 0.50 inch through-wall has been missed.

(*2*) Paragraph 3.1, Detection Acceptance Criteria—For procedure qualification, all flaws within the scope of the procedure are detected.

(*3*) Paragraph 1.1(b) for detection and sizing test flaws and locations—Flaws smaller than the 50 percent of allowable flaw size, as defined in IWB-3500, need not be included as detection flaws. Flaws that are less than the allowable flaw size, as defined in IWB-3500, may be used as detection and sizing flaws.

(*4*) Notches are not permitted.

(E) *Specimen set and qualification: Fifth provision*. When applying Supplement 6 to Appendix VIII, the following conditions must be used:

(*1*) A depth sizing requirement of 0.25 inch RMS must be used in lieu of the requirements of subparagraphs 3.2(a), 3.2(c)(2), and 3.2(c)(3).

(*2*) In lieu of the location acceptance criteria requirements in Subparagraph 2.1(b), a flaw will be considered detected when reported within 1.0 inch or 10 percent of the metal path to the flaw, whichever is greater, of its true location in the X and Y directions.

(*3*) In lieu of the length sizing criteria requirements of Subparagraph 3.2(b), a length sizing acceptance criteria of 0.75 inch RMS must be used.

(*4*) In lieu of the detection specimen requirements in Subparagraph 1.1(e)(1), a minimum of 55 percent of the flaws must be cracks. The remaining flaws may be cracks or fabrication type flaws, such as slag and lack of fusion. The use of notches is not allowed.

(*5*) In lieu of paragraphs 1.1(e)(2) and 1.1(e)(3) detection test matrix, personnel demonstration test sets must contain a representative distribution of flaw orientations, sizes, and locations.

(F) *Specimen set and qualification: Sixth provision*. The following conditions may be used for personnel qualification for combined Supplement 4 to Appendix VIII and Supplement 6 to Appendix VIII qualification. Licensees choosing to apply this combined qualification must apply all of the provisions of Supplements 4 and 6 including the following conditions:

(*1*) For detection and sizing, the total number of flaws must be at least 10. A minimum of 5 flaws must be from Supplement 4, and a minimum of 50 percent of the flaws must be from Supplement 6. At least 50 percent of the flaws in any sizing must be cracks. Notches are not acceptable for Supplement 6.

(*2*) Examination personnel are qualified for detection and length sizing when the results of any combined performance demonstration satisfy the acceptance criteria of Supplement 4 to Appendix VIII.

(*3*) Examination personnel are qualified for depth sizing when Supplement 4 to Appendix VIII and Supplement 6 to Appendix VIII flaws are sized within the respective acceptance criteria of those supplements.

(G) *Specimen set and qualification: Seventh provision*. When applying Supplement 4 to Appendix VIII, Supplement 6 to Appendix VIII, or combined Supplement 4 and Supplement 6 qualification, the following additional conditions must be used, and examination coverage must include:

(*1*) The clad-to-base-metal-interface, including a minimum of 15 percent T (measured from the clad-to-base-metal-interface), must be examined from four orthogonal directions using procedures and personnel qualified in accordance with Supplement 4 to Appendix VIII.

(*2*) If the clad-to-base-metal-interface procedure demonstrates detectability of flaws with a tilt angle relative to the weld centerline of at least 45 degrees, the remainder of the examination volume is considered fully examined if coverage is obtained in one parallel and one perpendicular direction. This must be accomplished using a procedure and personnel qualified for single-side examination in accordance with Supplement 6. Subsequent examinations of this volume may be performed using examination techniques qualified for a tilt angle of at least 10 degrees.

(*3*) The examination volume not addressed by paragraph (b)(2)(xv)(G)(*1*) of this section is considered fully examined if

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coverage is obtained in one parallel and one perpendicular direction, using a procedure and personnel qualified for single sided examination when the conditions in paragraph (b)(2)(xv)(G)(*2*) are met.

(H) *Specimen set and qualification: Eighth provision.* When applying Supplement 5 to Appendix VIII, at least 50 percent of the flaws in the demonstration test set must be cracks and the maximum misorientation must be demonstrated with cracks. Flaws in nozzles with bore diameters equal to or less than 4 inches may be notches.

(I) *Specimen set and qualification: Ninth provision.* When applying Supplement 5, Paragraph (a), to Appendix VIII, the number of false calls allowed must be D/10, with a maximum of 3, where D is the diameter of the nozzle.

(J) [Reserved]

(K) *Specimen set and qualification: Eleventh provision.* When performing nozzle-to-vessel weld examinations, the following conditions must be used when the requirements contained in Supplement 7 to Appendix VIII are applied for nozzle-to-vessel welds in conjunction with Supplement 4 to Appendix VIII, Supplement 6 to Appendix VIII, or combined Supplement 4 and Supplement 6 qualification.

(*1*) For examination of nozzle-to-vessel welds conducted from the bore, the following conditions are required to qualify the procedures, equipment, and personnel:

(*i*) For detection, a minimum of four flaws in one or more full-scale nozzle mock-ups must be added to the test set. The specimens must comply with Supplement 6, paragraph 1.1, to Appendix VIII, except for flaw locations specified in Table VIII S6-1. Flaws may be notches, fabrication flaws, or cracks. Seventy-five (75) percent of the flaws must be cracks or fabrication flaws. Flaw locations and orientations must be selected from the choices shown in paragraph (b)(2)(xv)(K)(*4*) of this section, Table VIII-S7-1—Modified, with the exception that flaws in the outer eighty-five (85) percent of the weld need not be perpendicular to the weld. There may be no more than two flaws from each category, and at least one subsurface flaw must be included.

(*ii*) For length sizing, a minimum of four flaws as in paragraph (b)(2)(xv)(K)(*1*)(*i*) of this section must be included in the test set. The length sizing results must be added to the results of combined Supplement 4 to Appendix VIII and Supplement 6 to Appendix VIII. The combined results must meet the acceptance standards contained in paragraph (b)(2)(xv)(E)(*3*) of this section.

(*iii*) For depth sizing, a minimum of four flaws as in paragraph (b)(2)(xv)(K)(*1*)(*i*) of this section must be included in the test set. Their depths must be distributed over the ranges of Supplement 4, Paragraph 1.1, to Appendix VIII, for the inner 15 percent of the wall thickness and Supplement 6, Paragraph 1.1, to Appendix VIII, for the remainder of the wall thickness. The depth sizing results must be combined with the sizing results from Supplement 4 to Appendix VIII for the inner 15 percent and to Supplement 6 to Appendix VIII for the remainder of the wall thickness. The combined results must meet the depth sizing acceptance criteria contained in paragraphs (b)(2)(xv)(C)(*1*), (b)(2)(xv)(E)(*1*), and (b)(2)(xv)(F)(*3*) of this section.

(*2*) For examination of reactor pressure vessel nozzle-to-vessel welds conducted from the inside of the vessel, the following conditions are required:

(*i*) The clad-to-base-metal-interface and the adjacent examination volume to a minimum depth of 15 percent T (measured from the clad-to-base-metal-interface) must be examined from four orthogonal directions using a procedure and personnel qualified in accordance with Supplement 4 to Appendix VIII as conditioned by paragraphs (b)(2)(xv)(B) and (C) of this section.

(*ii*) When the examination volume defined in paragraph (b)(2)(xv)(K)(*2*)(*i*) of this section cannot be effectively examined in all four directions, the examination must be augmented by examination from the nozzle bore using a procedure and personnel qualified in accordance with paragraph (b)(2)(xv)(K)(*1*) of this section.

(*iii*) The remainder of the examination volume not covered by paragraph (b)(2)(xv)(K)(*2*)(*ii*) of this section or a combination of paragraphs (b)(2)(xv)(K)(*2*)(*i*) and (*ii*) of this section, must be examined from the nozzle bore using a procedure and personnel qualified in accordance with paragraph (b)(2)(xv)(K)(*1*) of this section, or from the vessel shell using a procedure and personnel qualified for single sided examination in accordance with Supplement 6 to Appendix VIII, as conditioned by paragraphs (b)(2)(xv)(D) through (G) of this section.

(*3*) For examination of reactor pressure vessel nozzle-to-shell welds conducted from the outside of the vessel, the following conditions are required:

(*i*) The clad-to-base-metal-interface and the adjacent metal to a depth of 15 percent T (measured from the clad-to-base-metal-interface) must be examined from one radial and two opposing circumferential directions using a procedure and personnel qualified in accordance with Supplement 4 to Appendix VIII, as conditioned by paragraphs (b)(2)(xv)(B) and (C) of this section, for examinations performed in the radial direction, and Supplement 5 to Appendix VIII, as conditioned by paragraph (b)(2)(xv)(J) of this section, for examinations performed in the circumferential direction.

(*ii*) The examination volume not addressed by paragraph (b)(2)(xv)(K)(*3*)(*i*) of this section must be examined in a minimum

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of one radial direction using a procedure and personnel qualified for single sided examination in accordance with Supplement 6 to Appendix VIII, as conditioned by paragraphs (b)(2)(xv)(D) through (G) of this section.

(*4*) Table VIII-S7-1, "Flaw Locations and Orientations," Supplement 7 to Appendix VIII, is conditioned as follows:

Table VIII-S7-1-Modified

Flaw Locations and Orientations		
	Parallel to weld	**Perpendicular to weld**
Inner 15 percent	X	X
OD Surface	X	.....
Subsurface	X	.....

(L) *Specimen set and qualification: Twelfth provision*. As a condition to the requirements of Supplement 8, Subparagraph 1.1(c), to Appendix VIII, notches may be located within one diameter of each end of the bolt or stud.

(M) *Specimen set and qualification: Thirteenth provision*. When implementing Supplement 12 to Appendix VIII, only the provisions related to the coordinated implementation of Supplement 3 to Supplement 2 performance demonstrations are to be applied.

(xvi) *Section XI condition: Appendix VIII single side ferritic vessel and piping and stainless steel piping examinations*. When applying editions and addenda prior to the 2007 Edition of Section XI, the following conditions apply.

(A) *Ferritic and stainless steel piping examinations: First provision*. Examinations performed from one side of a ferritic vessel weld must be conducted with equipment, procedures, and personnel that have demonstrated proficiency with single side examinations. To demonstrate equivalency to two sided examinations, the demonstration must be performed to the requirements of Appendix VIII, as conditioned by this paragraph and paragraphs (b)(2)(xv)(B) through (G) of this section, on specimens containing flaws with non-optimum sound energy reflecting characteristics or flaws similar to those in the vessel being examined.

(B) *Ferritic and stainless steel piping examinations: Second provision*. Examinations performed from one side of a ferritic or stainless steel pipe weld must be conducted with equipment, procedures, and personnel that have demonstrated proficiency with single side examinations. To demonstrate equivalency to two sided examinations, the demonstration must be performed to the requirements of Appendix VIII, as conditioned by this paragraph and paragraph (b)(2)(xv)(A) of this section.

(xvii) *Section XI condition: Reconciliation of quality requirements*. When purchasing replacement items, in addition to the reconciliation provisions of IWA-4200, 1995 Addenda through 1998 Edition, the replacement items must be purchased, to the extent necessary, in accordance with the licensee's quality assurance program description required by 10 CFR 50.34(b)(6)(ii).

(xviii) *Section XI condition: NDE personnel certification*. (A) *NDE personnel certification: First provision*. Level I and II nondestructive examination personnel must be recertified on a 3-year interval in lieu of the 5-year interval specified in the 1997 Addenda and 1998 Edition of IWA-2314, and IWA-2314(a) and IWA-2314(b) of the 1999 Addenda through the latest edition and addenda incorporated by reference in paragraph (a)(1)(ii) of this section.

(B) *NDE personnel certification: Second provision*. When applying editions and addenda prior to the 2007 Edition of Section XI, paragraph IWA-2316 may only be used to qualify personnel that observe leakage during system leakage and hydrostatic tests conducted in accordance with IWA 5211(a) and (b).

(C) *NDE personnel certification: Third provision*. When applying editions and addenda prior to the 2005 Addenda of Section XI, licensee's qualifying visual examination personnel for VT-3 visual examination under paragraph IWA-2317 of Section XI must demonstrate the proficiency of the training by administering an initial qualification examination and administering subsequent examinations on a 3-year interval.

(xix) *Section XI condition: Substitution of alternative methods*. The provisions for substituting alternative examination methods, a combination of methods, or newly developed techniques in the 1997 Addenda of IWA-2240 must be applied when using the 1998 Edition through the 2004 Edition of Section XI of the ASME BPV Code. The provisions in IWA-4520(c), 1997 Addenda through the 2004 Edition, allowing the substitution of alternative methods, a combination of methods, or newly developed techniques for the methods specified in the Construction Code, are not approved for use. The provisions in IWA-4520(b)(2) and IWA-4521 of the 2008 Addenda through the latest edition and addenda incorporated by reference in paragraph (a)(1)(ii) of this section, allowing the substitution of ultrasonic examination for radiographic examination specified in the Construction Code, are not approved for use.

(xx) *Section XI condition: System leakage tests*-(A) *System leakage tests: First provision*. When performing system leakage tests in accordance with IWA-5213(a), 1997 through 2002 Addenda, the licensee must maintain a 10-minute hold time after

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test pressure has been reached for Class 2 and Class 3 components that are not in use during normal operating conditions. No hold time is required for the remaining Class 2 and Class 3 components provided that the system has been in operation for at least 4 hours for insulated components or 10 minutes for uninsulated components.

(B) *System leakage tests: Second provision.* The NDE provision in IWA-4540(a)(2) of the 2002 Addenda of Section XI must be applied when performing system leakage tests after repair and replacement activities performed by welding or brazing on a pressure retaining boundary using the 2003 Addenda through the latest edition and addenda incorporated by reference in paragraph (a)(1)(ii) of this section.

(xxi) *Section XI condition: Table IWB-2500-1 examination requirements.* (A) *Table IWB-2500-1 examination requirements: First provision.* The provisions of Table IWB 2500-1, Examination Category B-D, Full Penetration Welded Nozzles in Vessels, Items B3.40 and B3.60 (Inspection Program A) and Items B3.120 and B3.140 (Inspection Program B) of the 1998 Edition must be applied when using the 1999 Addenda through the latest edition and addenda incorporated by reference in paragraph (a)(1)(ii) of this section. A visual examination with magnification that has a resolution sensitivity to detect a 1-mil width wire or crack, utilizing the allowable flaw length criteria in Table IWB-3512-1, 1997 Addenda through the latest edition and addenda incorporated by reference in paragraph (a)(1)(ii) of this section, with a limiting assumption on the flaw aspect ratio (i.e., a/l = 0.5), may be performed instead of an ultrasonic examination.

(B) [Reserved]

(xxii) *Section XI condition: Surface examination.* The use of the provision in IWA-2220, "Surface Examination," of Section XI, 2001 Edition through the latest edition and addenda incorporated by reference in paragraph (a)(1)(ii) of this section, that allows use of an ultrasonic examination method is prohibited.

(xxiii) *Section XI condition: Evaluation of thermally cut surfaces.* The use of the provisions for eliminating mechanical processing of thermally cut surfaces in IWA-4461.4.2 of Section XI, 2001 Edition through the latest edition and addenda incorporated by reference in paragraph (a)(1)(ii) of this section, is prohibited.

(xxiv) *Section XI condition: Incorporation of the performance demonstration initiative and addition of ultrasonic examination criteria.* The use of Appendix VIII and the supplements to Appendix VIII and Article I-3000 of Section XI of the ASME BPV Code, 2002 Addenda through the 2006 Addenda, is prohibited.

(xxv) *Section XI condition: Mitigation of defects by modification.* The use of the provisions in IWA-4340, "Mitigation of Defects by Modification," Section XI, 2001 Edition through the latest edition and addenda incorporated by reference in paragraph (a)(1)(ii) of this section are prohibited.

(xxvi) *Section XI condition: Pressure testing Class 1, 2 and 3 mechanical joints.* The repair and replacement activity provisions in IWA-4540(c) of the 1998 Edition of Section XI for pressure testing Class 1, 2, and 3 mechanical joints must be applied when using the 2001 Edition through the latest edition and addenda incorporated by reference in paragraph (a)(1)(ii) of this section.

(xxvii) *Section XI condition: Removal of insulation.* When performing visual examination in accordance with IWA-5242 of Section XI of the ASME BPV Code, 2003 Addenda through the 2006 Addenda, or IWA-5241 of the 2007 Edition through the latest edition and addenda incorporated by reference in paragraph (a)(1)(ii) of this section, insulation must be removed from 17-4 PH or 410 stainless steel studs or bolts aged at a temperature below 1100 °F or having a Rockwell Method C hardness value above 30, and from A-286 stainless steel studs or bolts preloaded to 100,000 pounds per square inch or higher.

(xxviii) *Section XI condition: Analysis of flaws.* Licensees using ASME BPV Code, Section XI, Appendix A, must use the following conditions when implementing Equation (2) in A-4300(b)(1):

For $R < 0$, ΔK_I depends on the crack depth (a), and the flow stress (σ_f). The flow stress is defined by $\sigma_f = 1/2(\sigma_{ys} + \sigma_{ult})$, where σ_{ys} is the yield strength and σ_{ult} is the ultimate tensile strength in units ksi (MPa) and (a) is in units in. (mm). For $-2 \leq R \leq 0$ and $K_{max} - K_{min} \leq 0.8 \times 1.12\ \sigma_f\sqrt{(\pi a)}$, S = 1 and $\Delta K_I = K_{max}$. For $R < -2$ and $K_{max} - K_{min} \leq 0.8 \times 1.12\ \sigma_f\sqrt{(\pi a)}$, S = 1 and $\Delta K_I = (1 - R)\ K_{max}/3$. For $R < 0$ and $K_{max} - K_{min} > 0.8 \times 1.12\ \sigma_f\sqrt{(\pi a)}$, S = 1 and $\Delta K_I = K_{max} - K_{min}$.

(xxix) *Section XI condition: Nonmandatory Appendix R.* Nonmandatory Appendix R, "Risk-Informed Inspection Requirements for Piping," of Section XI, 2005 Addenda through the latest edition and addenda incorporated by reference in paragraph (a)(1)(ii) of this section, may not be implemented without prior NRC authorization of the proposed alternative in accordance with paragraph (z) of this section.

(3) *Conditions on ASME OM Code.* As used in this section, references to the OM Code refer to the ASME Code for Operation and Maintenance of Nuclear Power Plants, Subsections ISTA, ISTB, ISTC, ISTD, Mandatory Appendices I and II, and Nonmandatory Appendices A through H and J, including the 1995 Edition through the 2006 Addenda, subject to the following conditions:

(i) *OM condition: Quality assurance.* When applying editions and addenda of the OM Code, the requirements of NQA-1, "Quality Assurance Requirements for Nuclear Facilities," 1979 Addenda, are acceptable as permitted by ISTA 1.4 of the 1995 Edition through 1997 Addenda or ISTA-1500 of the 1998 Edition through the latest edition and addenda incorporated

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by reference in paragraph (a)(1)(iv) of this section, provided the licensee uses its 10 CFR part 50, Appendix B, quality assurance program in conjunction with the OM Code requirements. Commitments contained in the licensee's quality assurance program description that are more stringent than those contained in NQA-1 govern OM Code activities. If NQA-1 and the OM Code do not address the commitments contained in the licensee's Appendix B quality assurance program description, the commitments must be applied to OM Code activities.

(ii) *OM condition: Motor-Operated Valve (MOV) testing*. Licensees must comply with the provisions for MOV testing in OM Code ISTC 4.2, 1995 Edition with the 1996 and 1997 Addenda, or ISTC-3500, 1998 Edition through the latest edition and addenda incorporated by reference in paragraph (a)(1)(iv) of this section, and must establish a program to ensure that motor-operated valves continue to be capable of performing their design basis safety functions.

(iii) [Reserved]

(iv) *OM condition: Check valves (Appendix II)*. Licensees applying Appendix II, "Check Valve Condition Monitoring Program," of the OM Code, 1995 Edition with the 1996 and 1997 Addenda, must satisfy the requirements of (b)(3)(iv)(A) through (C) of this section. Licensees applying Appendix II, 1998 Edition through the 2002 Addenda, must satisfy the requirements of (b)(3)(iv)(A), (B), and (D) of this section.

(A) *Check valves: First provision*. Valve opening and closing functions must be demonstrated when flow testing or examination methods (nonintrusive, or disassembly and inspection) are used;

(B) *Check valves: Second provision*. The initial interval for tests and associated examinations may not exceed two fuel cycles or 3 years, whichever is longer; any extension of this interval may not exceed one fuel cycle per extension with the maximum interval not to exceed 10 years. Trending and evaluation of existing data must be used to reduce or extend the time interval between tests.

(C) *Check valves: Third provision*. If the Appendix II condition monitoring program is discontinued, then the requirements of ISTC 4.5.1 through 4.5.4 must be implemented.

(D) *Check valves: Fourth provision*. The applicable provisions of subsection ISTC must be implemented if the Appendix II condition monitoring program is discontinued.

(v) *OM condition: Snubbers ISTD*. Article IWF-5000, "Inservice Inspection Requirements for Snubbers," of the ASME BPV Code, Section XI, must be used when performing inservice inspection examinations and tests of snubbers at nuclear power plants, except as conditioned in paragraphs (b)(3)(v)(A) and (B) of this section.

(A) *Snubbers: First provision*. Licensees may use Subsection ISTD, "Preservice and Inservice Examination and Testing of Dynamic Restraints (Snubbers) in Light-Water Reactor Power Plants," ASME OM Code, 1995 Edition through the latest edition and addenda incorporated by reference in paragraph (a)(1)(iv) of this section, in place of the requirements for snubbers in the editions and addenda up to the 2005 Addenda of the ASME BPV Code, Section XI, IWF-5200(a) and (b) and IWF-5300(a) and (b), by making appropriate changes to their technical specifications or licensee-controlled documents. Preservice and inservice examinations must be performed using the VT-3 visual examination method described in IWA-2213.

(B) *Snubbers: Second provision*. Licensees must comply with the provisions for examining and testing snubbers in Subsection ISTD of the ASME OM Code and make appropriate changes to their technical specifications or licensee-controlled documents when using the 2006 Addenda and later editions and addenda of Section XI of the ASME BPV Code.

(vi) *OM condition: Exercise interval for manual valves*. Manual valves must be exercised on a 2-year interval rather than the 5-year interval specified in paragraph ISTC-3540 of the 1999 through the 2005 Addenda of the ASME OM Code, provided that adverse conditions do not require more frequent testing.

(4) *Conditions on Design, Fabrication, and Materials Code Cases*. Each manufacturing license, standard design approval, and design certification application under part 52 of this chapter is subject to the following conditions. Licensees may apply the ASME BPV Code Cases listed in NRC Regulatory Guide 1.84, Revision 36, without prior NRC approval, subject to the following conditions:

(i) *Design, Fabrication, and Materials Code Case condition: Applying Code Cases*. When an applicant or licensee initially applies a listed Code Case, the applicant or licensee must apply the most recent version of that Code Case incorporated by reference in paragraph (a) of this section.

(ii) *Design, Fabrication, and Materials Code Case condition: Applying different revisions of Code Cases*. If an applicant or licensee has previously applied a Code Case and a later version of the Code Case is incorporated by reference in paragraph (a) of this section, the applicant or licensee may continue to apply the previous version of the Code Case as authorized or may apply the later version of the Code Case, including any NRC-specified conditions placed on its use, until it updates its Code of Record for the component being constructed.

(iii) *Design, Fabrication, and Materials Code Case condition: Applying annulled Code Cases*. Application of an annulled Code Case is prohibited unless an applicant or licensee applied the listed Code Case prior to it being listed as annulled in

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Regulatory Guide 1.84. If an applicant or licensee has applied a listed Code Case that is later listed as annulled in Regulatory Guide 1.84, the applicant or licensee may continue to apply the Code Case until it updates its Code of Record for the component being constructed.

(5) *Conditions on inservice inspection Code Cases.* Licensees may apply the ASME BPV Code Cases listed in Regulatory Guide 1.147, Revision 17, without prior NRC approval, subject to the following:

(i) *ISI Code Case condition: Applying Code Cases.* When a licensee initially applies a listed Code Case, the licensee must apply the most recent version of that Code Case incorporated by reference in paragraph (a) of this section.

(ii) *ISI Code Case condition: Applying different revisions of Code Cases.* If a licensee has previously applied a Code Case and a later version of the Code Case is incorporated by reference in paragraph (a) of this section, the licensee may continue to apply, to the end of the current 120-month interval, the previous version of the Code Case, as authorized, or may apply the later version of the Code Case, including any NRC-specified conditions placed on its use. Licensees who choose to continue use of the Code Case during subsequent 120-month ISI program intervals will be required to implement the latest version incorporated by reference into 10 CFR 50.55a as listed in Tables 1 and 2 of Regulatory Guide 1.147, Revision 17.

(iii) *ISI Code Case condition: Applying annulled Code Cases.* Application of an annulled Code Case is prohibited unless a licensee previously applied the listed Code Case prior to it being listed as annulled in Regulatory Guide 1.147. If a licensee has applied a listed Code Case that is later listed as annulled in Regulatory Guide 1.147, the licensee may continue to apply the Code Case to the end of the current 120-month interval.

(6) *Conditions on Operation and Maintenance of Nuclear Power Plants Code Cases.* Licensees may apply the ASME Operation and Maintenance Code Cases listed in Regulatory Guide 1.192, Revision 1, without prior NRC approval, subject to the following:

(i) *OM Code Case condition: Applying Code Cases.* When a licensee initially applies a listed Code Case, the licensee must apply the most recent version of that Code Case incorporated by reference in paragraph (a) of this section.

(ii) *OM Code Case condition: Applying different revisions of Code Cases.* If a licensee has previously applied a Code Case and a later version of the Code Case is incorporated by reference in paragraph (a) of this section, the licensee may continue to apply, to the end of the current 120-month interval, the previous version of the Code Case, as authorized, or may apply the later version of the Code Case, including any NRC-specified conditions placed on its use. Licensees who choose to continue use of the Code Case during subsequent 120-month ISI program intervals will be required to implement the latest version incorporated by reference into 10 CFR 50.55a as listed in Tables 1 and 2 of Regulatory Guide 1.192, Revision 1.

(iii) *OM Code Case condition: Applying annulled Code Cases.* Application of an annulled Code Case is prohibited unless a licensee previously applied the listed Code Case prior to it being listed as annulled in Regulatory Guide 1.192. If a licensee has applied a listed Code Case that is later listed as annulled in Regulatory Guide 1.192, the licensee may continue to apply the Code Case to the end of the current 120-month interval.

(c) *Reactor coolant pressure boundary.* Systems and components of boiling and pressurized water-cooled nuclear power reactors must meet the requirements of the ASME BPV Code as specified in this paragraph. Each manufacturing license, standard design approval, and design certification application under part 52 of this chapter and each combined license for a utilization facility is subject to the following conditions:

(1) *Standards requirement for reactor coolant pressure boundary components.* Components that are part of the reactor coolant pressure boundary must meet the requirements for Class 1 components in Section III [1],[4] of the ASME BPV Code, except as provided in paragraphs (c)(2) through (4) of this section.

(2) *Exceptions to reactor coolant pressure boundary standards requirement.* Components that are connected to the reactor coolant system and are part of the reactor coolant pressure boundary as defined in § 50.2 need not meet the requirements of paragraph (c)(1) of this section, provided that:

(i) *Exceptions: Shutdown and cooling capability.* In the event of postulated failure of the component during normal reactor operation, the reactor can be shut down and cooled down in an orderly manner, assuming makeup is provided by the reactor coolant makeup system; or

(ii) *Exceptions: Isolation capability.* The component is or can be isolated from the reactor coolant system by two valves in series (both closed, both open, or one closed and the other open). Each open valve must be capable of automatic actuation and, assuming the other valve is open, its closure time must be such that, in the event of postulated failure of the component during normal reactor operation, each valve remains operable and the reactor can be shut down and cooled down in an orderly manner, assuming makeup is provided by the reactor coolant makeup system only.

(3) *Applicable Code and Code Cases and conditions on their use.* The Code edition, addenda, and optional ASME Code Cases to be applied to components of the reactor coolant pressure boundary must be determined by the provisions of paragraph NCA-1140, Subsection NCA of Section III of the ASME BPV Code, subject to the following conditions:

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(i) *Reactor coolant pressure boundary condition: Code edition and addenda*. The edition and addenda applied to a component must be those that are incorporated by reference in paragraph (a)(1)(i) of this section;

(ii) *Reactor coolant pressure boundary condition: Earliest edition and addenda for pressure vessel*. The ASME Code provisions applied to the pressure vessel may be dated no earlier than the summer 1972 Addenda of the 1971 Edition;

(iii) *Reactor coolant pressure boundary condition: Earliest edition and addenda for piping, pumps, and valves*. The ASME Code provisions applied to piping, pumps, and valves may be dated no earlier than the Winter 1972 Addenda of the 1971 Edition; and

(iv) *Reactor coolant pressure boundary condition: Use of Code Cases*. The optional Code Cases applied to a component must be those listed in NRC Regulatory Guide 1.84 that is incorporated by reference in paragraph (a)(3)(i) of this section.

(4) *Standards requirement for components in older plants*. For a nuclear power plant whose construction permit was issued prior to May 14, 1984, the applicable Code edition and addenda for a component of the reactor coolant pressure boundary continue to be that Code edition and addenda that were required by Commission regulations for such a component at the time of issuance of the construction permit.

(d) *Quality Group B components*. Systems and components of boiling and pressurized water-cooled nuclear power reactors must meet the requirements of the ASME BPV Code as specified in this paragraph. Each manufacturing license, standard design approval, and design certification application under part 52 of this chapter, and each combined license for a utilization facility is subject to the following conditions:

(1) *Standards requirement for Quality Group B components*. For a nuclear power plant whose application for a construction permit under this part, or a combined license or manufacturing license under part 52 of this chapter, docketed after May 14, 1984, or for an application for a standard design approval or a standard design certification docketed after May 14, 1984, components classified Quality Group B [7] must meet the requirements for Class 2 Components in Section III of the ASME BPV Code.

(2) *Quality Group B: Applicable Code and Code Cases and conditions on their use*. The Code edition, addenda, and optional ASME Code Cases to be applied to the systems and components identified in paragraph (d)(1) of this section must be determined by the rules of paragraph NCA-1140, Subsection NCA of Section III of the ASME BPV Code, subject to the following conditions:

(i) *Quality Group B condition: Code edition and addenda*. The edition and addenda must be those that are incorporated by reference in paragraph (a)(1)(i) of this section;

(ii) *Quality Group B condition: Earliest edition and addenda for components*. The ASME Code provisions applied to the systems and components may be dated no earlier than the 1980 Edition; and

(iii) *Quality Group B condition: Use of Code Cases*. The optional Code Cases must be those listed in NRC Regulatory Guide 1.84 that is incorporated by reference in paragraph (a)(3)(i) of this section.

(e) *Quality Group C components*. Systems and components of boiling and pressurized water-cooled nuclear power reactors must meet the requirements of the ASME BPV Code as specified in this paragraph. Each manufacturing license, standard design approval, and design certification application under part 52 of this chapter and each combined license for a utilization facility is subject to the following conditions.

(1) *Standards requirement for Quality Group C components*. For a nuclear power plant whose application for a construction permit under this part, or a combined license or manufacturing license under part 52 of this chapter, docketed after May 14, 1984, or for an application for a standard design approval or a standard design certification docketed after May 14, 1984, components classified Quality Group C [7] must meet the requirements for Class 3 components in Section III of the ASME BPV Code.

(2) *Quality Group C applicable Code and Code Cases and conditions on their use*. The Code edition, addenda, and optional ASME Code Cases to be applied to the systems and components identified in paragraph (e)(1) of this section must be determined by the rules of paragraph NCA-1140, subsection NCA of Section III of the ASME BPV Code, subject to the following conditions:

(i) *Quality Group C condition: Code edition and addenda*. The edition and addenda must be those incorporated by reference in paragraph (a)(1)(i) of this section;

(ii) *Quality Group C condition: Earliest edition and addenda for components*. The ASME Code provisions applied to the systems and components may be dated no earlier than the 1980 Edition; and

(iii) *Quality Group C condition: Use of Code Cases*. The optional Code Cases must be those listed in NRC Regulatory Guide 1.84 that is incorporated by reference in paragraph (a)(3)(i) of this section.

(f) *Inservice testing requirements*. Systems and components of boiling and pressurized water-cooled nuclear power reactors must meet the requirements of the ASME BPV Code and ASME Code for Operation and Maintenance of Nuclear Power Plants as specified in this paragraph. Each operating license for a boiling or pressurized water-cooled nuclear facility is

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subject to the following conditions. Each combined license for a boiling or pressurized water-cooled nuclear facility is subject to the following conditions, but the conditions in paragraphs (f)(4) through (6) of this section must be met only after the Commission makes the finding under § 52.103(g) of this chapter. Requirements for inservice inspection of Class 1, Class 2, Class 3, Class MC, and Class CC components (including their supports) are located in § 50.55a(g).

(1) *Inservice testing requirements for older plants (pre-1971 CPs).* For a boiling or pressurized water-cooled nuclear power facility whose construction permit was issued prior to January 1, 1971, pumps and valves must meet the test requirements of paragraphs (f)(4) and (5) of this section to the extent practical. Pumps and valves that are part of the reactor coolant pressure boundary must meet the requirements applicable to components that are classified as ASME Code Class 1. Other pumps and valves that perform a function to shut down the reactor or maintain the reactor in a safe shutdown condition, mitigate the consequences of an accident, or provide overpressure protection for safety-related systems (in meeting the requirements of the 1986 Edition, or later, of the BPV or OM Code) must meet the test requirements applicable to components that are classified as ASME Code Class 2 or Class 3.

(2) *Design and accessibility requirements for performing inservice testing in plants with CPs issued between 1971 and 1974.* For a boiling or pressurized water-cooled nuclear power facility whose construction permit was issued on or after January 1, 1971, but before July 1, 1974, pumps and valves that are classified as ASME Code Class 1 and Class 2 must be designed and provided with access to enable the performance of inservice tests for operational readiness set forth in editions and addenda of Section XI of the ASME BPV incorporated by reference in paragraph (a)(1)(ii) of this section (or the optional ASME Code Cases listed in NRC Regulatory Guide 1.147, Revision 17, or Regulatory Guide 1.192, Revision 1, that are incorporated by reference in paragraphs (a)(3)(ii) and (iii) of this section, respectively) in effect 6 months before the date of issuance of the construction permit. The pumps and valves may meet the inservice test requirements set forth in subsequent editions of this Code and addenda that are incorporated by reference in paragraph (a)(1)(ii) of this section (or the optional ASME Code Cases listed in NRC Regulatory Guide 1.147, Revision 17; or Regulatory Guide 1.192, Revision 1, that are incorporated by reference in paragraphs (a)(3)(ii) and (iii) of this section, respectively), subject to the applicable conditions listed therein.

(3) *Design and accessibility requirements for performing inservice testing in plants with CPs issued after 1974.* For a boiling or pressurized water-cooled nuclear power facility whose construction permit under this part or design approval, design certification, combined license, or manufacturing license under part 52 of this chapter was issued on or after July 1, 1974:

(i)-(ii) [Reserved]

(iii) (A) (B) ...

(iv) (A) (B) ...

(v) ...

(4) (i) (ii) ....

(iii) [Reserved]

(iv) ....

(5) (i) (ii) (iii) (iv) ...

(6) (i) (ii) ...

(g) *Inservice inspection requirements.* Systems and components of boiling and pressurized water-cooled nuclear power reactors must meet the requirements of the ASME BPV Code as specified in this paragraph. Each operating license for a boiling or pressurized water-cooled nuclear facility is subject to the following conditions. Each combined license for a boiling or pressurized water-cooled nuclear facility is subject to the following conditions, but the conditions in paragraphs (g)(4) through (6) of this section must be met only after the Commission makes the finding under § 52.103(g) of this chapter. Requirements for inservice testing of Class 1, Class 2, and Class 3 pumps and valves are located in § 50.55a(f).

(1) *Inservice inspection requirements for older plants (pre-1971 CPs).* For a boiling or pressurized water-cooled nuclear power facility whose construction permit was issued before January 1, 1971, components (including supports) must meet the requirements of paragraphs (g)(4) and (g)(5) of this section to the extent practical. Components that are part of the reactor coolant pressure boundary and their supports must meet the requirements applicable to components that are classified as ASME Code Class 1. Other safety-related pressure vessels, piping, pumps and valves, and their supports must meet the requirements applicable to components that are classified as ASME Code Class 2 or Class 3.

(2) *Design and accessibility requirements for performing inservice inspection in plants with CPs issued between 1971 and 1974.* For a boiling or pressurized water-cooled nuclear power facility whose construction permit was issued on or after January 1, 1971, but before July 1, 1974, components (including supports) that are classified as ASME Code Class 1 and Class 2 must be designed and be provided with access to enable the performance of inservice examination of such components (including supports) and must meet the preservice examination requirements set forth in editions and addenda of Section III or Section XI of the ASME BPV Code incorporated by reference in paragraph (a)(1) of this section (or the

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optional ASME Code Cases listed in NRC Regulatory Guide 1.147, Revision 17, that are incorporated by reference in paragraph (a)(3)(ii) of this section) in effect 6 months before the date of issuance of the construction permit. The components (including supports) may meet the requirements set forth in subsequent editions and addenda of this Code that are incorporated by reference in paragraph (a) of this section (or the optional ASME Code Cases listed in NRC Regulatory Guide 1.147, Revision 17, that are incorporated by reference in paragraph (a)(3)(ii) of this section), subject to the applicable limitations and modifications.

(3) *Design and accessibility requirements for performing inservice inspection in plants with CPs issued after 1974.* For a boiling or pressurized water-cooled nuclear power facility, whose construction permit under this part, or design certification, design approval, combined license, or manufacturing license under part 52 of this chapter, was issued on or after July 1, 1974, the following are required:

(i) *ISI design and accessibility requirements: Class 1 components and supports.* Components (including supports) that are classified as ASME Code Class 1 must be designed and be provided with access to enable the performance of inservice examination of these components and must meet the preservice examination requirements set forth in the editions and addenda of Section III or Section XI of the ASME BPV Code incorporated by reference in paragraph (a)(1) of this section (or the optional ASME Code Cases listed in NRC Regulatory Guide 1.147, Revision 17, that are incorporated by reference in paragraph (a)(3)(ii) of this section) applied to the construction of the particular component.

(ii) *ISI design and accessibility requirements: Class 2 and 3 components and supports.* Components that are classified as ASME Code Class 2 and Class 3 and supports for components that are classified as ASME Code Class 1, Class 2, and Class 3 must be designed and provided with access to enable the performance of inservice examination of these components and must meet the preservice examination requirements set forth in the editions and addenda of Section XI of the ASME BPV Code incorporated by reference in paragraph (a)(1)(ii) of this section (or the optional ASME Code Cases listed in NRC Regulatory Guide 1.147, Revision 17, that are incorporated by reference in paragraph (a)(3)(ii) of this section) applied to the construction of the particular component.

(iii)-(iv) [Reserved]

(v) *ISI design and accessibility requirements: Meeting later ISI requirements.* All components (including supports) may meet the requirements set forth in subsequent editions of codes and addenda or portions thereof that are incorporated by reference in paragraph (a) of this section, subject to the conditions listed therein.

(4) *Inservice inspection standards requirement for operating plants.* Throughout the service life of a boiling or pressurized water-cooled nuclear power facility, components (including supports) that are classified as ASME Code Class 1, Class 2, and Class 3 must meet the requirements, except design and access provisions and preservice examination requirements, set forth in Section XI of editions and addenda of the ASME BPV Code (or ASME OM Code for snubber examination and testing) that become effective subsequent to editions specified in paragraphs (g)(2) and (3) of this section and that are incorporated by reference in paragraph (a)(1)(ii) or (iv) for snubber examination and testing of this section, to the extent practical within the limitations of design, geometry, and materials of construction of the components. Components that are classified as Class MC pressure retaining components and their integral attachments, and components that are classified as Class CC pressure retaining components and their integral attachments, must meet the requirements, except design and access provisions and preservice examination requirements, set forth in Section XI of the ASME BPV Code and addenda that are incorporated by reference in paragraph (a)(1)(ii) of this section, subject to the condition listed in paragraph (b)(2)(vi) of this section and the conditions listed in paragraphs (b)(2)(viii) and (ix) of this section, to the extent practical within the limitation of design, geometry, and materials of construction of the components.

(i) *Applicable ISI Code: Initial 120-month interval.* Inservice examination of components and system pressure tests conducted during the initial 120-month inspection interval must comply with the requirements in the latest edition and addenda of the Code incorporated by reference in paragraph (a) of this section on the date 12 months before the date of issuance of the operating license under this part, or 12 months before the date scheduled for initial loading of fuel under a combined license under part 52 of this chapter (or the optional ASME Code Cases listed in NRC Regulatory Guide 1.147, Revision 17, when using Section XI, or Regulatory Guide 1.192, Revision 1, when using the OM Code, that are incorporated by reference in paragraphs (a)(3)(ii) and (iii) of this section, respectively), subject to the conditions listed in paragraph (b) of this section.

(ii) *Applicable ISI Code: Successive 120-month intervals.* Inservice examination of components and system pressure tests conducted during successive 120-month inspection intervals must comply with the requirements of the latest edition and addenda of the Code incorporated by reference in paragraph (a) of this section 12 months before the start of the 120-month inspection interval (or the optional ASME Code Cases listed in NRC Regulatory Guide 1.147, Revision 17, when using Section XI, or Regulatory Guide 1.192, Revision 1, when using the OM Code, that are incorporated by reference in paragraphs (a)(3)(ii) and (iii) of this section), subject to the conditions listed in paragraph (b) of this section. However, a licensee whose inservice inspection interval commences during the 12 through 18-month period after July 21, 2011, may delay the update of their Appendix VIII program by up to 18 months after July 21, 2011.

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(iii) *Applicable ISI Code: Optional surface examination requirement.* When applying editions and addenda prior to the 2003 Addenda of Section XI of the ASME BPV Code, licensees may, but are not required to, perform the surface examinations of high-pressure safety injection systems specified in Table IWB-2500-1, Examination Category B-J, Item Numbers B9.20, B9.21, and B9.22.

(iv) *Applicable ISI Code: Use of subsequent Code editions and addenda.* Inservice examination of components and system pressure tests may meet the requirements set forth in subsequent editions and addenda that are incorporated by reference in paragraph (a) of this section, subject to the conditions listed in paragraph (b) of this section, and subject to Commission approval. Portions of editions or addenda may be used, provided that all related requirements of the respective editions or addenda are met.

(v) *Applicable ISI Code: Metal and concrete containments.* For a boiling or pressurized water-cooled nuclear power facility whose construction permit under this part or combined license under part 52 of this chapter was issued after January 1, 1956, the following are required:

(A) *Metal and concrete containments: First provision.* Metal containment pressure retaining components and their integral attachments must meet the inservice inspection, repair, and replacement requirements applicable to components that are classified as ASME Code Class MC;

(B) *Metal and concrete containments: Second provision.* Metallic shell and penetration liners that are pressure retaining components and their integral attachments in concrete containments must meet the inservice inspection, repair, and replacement requirements applicable to components that are classified as ASME Code Class MC; and

(C) *Metal and concrete containments: Third provision.* Concrete containment pressure retaining components and their integral attachments, and the post-tensioning systems of concrete containments, must meet the inservice inspections, repair, and replacement requirements applicable to components that are classified as ASME Code Class CC.

(5) *Requirements for updating ISI programs*—(i) *ISI program update: Applicable ISI Code editions and addenda.* The inservice inspection program for a boiling or pressurized water-cooled nuclear power facility must be revised by the licensee, as necessary, to meet the requirements of paragraph (g)(4) of this section.

(ii) *ISI program update: Conflicting ISI Code requirements with technical specifications.* If a revised inservice inspection program for a facility conflicts with the technical specifications for the facility, the licensee must apply to the Commission for amendment of the technical specifications to conform the technical specifications to the revised program. The licensee must submit this application, as specified in § 50.4, at least six months before the start of the period during which the provisions become applicable, as determined by paragraph (g)(4) of this section.

(iii) *ISI program update: Notification of impractical ISI Code requirements.* If the licensee has determined that conformance with a Code requirement is impractical for its facility the licensee must notify the NRC and submit, as specified in § 50.4, information to support the determinations. Determinations of impracticality in accordance with this section must be based on the demonstrated limitations experienced when attempting to comply with the Code requirements during the inservice inspection interval for which the request is being submitted. Requests for relief made in accordance with this section must be submitted to the NRC no later than 12 months after the expiration of the initial or subsequent 120-month inspection interval for which relief is sought.

(iv) *ISI program update: Schedule for completing impracticality determinations.* Where the licensee determines that an examination required by Code edition or addenda is impractical, the basis for this determination must be submitted for NRC review and approval not later than 12 months after the expiration of the initial or subsequent 120-month inspection interval for which relief is sought.

(6) *Actions by the Commission for evaluating impractical and augmented ISI Code requirements*—(i) *Impractical ISI requirements: Granting of relief.* The Commission will evaluate determinations under paragraph (g)(5) of this section that code requirements are impractical. The Commission may grant such relief and may impose such alternative requirements as it determines are authorized by law, will not endanger life or property or the common defense and security, and are otherwise in the public interest giving due consideration to the burden upon the licensee that could result if the requirements were imposed on the facility.

(ii) *Augmented ISI program.* The Commission may require the licensee to follow an augmented inservice inspection program for systems and components for which the Commission deems that added assurance of structural reliability is necessary.

(A) [Reserved]

(B) *Augmented ISI requirements: Submitting containment ISI programs.* Licensees do not have to submit to the NRC for approval of their containment inservice inspection programs that were developed to satisfy the requirements of Subsection IWE and Subsection IWL with specified conditions. The program elements and the required documentation must be maintained on site for audit.

(C) *Augmented ISI requirements: Implementation of Appendix VIII to Section XI.* (*1*) Appendix VIII and the supplements to

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Appendix VIII to Section XI, Division 1, 1995 Edition with the 1996 Addenda of the ASME BPV Code must be implemented in accordance with the following schedule: Appendix VIII and Supplements 1, 2, 3, and 8—May 22, 2000; Supplements 4 and 6—November 22, 2000; Supplement 11—November 22, 2001; and Supplements 5, 7, and 10—November 22, 2002.

(2) Licensees implementing the 1989 Edition and earlier editions and addenda of IWA-2232 of Section XI, Division 1, of the ASME BPV Code must implement the 1995 Edition with the 1996 Addenda of Appendix VIII and the supplements to Appendix VIII of Section XI, Division 1, of the ASME BPV Code.

(D) *Augmented ISI requirements: Reactor vessel head inspections—(1)* All licensees of pressurized water reactors must augment their inservice inspection program with ASME Code Case N-729-1, subject to the conditions specified in paragraphs (g)(6)(ii)(D)(2) through (6) of this section. Licensees of existing operating reactors as of September 10, 2008, must implement their augmented inservice inspection program by December 31, 2008. Once a licensee implements this requirement, the First Revised NRC Order EA-03-009 no longer applies to that licensee and shall be deemed to be withdrawn.

(2) Note 9 of ASME Code Case N-729-1 must not be implemented.

(3) Instead of the specified "examination method" requirements for volumetric and surface examinations in Note 6 of Table 1 of Code Case N-729-1, the licensee must perform volumetric and/or surface examination of essentially 100 percent of the required volume or equivalent surfaces of the nozzle tube, as identified by Figure 2 of ASME Code Case N-729-1. A demonstrated volumetric or surface leak path assessment through all J-groove welds must be performed. If a surface examination is being substituted for a volumetric examination on a portion of a penetration nozzle that is below the toe of the J-groove weld [Point E on Figure 2 of ASME Code Case N-729-1], the surface examination must be of the inside and outside wetted surface of the penetration nozzle not examined volumetrically.

(4) By September 1, 2009, ultrasonic examinations must be performed using personnel, procedures, and equipment that have been qualified by blind demonstration on representative mockups using a methodology that meets the conditions specified in paragraphs (g)(6)(ii)(D)(4)(*i*) through (*iv*), instead of the qualification requirements of Paragraph -2500 of ASME Code Case N-729-1. References herein to Section XI, Appendix VIII, must be to the 2004 Edition with no addenda of the ASME BPV Code.

(*i*) The specimen set must have an applicable thickness qualification range of +25 percent to -40 percent for nominal depth through-wall thickness. The specimen set must include geometric and material conditions that normally require discrimination from primary water stress corrosion cracking (PWSCC) flaws.

(*ii*) The specimen set must have a minimum of ten (10) flaws that provide an acoustic response similar to PWSCC indications. All flaws must be greater than 10 percent of the nominal pipe wall thickness. A minimum of 20 percent of the total flaws must initiate from the inside surface and 20 percent from the outside surface. At least 20 percent of the flaws must be in the depth ranges of 10-30 percent through-wall thickness and at least 20 percent within a depth range of 31-50 percent through-wall thickness. At least 20 percent and no more than 60 percent of the flaws must be oriented axially.

(*iii*) Procedures must identify the equipment and essential variables and settings used for the qualification, in accordance with Subarticle VIII-2100 of Section XI, Appendix VIII. The procedure must be requalified when an essential variable is changed outside the demonstration range as defined by Subarticle VIII-3130 of Section XI, Appendix VIII, and as allowed by Articles VIII-4100, VIII-4200, and VIII-4300 of Section XI, Appendix VIII. Procedure qualification must include the equivalent of at least three personnel performance demonstration test sets. Procedure qualification requires at least one successful personnel performance demonstration.

(*iv*) Personnel performance demonstration test acceptance criteria must meet the personnel performance demonstration detection test acceptance criteria of Table VIII—S10-1 of Section XI, Appendix VIII, Supplement 10. Examination procedures, equipment, and personnel are qualified for depth sizing and length sizing when the RMS error, as defined by Subarticle VIII-3120 of Section XI, Appendix VIII, of the flaw depth measurements, as compared to the true flaw depths, do not exceed 1/8 inch (3 mm) and the root mean square (RMS) error of the flaw length measurements, as compared to the true flaw lengths, do not exceed 3/8 inch (10 mm), respectively.

(5) If flaws attributed to PWSCC have been identified, whether acceptable or not for continued service under Paragraphs -3130 or -3140 of ASME Code Case N-729-1, the re-inspection interval must be each refueling outage instead of the re-inspection intervals required by Table 1, Note (8), of ASME Code Case N-729-1.

(6) Appendix I of ASME Code Case N-729-1 must not be implemented without prior NRC approval.

(E) *Augmented ISI requirements: Reactor coolant pressure boundary visual inspections* [10]*—(1)* All licensees of pressurized water reactors must augment their inservice inspection program by implementing ASME Code Case N-722-1, subject to the conditions specified in paragraphs (g)(6)(ii)(E)(2) through (4) of this section. The inspection requirements of ASME Code Case N-722-1 do not apply to components with pressure retaining welds fabricated with Alloy 600/82/182 materials that have been mitigated by weld overlay or stress improvement.

(2) If a visual examination determines that leakage is occurring from a specific item listed in Table 1 of ASME Code Case N-

TABLE 1.10-1
CODE OF FEDERAL REGULATIONS 10 CFR 50.55a REQUIREMENTS
LIMITATIONS, MODIFICATIONS, AND CLARIFICATIONS

722-1 that is not exempted by the ASME Code, Section XI, IWB-1220(b)(1), additional actions must be performed to characterize the location, orientation, and length of a crack or cracks in Alloy 600 nozzle wrought material and location, orientation, and length of a crack or cracks in Alloy 82/182 butt welds. Alternatively, licensees may replace the Alloy 600/82/182 materials in all the components under the item number of the leaking component.

(*3*) If the actions in paragraph (g)(6)(ii)(E)(*2*) of this section determine that a flaw is circumferentially oriented and potentially a result of primary water stress corrosion cracking, licensees must perform non-visual NDE inspections of components that fall under that ASME Code Case N-722-1 item number. The number of components inspected must equal or exceed the number of components found to be leaking under that item number. If circumferential cracking is identified in the sample, non-visual NDE must be performed in the remaining components under that item number.

(*4*) If ultrasonic examinations of butt welds are used to meet the NDE requirements in paragraphs (g)(6)(ii)(E)(*2*) or (*3*) of this section, they must be performed using the appropriate supplement of Section XI, Appendix VIII, of the ASME BPV Code.

(F) *Augmented ISI requirements: Examination requirements for Class 1 piping and nozzle dissimilar-metal butt welds—(1)* Licensees of existing, operating pressurized-water reactors as of July 21, 2011, must implement the requirements of ASME Code Case N-770-1, subject to the conditions specified in paragraphs (g)(6)(ii)(F)(*2*) through (*10*) of this section, by the first refueling outage after August 22, 2011.

(*2*) Full structural weld overlays authorized by the NRC staff may be categorized as Inspection Items C or F, as appropriate. Welds that have been mitigated by the Mechanical Stress Improvement Process (MSIP™) may be categorized as Inspection Items D or E, as appropriate, provided the criteria in Appendix I of the Code Case have been met. For ISI frequencies, all other butt welds that rely on Alloy 82/182 for structural integrity must be categorized as Inspection Items A-1, A-2 or B until the NRC staff has reviewed the mitigation and authorized an alternative Code Case Inspection Item for the mitigated weld, or until an alternative Code Case Inspection Item is used based on conformance with an ASME mitigation Code Case endorsed in Regulatory Guide 1.147 with conditions, if applicable, and incorporated by reference in this section.

(*3*) Baseline examinations for welds in Table 1, Inspection Items A-1, A-2, and B, must be completed by the end of the next refueling outage after January 20, 2012. Previous examinations of these welds can be credited for baseline examinations if they were performed within the re-inspection period for the weld item in Table 1 using Section XI, Appendix VIII, requirements and met the Code required examination volume of essentially 100 percent. Other previous examinations that do not meet these requirements can be used to meet the baseline examination requirement, provided NRC approval of alternative inspection requirements in accordance with paragraphs (z)(1) or (2) of this section is granted prior to the end of the next refueling outage after January 20, 2012.

(*4*) The axial examination coverage requirements of Paragraph—2500(c) may not be considered to be satisfied unless essentially 100 percent coverage is achieved.

(*5*) All hot-leg operating temperature welds in Inspection Items G, H, J, and K must be inspected each inspection interval. A 25 percent sample of Inspection Items G, H, J, and K cold-leg operating temperature welds must be inspected whenever the core barrel is removed (unless it has already been inspected within the past 10 years) or 20 years, whichever is less.

(*6*) For any mitigated weld whose volumetric examination detects growth of existing flaws in the required examination volume that exceed the previous IWB-3600 flaw evaluations or new flaws, a report summarizing the evaluation, along with inputs, methodologies, assumptions, and causes of the new flaw or flaw growth is to be provided to the NRC prior to the weld being placed in service other than modes 5 or 6.

(7) For Inspection Items G, H, J, and K, when applying the acceptance standards of ASME BPV Code, Section XI, IWB-3514, for planar flaws contained within the inlay or onlay, the thickness "t" in IWB-3514 is the thickness of the inlay or onlay. For planar flaws in the balance of the dissimilar metal weld examination volume, the thickness "t" in IWB-3514 is the combined thickness of the inlay or onlay and the dissimilar metal weld.

(*8*) Welds mitigated by optimized weld overlays in Inspection Items D and E are not permitted to be placed into a population to be examined on a sample basis and must be examined once each inspection interval.

(*9*) Replace the first two sentences of Extent and Frequency of Examination for Inspection Item D in Table 1 of Code Case N-770-1 with, "Examine all welds no sooner than the third refueling outage and no later than 10 years following stress improvement application." Replace the first two sentences of Note (11)(b)(2) in Code Case N-770-1 with, "The first examination following weld inlay, onlay, weld overlay, or stress improvement for Inspection Items D through K must be performed as specified."

(*10*) General Note (b) to Figure 5(a) of Code Case N-770-1 pertaining to alternative examination volume for optimized weld overlays may not be applied unless NRC approval is authorized under paragraphs (z)(1) or (2) of this section.

(h) *Protection and safety systems*. Protection systems of nuclear power reactors of all types must meet the requirements specified in this paragraph. Each combined license for a utilization facility is subject to the following conditions.

(1) [Reserved]

TABLE 1.10-1 CODE OF FEDERAL REGULATIONS 10 CFR 50.55a REQUIREMENTS
LIMITATIONS, MODIFICATIONS, AND CLARIFICATIONS
(2) ... (3) ... (i)-(y) [Reserved] (z) *Alternatives to codes and standards requirements*. Alternatives to the requirements of paragraphs (b) through (h) of this section or portions thereof may be used when authorized by the Director, Office of Nuclear Reactor Regulation, or Director, Office of New Reactors, as appropriate. A proposed alternative must be submitted and authorized prior to implementation. The applicant or licensee must demonstrate that: (1) *Acceptable level of quality and safety*. The proposed alternative would provide an acceptable level of quality and safety; or (2) *Hardship without a compensating increase in quality and safety*. Compliance with the specified requirements of this section would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety. Footnotes to § 50.55a: [1] USAS and ASME Code addenda issued prior to the winter 1977 Addenda are considered to be "in effect" or "effective" 6 months after their date of issuance and after they are incorporated by reference in paragraph (a) of this section. Addenda to the ASME Code issued after the summer 1977 Addenda are considered to be "in effect" or "effective" after the date of publication of the addenda and after they are incorporated by reference in paragraph (a) of this section. [2-3] [Reserved]. [4] For ASME Code editions and addenda issued prior to the winter 1977 Addenda, the Code edition and addenda applicable to the component is governed by the order or contract date for the component, not the contract date for the nuclear energy system. For the winter 1977 Addenda and subsequent editions and addenda the method for determining the applicable Code editions and addenda is contained in Paragraph NCA 1140 of Section III of the ASME Code. [5-6] [Reserved]. [7] Guidance for quality group classifications of components that are to be included in the safety analysis reports pursuant to § 50.34(a) and § 50.34(b) may be found in Regulatory Guide 1.26, "Quality Group Classifications and Standards for Water-, Steam-, and Radiological-Waste-Containing Components of Nuclear Power Plants," and in Section 3.2.2 of NUREG-0800, "Standard Review Plan for Review of Safety Analysis Reports for Nuclear Power Plants." [8-9] [Reserved]. [10] For inspections to be conducted once per interval, the inspections must be performed in accordance with the schedule in Section XI, paragraph IWB-2400, except for plants with inservice inspection programs based on a Section XI edition or addenda prior to the 1994 Addenda. For plants with inservice inspection programs based on a Section XI edition or addenda prior to the 1994 Addenda, the inspection must be performed in accordance with the schedule in Section XI, paragraph IWB-2400, of the 1994 Addenda. [80 FR 45843, Aug. 3, 2015] Page Last Reviewed/Updated Wednesday, December 02, 2015

1.11 CODE CASES

Per 10 CFR 50.55a(b)(5), ASME Code Cases that have been determined to be suitable for use in ISI Program Plans by the NRC are listed in Regulatory Guide 1.147, "Inservice Inspection Code Case Acceptability-ASME Section XI, Division 1." The approved Code Cases in Regulatory Guide 1.147 being utilized by Byron Station, are included in Section 2.1.2 of this document. The most recent version of a given Code Case incorporated in the revision of Regulatory Guide 1.147 referenced in 10 CFR 50.55a(b)(5)(i) at the time it is applied within the ISI Program shall be used. As this guide is revised, newly approved Code Cases may be assessed for plan implementation at Byron Station per Paragraph IWA-2441(e) and proposed for use in revisions to the ISI Program Plan.

Per the latest revision of Regulatory Guide 1.147, if a Code Case is implemented by a licensee and a later version of the Code Case is incorporated by reference into 10 CFR 50.55a and listed in Tables 1 and 2 during the licensee's present 120-month ISI program interval, that licensee may use either the later version or the previous version. An exception to this provision would be the inclusion of a limitation or condition on the use of the Code Case that is necessary, for example, to enhance safety.

The use of Code Cases (other than those listed in Regulatory Guide 1.147) may be authorized by the Director of the Office of Nuclear Reactor Regulation upon request pursuant to 10 CFR 50.55a(z). Code Cases not approved for use in Regulatory Guide 1.147, which are being utilized by Byron Station through associated Relief Requests, are included in Section 8.0.

1.12 RELIEF REQUESTS

In accordance with 10 CFR 50.55a, when a licensee either proposes alternatives to ASME Section XI requirements, which provide an acceptable level of quality and safety, determines compliance with ASME Section XI requirements would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety, or determines that specific ASME Section XI requirements for inservice inspection are impractical, the licensee shall notify the NRC and submit information to support the determination.

The submittal of this information will be referred to in this document as a "Relief Request". Relief Requests for the Fourth ISI Interval and the Second CISI Interval are included in Section 8.0 of this document. The text of the Relief Requests contained in Section 8.0 will demonstrate one of the following: the proposed alternatives provide an acceptable level of quality and safety per 10 CFR 50.55a(z)(1); or compliance with the specified requirements would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety per 10 CFR 50.55a(z)(2), or the Code requirements are considered impractical per 10 CFR 50.55a(g)(5)(iii).

Per 10 CFR 50.55a Paragraphs (z) and (g)(6)(i), the NRC will evaluate relief requests and "may grant such relief and may impose such alternative requirements as it determines is authorized by law and will not endanger life or property or the common defense and security and is otherwise in the public interest giving due consideration to the burden upon the licensee that could result if the requirements were imposed on the facility."

2.0 BASIS FOR INSERVICE INSPECTION PROGRAM

2.1 ASME SECTION XI EXAMINATION REQUIREMENTS

2.1.1 Welds and Components, Supports, and Pressure Tests

As required by 10 CFR 50.55a, this program was developed in accordance with the requirements detailed in the 2007 Edition with the 2008 Addenda, of the ASME Boiler and Pressure Vessel Code, Section XI, Division 1, Subsections IWA, IWB, IWC, IWD, IWE, IWF, IWL, Mandatory Appendices, Inspection Program of Paragraph IWA-2431, approved ASME Code Cases, and approved alternatives through Relief Requests and Safety Evaluations (SE's).

The Performance Demonstration Initiative (PDI) is an organization comprised of all United States (US) nuclear utilities that was formed to provide an efficient implementation of Appendix VIII performance demonstration requirements. The Electric Power Research Institute (EPRI) NDE Center was selected as the administrator of this program. The PDI program is administered according to the "PDI Program Description." The ISI Program implements Appendix VIII "Performance Demonstration for Ultrasonic Examination Systems," ASME Section XI 2007 Edition with the 2008 Addenda with modifications as identified in 10 CFR 50.55a(b)(2)(xiv). Appendix VIII requires qualification of the procedures, personnel, and equipment used to detect and size flaws in piping, bolting, and the reactor pressure vessel (RPV). Each organization (e.g., owner or vendor) is required to have a written program to ensure compliance with the requirements. Byron Station maintains the responsibility to ensure that Appendix VIII requirements are properly implemented. In accordance with ASME Section XI, ultrasonic examinations performed during the Fourth ISI Interval, as required by Paragraph IWA-2232, shall use the requirements identified in Mandatory Appendix I, Ultrasonic Examinations. Per I-2600, Appendix VIII of ASME Section XI may be applied to components for which it is not applicable, provided such components, materials, sizes, and shapes are within the scope of the qualified examination procedure.

For the Fourth ISI Interval, Byron Station's inspection program for ASME Section XI Examination Categories B-F, B-J, C-F-1, and C-F-2 will be governed by risk-informed regulations. The RI-ISI Program methodology is described in the EPRI Topical Report TR-112657, Rev. B-A. To supplement the EPRI Topical Report, N-578-1 (as applicable per Relief Request I4R-01) is also being used for the classification of piping structural elements under the RI-ISI Program. The RI-ISI Program scope has been implemented as an alternative to the 2007 Edition with the 2008 Addenda ASME Section XI examination program for ISI Class 1 B-F and B-J welds and ISI Class 2 C-F-1 and C-F-2 welds in accordance with 10 CFR 50.55a(z)(1). The basis for the resulting Risk Categorizations of the nonexempt ISI Class 1 and 2 piping systems at Byron Station is defined and maintained in the Final Report "Risk Informed Inservice Inspection Evaluation" as referenced in Section 9.0 of this document. References to ASME Section XI Examination Categories B-F, B-J, C-F-1, and C-F-2 have been replaced with Examination Category R-A to identify them as part of the RI-ISI program.

For the Fourth Inspection Interval, the RI-ISI Program scope continues to include welds in the BER piping, also referred to as the HELB region, which includes several Non-Class welds that fall within the BER augmented inspection program. The BER program methodology is described in EPRI Topical Report TR-1006937, Rev. 0-A, which has been used to define the inspection scope in lieu of the 100% volumetric examination of all piping welds in the previous BER augmented program. Therefore, all welds in the original augmented program for BER remains evaluated under the RI-ISI Program using an integrated risk-informed approach.

The CISI Program Plan per Subsections IWE and IWL has been incorporated into Section 6.0 "Containment ISI Plan" of this ISI Program Plan. The CISI relief requests are included in Section 8.0 of this document.

2.1.2 ASME Section XI Code Cases

As referenced by 10 CFR 50.55a(b)(5) and allowed by NRC Regulatory Guide 1.147, Revision 17, being the latest incorporated into this ISI Program Plan, the following Code Cases are incorporated into the Byron Station ISI Program. These Code Cases have been determined by the NRC to be acceptable alternatives to applicable parts of ASME Section XI. These Code Cases may be used by Byron Station without a Relief Request from the NRC, provided that they are used with any identified limitations or modifications. Code Cases implemented through the Relief Request process are included in Section 8.0 of this document. Some of the Code Cases listed below are acceptable to the NRC for application at Byron Station within the limitations imposed by the NRC staff. Unless otherwise stated, limitations imposed by the NRC are in addition to the conditions specified in the Code Case. Several of these Code Cases are included as contingencies, to ensure that they are available for future repair/replacement activities.

N-432-1 *Repair Welding Using Automatic or Machine Gas Tungsten-Arc Welding (GTAW) Temper Bead Technique.*

N-508-4 *Rotation of Serviced Snubbers and Pressure Retaining Items for the Purpose of Testing.*

ASME Code Case N-508-4 is acceptable subject to the following condition:
When Section XI requirements are used to govern the examination and testing of snubbers and the ISI Code of Record is earlier than Section XI, 2006 Addenda, Footnote 1 shall not be applied.

N-513-3 *Evaluation Criteria for Temporary Acceptance of Flaws in Moderate Energy Class 2 or 3 Piping.*

ASME Code Case N-513-3 is acceptable subject to the following condition:
The repair or replacement activity temporarily deferred under the provisions of this Code Case shall be performed during the next scheduled outage.

N-526 *Alternative Requirements for Successive Inspections of Class 1 and 2 Vessels.*

N-532-5 *Alternative Requirements to Repair/Replacement Activity Documentation Requirements and Inservice Summary Report Preparation and Submission.*

N-561-2 *Alternative Requirements for Wall Thickness Restoration of Class 2 and High Energy Class 3 Carbon Steel Piping.*

ASME Code Case N-561-2 is acceptable subject to the following conditions:
(1) Paragraph 5(b): for repairs performed on a wet surface, the overlay is only acceptable until the next refueling outage.
(2) Paragraph 7(c): if the cause of the degradation has not been determined, the repair is only acceptable until the next refueling outage.
(3) The area where the weld overlay is to be applied must be examined using ultrasonic methods to demonstrate that no crack-like defects exist.
(4) Piping with wall thickness less than the diameter of the electrode shall be depressurized before welding.

N-562-2 *Alternative Requirements for Wall Thickness Restoration of Class 3 Moderate Energy Carbon Steel Piping.*

ASME Code Case N-562-2 is acceptable subject to the following conditions:
(1) Paragraph 5(b): for repairs performed on a wet surface, the overlay is only acceptable until the next refueling outage.
(2) Paragraph 7(c): if the cause of the degradation has not been determined, the

repair is only acceptable until the next refueling outage.
(3) The area where the weld overlay is to be applied must be examined using ultrasonic methods to demonstrate that no crack-like defects exist.
(4) Piping with wall thickness less than the diameter of the electrode shall be depressurized before welding.

N-569-1 *Alternative Rules for Repair by Electrochemical Deposition of Classes 1 and 2 Steam Generator Tubing.*

ASME Code Case N-569-1 is acceptable subject to the following conditions:
NOTES: Steam generator tube repair methods require prior NRC approval through the Technical Specifications. This Code Case does not address certain aspects of this repair, e.g., the qualification of the inspection and plugging criteria necessary for staff approval of the repair method. In addition, if the user plans to "reconcile," as described in Footnote 2, the reconciliation is to be performed in accordance with IWA-4200 in the 1995 Edition, 1996 Addenda of ASME Section XI.

N-586-1 *Alternative Additional Examination Requirements for Classes 1, 2, and 3 Piping, Components, and Supports.*

Note: This Code Case is implemented for Examination Categories other than R-A. RI-ISI Program Relief Request I4R-01 requires that scope expansion for RI-ISI piping structural elements will be determined using Paragraph -2430 of N-578-1.

N-597-2 *Requirements for Analytical Evaluation of Pipe Wall Thinning.*

ASME Code Case N-597-2 is acceptable subject to the following conditions:
(1) Code Case must be supplemented by the provisions of EPRI Nuclear Safety Analysis Center Report 202L-R2, "Recommendations for an Effective Flow Accelerated Corrosion Program" (Ref. 6), April 1999, for developing the inspection requirements, the method of predicting the rate of wall thickness loss, and the value of the predicted remaining wall thickness. As used in NSAC-202L-R2, the term "should" is to be applied as "shall" (i.e., a requirement).
(2) Components affected by flow-accelerated corrosion to which this Code Case are applied must be repaired or replaced in accordance with the construction code of record and Owner's requirements or a later NRC approved edition of Section III, "Rules for Construction of Nuclear Power Plant Components," of the ASME Code (Ref. 7) prior to the value of tp reaching the allowable minimum wall thickness, tmin, as specified in -3622.1(a)(1) of this Code Case. Alternatively, use of the Code Case is subject to NRC review and approval per 10 CFR 50.55a(z).
(3) For Class 1 piping not meeting the criteria of -3221, the use of evaluation methods and criteria is subject to NRC review and approval per 10 CFR 50.55a(z).
(4) For those components that do not require immediate repair or replacement, the rate of wall thickness loss is to be used to determine a suitable inspection frequency so that repair or replacement occurs prior to reaching allowable minimum wall thickness, tmin.
(5) For corrosion phenomenon other than flow accelerated corrosion, use of the Code Case is subject to NRC review and approval. Inspection plans and wall thinning rates may be difficult to justify for certain degradation mechanisms such as MIC and pitting.
(6) The evaluation criteria in Code Case N-513-2 may be applied to Code Case N-597-2 for the temporary acceptance of wall thinning (until the next refueling outage) for moderate-energy Class 2 and 3 piping. Moderate energy piping is defined as Class 2 and 3 piping whose maximum operating temperature does not exceed 200°F (93°C) and whose maximum operating pressure does not exceed

275 psig (1.9 MPa). Code Case N-597-2 shall not be used to evaluate through-wall leakage conditions.

N-600 *Transfer of Welder, Welding Operator, Brazer, and Brazing Operator Qualifications Between Owners.*

N-613-1 *Ultrasonic Examination of Full Penetration Nozzles in Vessels, Examination Category B-D, Item Nos. B3.10 and B3.90, Reactor Nozzle-to-Vessel Welds, Figs. IWB-2500-7(a), (b), and (c).*

N-629 *Use of Fracture Toughness Test Data to Establish Reference Temperature for Pressure Retaining Materials.*

N-639 *Alternative Calibration Block Material.*

ASME Code Case N-639 is acceptable subject to the following conditions: Chemical ranges of the calibration block may vary from the materials specification if: (1) it is within the chemical range of the component specification to be inspected, and (2) the phase and grain shape are maintained in the same ranges produced by the thermal process required by the material specification.

N-641 *Alternative Pressure-Temperature Relationship and Low Temperature Overpressure Protection System Requirements.*

N-643-2 *Fatigue Crack Growth Rate Curves for Ferritic Steels in PWR Water Environment.*

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

ASME Code Case N-648-1 is acceptable subject to the following condition: In lieu of a UT examination, licensees may perform a VT-1 examination in accordance with the code of record for the Inservice Inspection Program utilizing the allowable flaw length criteria of Table IWB-3512-1 with limiting assumptions on the flaw aspect ratio.

N-651 *Ferritic and Dissimilar Metal Welding Using SMAW Temper Bead Technique Without Removing the Weld Bead Crown for the First Layer.*

N-660 *Risk-Informed Safety Classification for Use in Risk-Informed Repair/Replacement Activities.*

The Code Case must be applied only to ASME Code Classes 2 and 3, and non-Code Class pressure retaining components and their associated supports.

N-661-2 *Alternative Requirements for Wall Thickness Restoration of Class 2 and 3 Carbon Steel Piping for Raw Water Service.*

ASME Code Case N-661-2 is acceptable subject to the following conditions:
(1) Paragraph 4(b): for repairs performed on a wet surface, the overlay is only acceptable until the next refueling outage.
(2) Paragraph 7(c): if the cause of the degradation has not been determined, the repair is only acceptable until the next refueling outage.
(3) The area where the weld overlay is to be applied must be examined using ultrasonic methods to demonstrate that no crack-like defects exist.
(4) Piping with wall thickness less than the diameter of the electrode shall be depressurized before welding.

N-705 *Evaluation Criteria for Temporary Acceptance of Degradation in Moderate Energy Class 2 or 3 Vessels and Tanks.*

N-706-1 *Alternative Examination Requirements of Table IWB-2500-1 and Table IWC-2500-1 for PWR Stainless Steel Residual and Regenerative Heat Exchangers.* See TAP I4T-07 for details.

N-731 *Alternative Class 1 System Leakage Test Pressure Requirements.*

N-735 *Successive Inspections of Class 1 and 2 Piping Welds.*

N-747 *Reactor Vessel Head-to-Flange Weld Examinations.*

N-751 *Pressure Testing of Containment Penetration Piping.*

When a 10 CFR 50, Appendix J, Type C test is performed as an alternative to the requirements of IWA-4540 (IWA-4700 in the 1989 edition through the 1995 edition) during repair and replacement activities, nondestructive examination must be performed in accordance with IWA-4540(a)(2) of the 2002 Addenda of Section XI.

N-762 *Temper Bead Procedure Qualification Requirements for Repair/Replacement Activities Without Postweld Heat Treatment.*

N-765 *Alternative to Inspection Interval Scheduling Requirements of IWA-2430.*

N-773 *Alternative Qualification Criteria for Eddy Current Examinations of Piping Inside Surfaces.*

Additional Code Cases invoked in the future shall be in accordance with those approved for use in the latest published revision of Regulatory Guide 1.147 or 10 CFR 50.55a at that time.

2.2 AUGMENTED EXAMINATION REQUIREMENTS

Augmented examination requirements are those examinations that are performed in addition to the requirements of ASME Section XI. Below is a summary of those examinations performed by Byron Station that are not specifically prescribed by ASME Section XI, or the examinations that will be performed in addition to the requirements of ASME Section XI on a routine basis during the Fourth ISI Interval and Third CISI Interval. Previous revisions of the Byron Station ISI Program categorized some Augmented Examination Programs by using Augmented Numbers.

2.2.1

NRC Mechanical Engineering Branch (MEB) Technical Position 3-1 (MEB 3-1), *High Energy Fluid Systems, Protection Against Postulated Piping Failures in Fluid Systems Outside Containment*, dated November 24, 1975.

UFSAR Sections 3.6.1 and 3.6.2 detail Byron Station compliance with NRC Branch Technical Position MEB 3-1, which includes requirements for licensees to perform a 100% volumetric examination each interval of circumferential and longitudinal pipe welds within the pipe break exclusion regions associated with high energy piping in containment penetration areas.

Implementation of the examination requirements is included in Section 7.0 of this ISI Program Plan and the associated ISI Database.

Note: This requirement was previously maintained in accordance with UFSAR Section 3.6.1 and 3.6.2. With the implementation of the RI-ISI-BER Program, all BER augmented welds were evaluated under the RI-ISI methodology and were integrated into the RI-ISI Program. The RI-ISI Program will also include several Non-Class welds that fall within the BER augmented examination program. Additional guidance for adaptation of the RI-ISI evaluation process to BER piping is given in EPRI TR-1006937, Rev. 0-A.

2.2.2 NRC Regulatory Guide 1.14, *Reactor Coolant Pump Flywheel Integrity,* as modified by the requirements of Byron Station License Amendment #118 and Technical Requirements Manual Appendix G.

The requirement to Regulatory Guide 1.14 has been modified by Byron Station License Amendment #118 and Technical Requirements Manual Appendix G. In lieu of Regulatory Position c4.b.(1) and c4.b.(2), a qualified in-place ultrasonic testing (UT) examination over the volume from the inner bore of the flywheel to the circle of one-half the outer radius or a surface examination (MT and/or PT) of exposed surfaces of the removed flywheel may be conducted at approximately 10 year intervals coinciding with the Inservice Inspection schedule as required by ASME Section XI.

Implementation of the examination requirements is included in Section 7.0 of this ISI Program Plan and the associated ISI Database.

2.2.3 Byron Station UFSAR Section 10.2.3, *Turbine Disk and Rotor Integrity.*

This details Byron Station's requirement to perform visual and magnetic particle examination of the accessible areas of the high-pressure turbine rotor, low-pressure turbine blades, and low-pressure disks. In addition, visual examinations of the turbine coupling and coupling bolts are performed.

This program has been removed from the Engineering Group and is maintained by the Turbine Maintenance organization.

2.2.4 NRC Bulletin 88-08, *Thermal Stresses in Piping Connected to Reactor Coolant Systems,* including supplements 1, 2, and 3.

This details Byron Station's requirement to examine welds susceptible to thermal stratification.

To address NRC Bulletin 88-08, Byron Station had committed to inspecting critical locations on the suction lines to the Residual Heat Removal (RHR) pumps from RCS Loops 1 and 3, and the Auxiliary and Main Pressurizer Spray lines every other refueling outage.

With the implementation of the RI-ISI Program, the NRC Bulletin 88-08 augmented inspection requirement will no longer be required at Byron Station. The RI-ISI Program completely subsumes this requirement because the Degradation Mechanism assessment and Risk Categorization involve full assessment for Thermal Transients and Thermal Stratification, Cycling, and Striping. Thus, these piping structural elements have been categorized and selected for examination in accordance with the EPRI Topical Report TR-112657, Rev. B-A and N-578-1 in lieu of the original requirement to NRC Bulletin 88-08. The evaluation of susceptible lines is also addressed under MRP-146 (see below).

2.2.5 Information Notice 79-19, *Pipe Cracks in Stagnant Borated Water Systems at PWR Plants.*

Volumetric examinations will be performed on ISI Class 2 ECCS systems (or portions of systems) that are currently not subject to evaluation under the RI-ISI Program. The inspections include 7.5% sampling of the total population of circumferential piping welds (greater than 4 inches nominal pipe size) that contain stagnant borated water.

For the current inspection interval, the areas subject to augmented examination are limited to the 10" Safety Injection piping from the SI Accumulators (1/2SI04TA, B, C, and D) to the class boundary second check valve (1/2SI8956A, B, C, and D). These lines are exempted from ASME Section XI surface or volumetric examination by Paragraph IWC-1221(c).

The components selected for these examinations are to be examined before the end of the inspection interval.

2.2.6 NRC NUREG 0737, *TMI Action Plan Requirements,* Section III.D.1.1, dated November 1980.

Requires applicants to implement a program to reduce leakage from systems outside containment that would or could contain highly radioactive fluids or gases during a serious transient or accident to as low as practical levels. In response to this NUREG requirement, Section E.77, *Primary Coolant Sources Outside Containment*, was included in the Byron/Braidwood Station UFSAR. This UFSAR Section along with Technical Specifications Section 5.5.2 require performance of integrated leak tests at refueling cycle intervals or less on each system or portions of systems, which could potentially contain highly radioactive liquids or gases.

Implementation of the Byron Station program addressing these requirements is included in site procedure BVP 200-7.

2.2.7 Generic Letter 88-05, *Boric Acid Corrosion of Carbon Steel Reactor Pressure Boundary Components in PWR Plants.*

The NRC issued Generic Letter (GL) 88-05 to all licensees of operating Pressurized Water Reactors (PWR) in March, 1988. This Generic Letter deals with boric acid corrosion of carbon steel reactor coolant pressure boundary components in PWR plants. Specifically, GL 88-05 requested information to assess safe operation of PWR's when reactor coolant leaks below Tech Spec limits develop and the coolant containing Boric Acid comes in contact with and degrades low alloy carbon steel components. Byron Station's response to GL 88-05 requirements are incorporated through the completion of normal station operator walkdowns, heightened Maintenance and Tech Staff (now System Engineering) training, the normal Inservice Inspection Program, and the ASME Section XI System Pressure Testing Program.

To ensure compliance with this augmented examination requirement, the Reactor Coolant Pressure Boundary (RCPB), as defined by UFSAR Section 5.2, shall have a system inspection performed by certified VT-2 visual examiners every refueling outage consisting of a pre-outage visual examination as well as a visual examination conducted prior to startup. These examinations shall be conducted to identify evidence of boric acid crystallization and residue accumulations.

Implementation of the Byron Station program addressing these requirements is included in site procedure BVP-200-7.

2.2.8 N-722-1 Augmented Examination Program.

Per 10 CFR 50.55a(g)(6)(ii)(E)(*1*), all licensees of pressurized water reactors shall augment their inservice inspection program by implementing ASME Code Case N-722-1 (N-722-1) subject to the conditions specified in paragraphs (g)(6)(ii)(E)(2) through (4). The inspection requirements of N-722-1 do not apply to components with pressure retaining welds fabricated with Alloy 600/82/182 materials that have been mitigated by weld overlay or stress improvement. This requirement is implemented with the Second Period of the Third ISI Interval.

Implementation of the examination requirements is included in Section 7.0 of this ISI Program Plan and the associated ISI Database.

TABLE 2.2.9-1
N-722-1 TABLE 1 EXAMINATION ITEMS

ITEM NO.	DESCRIPTION	BYRON STATION APPLICABILITY
Reactor Vessel		
B15.80	RPV bottom-mounted instrument penetrations	58 nozzles per unit.
B15.90	Hot leg nozzle-to-pipe connections	Not Applicable. Note 1.
B15.95	Cold leg nozzle-to-pipe connections	Not Applicable. Note 1.
B15.100	Instrument connections	Not Applicable.
Steam Generators		
B15.110	Hot leg nozzle-to-pipe connections	Not Applicable. Non-A600 material.
B15.115	Cold leg nozzle-to-pipe connections	Not Applicable. Non-A600 material.
B15.120	Bottom channel head drain tube penetration	Not Applicable. Note 2.
B15.130	Primary side hot leg instrument connections	Not Applicable. Non-A600 material.
B15.135	Primary side cold leg instrument connection	Not Applicable. Non-A600 material.
Pressurizer		
B15.140	Heater penetrations	Not Applicable. Non-A600 material.
B15.150	Spray nozzle-to-pipe connections	Not Applicable. Note 3.
B15.160	Safety and relief nozzle-to-pipe connections	Not Applicable. Note 3.
B15.170	Surge nozzle-to-pipe connections	Not Applicable. Note 3.
B15.180	Instrument connections	Not Applicable. Non-A600 material.
B15.190	Drain nozzle-to-pipe connections	Not Applicable.
Piping		
B15.200	Hot leg instrument connections	Not Applicable. Non-A600 material.
B15.205	Cold leg instrument connections	Not Applicable. Non-A600 material.
B15.210	Hot leg full penetration welds	Not Applicable.
B15.215	Cold leg full penetration welds	Not Applicable.

Note 1: Safe-end welds have been mitigated by stress improvement are exempted from N-722-1 requirements per 10 CFR 50.55a(g)(6)(ii)(E)(1).

Note 2: The Unit 2 Bottom channel head drain tube penetrations have been replaced with resistant materials and are exempted from N-722-1 requirements.

Note 3: Safe-end welds have been mitigated by weld overlay with resistant material are exempted from N-722-1 requirements per 10 CFR 50.55a(g)(6)(ii)(E)(1).

2.2.9 N-729-1 Augmented Examination Program.

Per 10 CFR 50.55a(g)(6)(ii)(D)(*1*), all licensees of pressurized water reactors shall augment their inservice inspection program with ASME Code Case N-729-1 (N-729-1) subject to the conditions specified in paragraphs (g)(6)(ii)(D)(*2*) through (*6*). N-729-1 governs the visual and volumetric/surface examinations of the reactor vessel closure head penetrations and surrounding exterior surface. This requirement was implemented with the First Period of the Third ISI Interval.

Implementation of the examination requirements is included in Section 7.0 of this ISI Program Plan and the associated ISI Database.

2.2.10 N-770-1 Augmented Examination Program.

Per 10 CFR 50.55a(g)(6)(ii)(F)(*1*), licensees of existing, operating pressurized-water reactors as of July 21, 2011 shall implement the requirements of ASME Code Case N-770-1 (N-770-1), subject to the conditions specified in paragraphs (g)(6)(ii)(F)(2) through (g)(6)(ii)(F)(10) of this

section, by the first refueling outage after August 22, 2011. This requirement replaced the pervious industry standard Material Reliability Program: *Primary System Piping Butt Weld Inspection and Evaluation Guideline* (MRP-139). N-770-1 governs the visual and volumetric/surface examinations of the Alloy 600 butt welds. This requirement was implemented with the Second Period of the Third ISI Interval.

Implementation of the examination requirements is included in Section 7.0 of this ISI Program Plan and the associated ISI Database.

2.2.11 MRP-146 Augmented Examination Program.

This guideline is for the screening, evaluation, and inspection requirements for potential thermal fatigue cracking that may occur in normally stagnant non-isolable piping systems attached to pressurized water reactor (PWR) main reactor coolant system (RCS) piping. The objective of this guideline is to provide a common industry approach to use in effectively reducing the probability of cracking in and leakage from piping potentially susceptible to thermal fatigue. Some of the piping that is covered by this guideline was previously identified as being susceptible to thermal fatigue with the issuance of NRC Bulletin 88-08. The scope of this guideline applies only to ISI Class 1 piping.

Currently, the examinations are limited to the following locations:
Cold leg charging lines 1/2RC28A-3" and 1/2RC37A-3".
Loop Drain lines 1/2RC14AX-2" (Loops A, B, C, and D)

Implementation of the examination requirements is included in Section 7.0 of this ISI Program Plan and the associated ISI Database.

2.2.12 MRP-192 Augmented Examination Program.

MRP-192 was issued as a "good practice" industry guideline per NEI 03-08 classification, because of a thermal fatigue leakage event in piping downstream of a RHR heat exchanger. Current operating conditions at Byron Station for temperature differentials of the mixing flows and cumulative operating time in mixing mode, are within the limits specified in MRP-192 (< 144°F), therefore, no examinations are currently scheduled.

2.2.13 Appendix Q Program.

Non-Alloy 600/82/182 butt welds with full-structural overlays are removed from the RI-ISI Program and treated solely under the requirements of ASME Section XI, 2007 Edition with the 2008 Addenda, Nonmandatory Appendix Q. These locations may include repaired welds or welds adjacent to Alloy 600/82/182 welds where both welds were overlaid due to the proximity of the welds.

Implementation of the examination requirements is included in Section 7.0 of this ISI Program Plan and the associated ISI Database.

2.2.14 MRP-227 Augmented Examination Program

PWR Internals Program augmented examinations are implemented in accordance with MRP-227. The specific scope and requirements of this program are provided in BB-PBD-AMP-XI.M16A *Reactor Vessel Internals* and the applicable program documents ER-AP-333 *Pressurized Water Reactor Internals Management Program* and ER-AP-333-1001 *Pressurized Water Reactor (PWR) Internals Program*. These examinations should be performed simultaneously with the 10-Year ISI Reactor Vessel Internals examinations on a 10-year frequency starting during refueling outage B1R26 in Fall 2024 for Unit 1 (Fourth ISI Interval), and during refueling outage B2R26 in Fall 2026 for Unit 2 (Fifth ISI Interval).

Implementation of the examination requirements is included in Section 7.0 of this ISI Program Plan and the associated ISI Database. These components are Augmented Category, Item Number MRP-227.xx in the ISI Database, where xx is used to identify the type of component.

(Note that the NRC has recently endorsed MRP-227, so specific examination scope and schedule is currently being developed by EGC. Byron Station has committed to submitting a reactor vessel internals inspection plan to the NRC no later than 24 months prior to entering the period of extended operation. This inspection plan will provide detailed information on components subject to examination and the schedule for examination.)

2.2.15 License Renewal - **(CM-3)**

The license renewal supplement to the UFSAR, Appendix F, describes enhancements to the ISI Programs beyond the requirements of ASME Section XI.

The ASME Section XI, Subsection IWF aging management program commitments include the following:

1. Examinations of the MC supports, at both ends of the fuel transfer tube (in the refueling cavity in the Containment Structure and in the refueling canal in the Fuel Handling Building), are added to the scope of the program.
2. Periodic visual examinations of all (100%) high strength bolts (ASME SA 540 and ASTM A490 materials), greater than 1" in diameter, used on the steam generator, reactor coolant pump, and pressurizer supports, are added to the scope of the program. The periodic visual examinations, to detect a corrosive environment that supports the potential for stress corrosion cracking, are to be performed prior to the period of extended operation, and then each inspection interval of ten years thereafter.
3. VT-3 visual examinations, of the control rod drive mechanism (CRDM) seismic support assembly, are added to the scope of the program, for Class 1 component supports, during every ten (10) year ISI interval. The reactor head lifting lugs, which also provide restraint for the bottom of the (CRDM) seismic support assembly, are included as part of the CRDM seismic support assembly examinations.

Implementation of the commitments is included in Sections 4 and 7 of this ISI Program Plan and the associated ISI Database.

2.3 System Classifications and P&ID Boundary Drawings

The ISI Classification Basis Document details those systems that are ISI Class 1, 2, 3, or MC that fall within the ISI scope of examinations including the containment structures (metal and concrete) and post-tensioning system, which are shown on the containment roll-out drawings. Below is a summary of the classification criteria used within the ISI Classification Basis Document.

Each safety related, fluid system containing water, steam, air, oil, etc. included in the Byron Station UFSAR was reviewed to determine which safety functions they perform during all modes of system and plant operation. Based on these safety functions, the systems and components were evaluated per classification documents. The systems were then designated as ISI Class 1, 2, 3, MC, or Non-Classed accordingly. This evaluation followed the guidelines of UFSAR Section 5.2.4 for Class 1 and 6.6 for Classes 2 and 3. Safety related portions of systems are defined on the Piping and Instrument Diagrams (P&ID's) and Control and Instrumentation Diagrams (C&ID's).

When a particular group of components is identified as performing a ISI Class 1, 2, or 3 safety function, the components are further reviewed to assure the interfaces (boundary valves and boundary barriers) meet the criteria set by 10 CFR 50.2, 10 CFR 50.55a(c)(1), 10 CFR

50.55a(c)(2), Regulatory Guide 1.26, and ANSI N18.2-1973. Although Byron Station is not committed to or licensed in accordance with these documents, Standard Review Plan (SRP) 3.2.2 "System Quality Group Classification," and other American National Standards Institute/American Nuclear Society (ANSI/ANS) standards were also used for guidance in evaluating the classification boundaries when 10 CFR and Regulatory Guide 1.26 did not address a given situation. The valve positions shown on the system flow diagrams are assumed to be the normal positions during system operation unless otherwise noted.

ISI classification boundaries are defined by the ISI Code Boundary Drawings (ISI CBD's) with classification line codes. A summary of the line coding system used on the ISI CBD's to identify safety related systems or portions of systems subject to examination is included on drawing ISI-CBD-LEGEND. Typically, unhatched, solid coding (blue, yellow and green, Coding Designators 1A, 2A, and 3A, respectively) was used for nonexempt ASME Section XI components. Some hatched codings, (Coding Designators 2HPSI, 2F, and 3C) were also used to identify nonexempt ASME Section XI components. The remaining codings shown on ISI-CBD-LEGEND (Coding Designators 1B, 1C, 1D, 2B, 2C, 2D, 2E, 3B, and 3D) were used to identify exempt ASME Section XI components. In addition to the line coding system shown on ISI-CBD-LEGEND, codings used to develop Byron Station Units 1 and 2 System Pressure Testing Program are shown on drawing SPT-TBD-LEGEND, Sheet 1.

The systems and components (piping, pumps, valves, vessels, etc.), which are subject to the examinations of Articles IWB-2000, IWC-2000, IWD-2000, and IWF-2000, and pressure tests of Articles IWB-5000, IWC-5000, and, IWD-5000 are identified on the ISI CBD's as detailed in Tables 2.3-1 and 2.3-2. Containment components subject to examination of Articles IWE-2000 and IWL-2000 are identified on the CISI Drawings shown in Tables 2.4-3 and 2.4-4.

TABLE 2.3-1
COLOR CODED ISI P&ID BOUNDARY DRAWINGS

UNIT 1 & COMMON	UNIT 2	SYSTEM OR DESCRIPTION
M-34-1, 2, 3, 4, 5	M-34-1, 2, 3, 4, 5	P&ID Index & Symbols
M-35-1, 2	M-120-1, 2A, 2B	Main Steam (MS)
M-36-1A, 1B, 1C, 1D M-152-45	M-121-1A, 1B, 1C, 1D M-152-45	Feedwater (FW)
M-37	M-122	Auxiliary Feedwater (AF)
M-42-1A, 1B, 2A, 2B, 3, 4, 5A, 5B, 6, 7	M-42-1A, 1B, 2A, 2B M-126-1, 2, 3	Essential Service Water (SX)
M-46-1A, 1B, 1C	M-129-1A, 1B, 1C	Containment Spray (CS)
M-47-2	M-150-2	Off Gas Hydrogen Recombiners (OG)
M-48-5A	M-48-5B	Waste Disposal - Steam Generator Blowdown (SD)
M-48-6A, 6B	M-48-6A, 6B	Waste Disposal Aux. Building Floor Drains (RF)
M-48-18	---	Waste Disposal Resin Removal (WX)
M-49-1A	M-49-1B	Make-Up Demineralizer (WM)
M-50-1A, 1B, 1C, 1D, 3	M-130-1A, 1B, 2	Diesel Fuel Oil (DO)
M-52-1	---	Fire Protection (FP)
M-54-2, 4A	M-54-2, 4B	Service Air (SA)
M-55-4, 9	M-55-5, 7D	Instrument Air (IA)
M-59-1A, 1B	M-149	Nitrogen (NT)
M-60-1A, 1B, 2, 3, 4, 5, 6, 8	M-135-1A, 1B, 2, 3, 4, 5, 6, 8	Reactor Coolant (RC & RY)
M-61-1A, 1B, 2, 3, 4, 5, 6	M-136-1, 2, 3, 4, 5, 6	Safety Injection (SI)
M-62	M-137	Residual Heat Removal (RH)
M-63-1A, 1B, 1C	M-63-1A, 1B, 1C	Fuel Pool Cooling and Clean-Up (FC)
M-64-1, 2, 3A, 3B, 4A, 4B, 5	M-138-1, 2, 3A, 3B, 4, 5A, 5B	Chemical and Volume Control (CV)
M-64-6, 7	M-138-6, 7	Chemical and Volume Control / Boron Thermal Regeneration (CV & BR)
M-65-1B, 2A, 3, 5A, 5B, 6	M-65-1B, 5A, 5B, 6	Boric Acid (AB)
M-66-1A, 1B, 2, 3A, 3B, 4A, 4C, 4D	M-66-3A, 3B, 4B, 4C, 4D, M-139-1, 2	Component Cooling (CC)
M-68-1A, 1B, 6, 7, 8	M-140-1, 5, 6	Process Sampling (PS)
M-69-1, 2, 3	---	Radioactive Waste Gas (GW)
M-70-1, 2	M-141-1, 2	Reactor Building Equipment Drains & Vents to Radwaste (RE)
M-78-6, 10	M-78-6, M-151-1	Process Radiation Monitoring (PR)
M-82-1, 2, 3, 5, 14, 15	M-82-1, 2, 3, 5, 6	Auxiliary Building & Containment Equipment Drains (WE)

TABLE 2.3-1
COLOR CODED ISI P&ID BOUNDARY DRAWINGS

UNIT 1 & COMMON	UNIT 2	SYSTEM OR DESCRIPTION
M-105-1	M-106-1	Containment Purge / Pressure & Vacuum Relief Systems (VQ & VP)
M-105-3	M-105-3	Integrated Leak Rate System (VQ)
M-118-1, 5, 14	M-118-7	Control Room Chilled Water (WO)
M-152-9	M-152-9, 10	Diesel Generator Lube Oil (DG & DO)
M-152-14	M-152-14	Diesel Generator Jacket Water (DG)
M-152-19	M-152-19	Diesel Generator Cooling Water (DG)
M-152-20	M-152-20	Diesel Generator (DG)

TABLE 2.3-2
COLOR CODED ISI C&ID BOUNDARY DRAWINGS

UNIT 1 & COMMON	UNIT 2	TITLE
M-2060-6, 7, 8, 17, 18	M-2135-6, 7, 8, 17, 18	C&ID Reactor Coolant System (RC)

2.4 ISI ISOMETRIC AND COMPONENT DRAWINGS FOR NONEXEMPT ISI CLASS COMPONENTS AND SUPPORTS

ISI Isometric and Component drawings were developed to identify the ISI Class 1, 2, 3 components (welds, bolting, etc.) and support locations at Byron Station. These ISI component and support locations are identified on the ISI Isometric and Component drawings listed in Tables 2.4-1 and 2.4-2. The ISI Class MC and CC components are identified on the CISI Component Drawings listed in Tables 2.4-3 and 2.4-4.

Byron Station's ISI Program, including the ISI Database, ISI Classification Basis Document, and ISI Selection Document, addresses the non-exempt components, which require examination and testing.

A summary of Byron Station ASME Section XI nonexempt components and supports is included in Section 7.0.

TABLE 2.4-1
UNIT 1 & COMMON ISI ISOMETRIC AND COMPONENT DRAWINGS

DRAWING NUMBER	SHEET NUMBER	DRAWING TITLE
1AF-1-ISI	1	Auxiliary Feedwater Lines 1AF02DA-4", 1AF02DE-4", and 1AF02EA-4"
1AF-1-ISI	2	Auxiliary Feedwater Lines 1FW06AA-4" and 1FW87BA-3"
1AF-1-ISI	3	Auxiliary Feedwater Lines 1AF02DB-4", 1AF02DF-4", and 1AF02EB-4"
1AF-1-ISI	4	Auxiliary Feedwater Lines 1FW06AB-4" and 1FW87BB-3"
1AF-1-ISI	5	Auxiliary Feedwater Lines 1AF02DC-4", 1AF02DG-4", and 1AF02EC-4"
1AF-1-ISI	6	Auxiliary Feedwater Lines 1FW06AC-4" and 1FW87BC-3"
1AF-1-ISI	7	Auxiliary Feedwater Lines 1AF02DD-4", 1AF02DH-4", and 1AF02ED-4"
1AF-1-ISI	8	Auxiliary Feedwater Lines 1FW06AD-4" and 1FW87BD-3"
1CS-1-ISI	1	Containment Spray Line 1CS02AA-10"
1CS-1-ISI	2	Containment Spray Line 1CS10AA-6"
1CS-1-ISI	3	Containment Spray Lines 1CS01AA-16", 1CS23AA-14", and 1CS06AA-6"
1CS-1-ISI	4	Containment Spray Lines 1CS01AB-16", 1CS23AB-14", and 1CS06AB-6"
1CS-1-ISI	5	Containment Spray Line 1CS02AB-10"
1CS-1-ISI	6	Containment Spray Lines 1CS02AB-10" and 1CS10AB-6"
1CS-1-ISI	7	Containment Spray Line 1CS02AA-10"
1CV-1-ISI	1	Chemical & Volume Control Line 1CVB7A-3"
1CV-1-ISI	2	Chemical & Volume Control Lines 1RY18A-2" and 1CV45B-2"
1CV-1-ISI	3	Chemical & Volume Control Lines 1CV14FB-2" and 1CV14GB-1½"
1CV-1-ISI	4	Chemical & Volume Control Lines 1CVA5AB-2" and 1CVA6AB-2"
1CV-1-ISI	5	Chemical & Volume Control Line 1CVA3B-2"
1CV-1-ISI	6	Chemical & Volume Control Lines 1CV14FA-2" and 1CV14FD-2"
1CV-1-ISI	7	Chemical & Volume Control Line 1CVA3B-2"
1CV-1-ISI	8	Chemical & Volume Control Line 1CVA5AA-2"
1CV-1-ISI	9	Chemical & Volume Control Lines 1CVA3B-2", 1CVA3AB-2", and 1CVA7AB-2"
1CV-1-ISI	10	Chemical & Volume Control Line 1CVA3AB-2"
1CV-1-ISI	11	Chemical & Volume Control Lines 1CVA3B-2" and 1CVA6AA-2"
1CV-1-ISI	12	Chemical & Volume Control Line 1CV45B-2"
1CV-1-ISI	13	Chemical & Volume Control Line 1CVA3B-2"
1CV-1-ISI	14	Chemical & Volume Control Line 1CVA3B-2"
1CV-1-ISI	15	Chemical & Volume Control Line 1CVA3B-2"
1CV-1-ISI	16	Chemical & Volume Control Lines 1CV14FC-2" and 1CV14GC-1½"
1CV-1-ISI	17	Chemical & Volume Control Lines 1CV99A-8", 1CV05B-8", and 1CVA1A-6"
1CV-1-ISI	18	Chemical & Volume Control Lines 1CV05B-8", 1CV05CA-6", 1CV98BA-8", 1CV98BB-8", and 1CV98BC-8"
1CV-1-ISI	19	Chemical & Volume Control Line 1CV05CB-6"
1CV-1-ISI	20	Chemical & Volume Control Lines 1CV08AB-4", 1CV12AA-3", and 1CV42AA-2"
1CV-1-ISI	21	Chemical & Volume Control Lines 1CVJ4A-4", 1CV09A-4", and 1CV08BA-4"
1FW-1-ISI	1	Feedwater Lines 1FW03DD-16" and 1FW86AD-16"
1FW-1-ISI	2	Feedwater Lines 1FW03DA-16" and 1FW86AA-16"
1FW-1-ISI	3	Feedwater Lines 1FW86AB-16" and 1FW03DB-16"
1FW-1-ISI	4	Feedwater Lines 1FW03DC-16" and 1FW86AC-16"
1FW-1-ISI	5	Feedwater Lines 1FW81AB-6", 1FW81BB-6", and 1FW87CB-6"
1FW-1-ISI	10	Feedwater Lines 1FW81AC-6", 1FW81BC-6", and 1FW87CC-6"
1FW-1-ISI	11	Feedwater Lines 1FW81AA-6", 1FW81BA-6", and 1FW87CA-6"
1FW-1-ISI	12	Feedwater Lines 1FW81AD-6", 1FW81BD-6", and 1FW87CD-6"
1MS-1-ISI	1	Main Steam Line 1MS01AD-30 1/4" (Loop 4)

TABLE 2.4-1
UNIT 1 & COMMON ISI ISOMETRIC AND COMPONENT DRAWINGS

DRAWING NUMBER	SHEET NUMBER	DRAWING TITLE
1MS-1-ISI	2	Main Steam Lines 1MS01BD-30 1/4", 1MS07AD-28", 1MS13AD-8", 1MS07BD-28", and 1MS143AD-12" (Loop 4)
1MS-1-ISI	3	Main Steam Line 1MS01AA-30 1/4" (Loop 1)
1MS-1-ISI	4	Main Steam Lines 1MS01BA-30 1/4", 1MS07AA-28", 1MS13AA-8", 1MS07BA-28", and 1MS143AA-12" (Loop 1)
1MS-1-ISI	5	Main Steam Line 1MS01AB-32 3/4" (Loop 2)
1MS-1-ISI	6	Main Steam Lines 1MS01BB-32 3/4", 1MS07AB-28", 1MS13AB-8", 1MS07BB-28", and 1MS143AB-12" (Loop 2)
1MS-1-ISI	7	Main Steam Line 1MS01AC-32 3/4" (Loop 3)
1MS-1-ISI	8	Main Steam Lines 1MS01BC-32 3/4", 1MS07AC-28", 1MS13AC-8", 1MS143AC-12", and 1MS07BC-28" (Loop 3)
1RC-1-ISI	1	Primary Coolant System Loop 1 To Steam Gen. No. 1RC-01-BA
1RC-1-ISI	2	Primary Coolant System Loop 2 To Steam Gen. No. 1RC-01-BB
1RC-1-ISI	3	Primary Coolant System Loop 3 To Steam Gen. No. 1RC-01-BC
1RC-1-ISI	4	Primary Coolant System Loop 4 To Steam Gen. No. 1RC-01-BD
1RC-1-ISI	5	Reactor Coolant Surge Line 1RY11A-14"
1RC-1-ISI	6	Reactor Coolant Lines 1RC21AA-8" and 1RC21BA-8"
1RC-1-ISI	7	Reactor Coolant Lines 1RC28A-3", 1CV10DA-3", 1RC37A-3", 1CV10DB-3", and 1RC36A-3"
1RC-1-ISI	9	Reactor Coolant Line 1RC21AB-8"
1RC-1-ISI	11	Reactor Coolant Lines 1RC04AB-12" and 1RC05AB-6"; Residual Heat Removal Line 1RH01AB-12"
1RC-1-ISI	12	Reactor Coolant Lines 1RC21AC-8" and 1RC21BC-8"
1RC-1-ISI	14	Reactor Coolant Lines 1RC24AB-4" and 1RY01AB-4"
1RC-1-ISI	15	Reactor Coolant Lines 1RC21AD-8" and 1RC21BD-8"
1RC-1-ISI	16	Reactor Coolant Lines 1RY01B-6" and 1RY01C-4"
1RC-1-ISI	17	Reactor Coolant Lines 1RC24AA-4" 1RY01AA-4", 1RY01AB-4", and 1RY01B-6"
1RC-1-ISI	19	Reactor Coolant Lines 1RC22AB-1½" and 1RC46AB-3"
1RC-1-ISI	20	Reactor Coolant Lines 1RC22AD-1½" and 1RC46AD-3"
1RC-1-ISI	21	Reactor Coolant Line 1RC22AB-1½"
1RC-1-ISI	22	Reactor Coolant Lines 1RC05AA-6" (Loop 2) and 1RC35AB-6" (Loop 4)
1RC-1-ISI	23	Reactor Coolant Lines 1RC22AA-1½" and 1RC46AA-3"
1RC-1-ISI	24	Reactor Coolant Lines 1RC22AC-1½" and 1RC46AC-3"
1RC-1-ISI	27	Reactor Coolant Lines 1RC22AA-1½" and 1RC22AC-1½"
1RC-1-ISI	29	Reactor Coolant Lines 1RC16AC-2" (Loop 3) and 1RC16AD-2" (Loop 4)
1RC-1-ISI	30	Reactor Coolant Lines 1RC13AA-2", 1RC13AB-2", 1RC13AC-2", and 1RC13AD-2"
1RC-1-ISI	31	Reactor Coolant Lines 1RC14AB-2" (Loop 2) and 1RC26A-2" (Loop 4)
1RC-1-ISI	32	Reactor Coolant Lines 1RY03AA-6", 1RY03AB-6", 1RY03AC-6", 1RY03BA-6", 1RY03BB-6", and 1RY03BC-6"
1RC-1-ISI	35	Reactor Coolant Lines 1RY02A-6", 1RY06A-3", and 1RY02B-3"
1RC-1-ISI	36	Reactor Coolant Lines 1RC14AA-2" and 1CVA3AA-2"
1RC-1-ISI	37	Reactor Coolant Lines 1RC14AD-2" and 1CVA7AA-2"
1RC-1-ISI	41	Reactor Coolant Lines 1RC16AA-2" (Loop 1) and 1RC16AB-2" (Loop 2)
1RC-1-ISI	42	Reactor Coolant Line 1RC14AC-2"
1PZR-1-ISI	---	Pressurizer No. 1RY-01-S
1RCP-1-ISI	---	Reactor Coolant Pumps 1RC-01-PA, 1RC-01-PB, 1RC-01-PC, and 1RC-01-PD
1RPV-1-ISI	---	Reactor Pressure Vessel No. 1RC-01-R
1SG-1-ISI	5	Replacement Steam Generator No. 1RC-01-BA

TABLE 2.4-1
UNIT 1 & COMMON ISI ISOMETRIC AND COMPONENT DRAWINGS

DRAWING NUMBER	SHEET NUMBER	DRAWING TITLE
1SG-1-ISI	6	Replacement Steam Generator No. 1RC-01-BB
1SG-1-ISI	7	Replacement Steam Generator No. 1RC-01-BC
1SG-1-ISI	8	Replacement Steam Generator No. 1RC-01-BD
1RH-1-ISI	1	Residual Heat Removal Line 1RH01AB-12"
1RH-1-ISI	2	Residual Heat Removal Line 1RH01AA-12"
1RH-1-ISI	3	Residual Heat Removal Lines 1RH03AA-8" and 1RH12A-8"
1RH-1-ISI	4	Residual Heat Removal Lines 1RH01BA-12" and 1RH01CA-16"
1RH-1-ISI	5	Residual Heat Removal Lines 1RH02AA-8" and 1RH09AA-8"
1RH-1-ISI	6	Residual Heat Removal Lines 1RH02AB-8", 1RH03AB-8", and 1RH09AB-8"
1RH-1-ISI	7	Residual Heat Removal Lines 1RH03AB-8", 1RH14A-8", and 1RH03AA-8"
1RH-1-ISI	8	Residual Heat Removal Lines 1RH01BB-12", 1RH01CB-16", and 1SI82BB-12"
1RH-1-ISI	9	Residual Heat Removal Line 1RH02AB-8"
1RHP-1-ISI	---	Residual Heat Removal Pumps 1RH-01-PA-1-1A and 1RH-01-PB-2-1B
1RHX-1-ISI	---	Residual Heat Exchanger Nos. 1RH-02-AA and 1RH-02-AB
1SD-1-ISI	1	Inservice Inspection Isometric Cont. Bldg. & Safety Valve Rm. - Loop 1
1SD-1-ISI	2	Inservice Inspection Isometric Cont. Bldg. & Safety Valve Rm. - Loop 2
1SD-1-ISI	3	Inservice Inspection Isometric Cont. Bldg. & Safety Valve Rm. - Loop 3
1SD-1-ISI	4	Inservice Inspection Isometric Cont. Bldg. & Safety Valve Rm. - Loop 4
1SI-1-ISI	1	Safety Injection Lines 1RC29AA-10" and 1SI09BA-10"
1SI-1-ISI	2	Safety Injection Lines 1SIA4B-8", 1SI03FA-2", 1RC04AA-12", and 1RC35AA-6"
1SI-1-ISI	3	Safety Injection Line 1SI05DA-6"
1SI-1-ISI	4	Safety Injection Lines 1SI05BA-8", 1SI05CA-8", and 1SI05CD-8"
1SI-1-ISI	5	Safety Injection Lines 1RC29AB-10" and 1SI09BB-10"
1SI-1-ISI	6	Safety Injection Lines 1SI05DB-6" and 1SI18FB-2"
1SI-1-ISI	7	Safety Injection Lines 1SI08FA-3", 1SI08FB-3", and 1SI08E-3"
1SI-1-ISI	8	Safety Injection Line 1SI08FA-3"
1SI-1-ISI	9	Safety Injection Lines 1RC29AC-10" and 1SI09BC-10"
1SI-1-ISI	10	Safety Injection Lines 1SI05DC-6" and 1SI18FC-2"
1SI-1-ISI	11	Safety Injection Lines 1SI04D-8" and 1SI03DB-2"
1SI-1-ISI	12	Safety Injection Lines 1SI04A-12", 1SI04B-12", 1SI04C-8", and 1SIA4A-8"
1SI-1-ISI	13	Safety Injection Lines 1RC29AD-10" and 1SI09BD-10"
1SI-1-ISI	14	Safety Injection Line 1SI05DD-6"
1SI-1-ISI	15	Safety Injection Lines 1SI08JC-1½" 1RC45AC-3", and 1RC30AC-1½"
1SI-1-ISI	16	Safety Injection Lines 1SI08JD-1½", 1RC45AD-3", and 1RC30AD-1½"
1SI-1-ISI	17	Safety Injection Lines 1SI08JB-1½", 1RC45AB-3", and 1RC30AB-1½"
1SI-1-ISI	18	Safety Injection Lines 1SI08HB-2", 1SI08GB-1½", and 1SI08JB-1½"
1SI-1-ISI	19	Safety Injection Lines 1SI08GA-1½", 1SI08HA-2", and 1SI08JA-1½"
1SI-1-ISI	20	Safety Injection Lines 1SI08GC-1½", 1SI08HC-2", 1SI08JC-1 ½", 1SI08GD-1½", 1SI08HD-2", and 1SI08JD-1½"
1SI-1-ISI	21	Safety Injection Line 1SI03DA-2"
1SI-1-ISI	22	Safety Injection Line 1SI03FB-2"
1SI-1-ISI	23	Safety Injection Lines 1SI18FA-2" and 1SI18FD-2", and Reactor Coolant Line 1RY76A-2"
1SI-1-ISI	24	Safety Injection Lines 1SI06BA-24" and 1SI06BB-24"
1SI-1-ISI	25	Safety Injection Line 1SI05AA-8"
1SI-1-ISI	26	Safety Injection Lines 1SI05BB-8", 1SI05CB-8", and 1SI05CC-8"
1SI-1-ISI	27	Safety Injection Line 1SI08JD-1½"

TABLE 2.4-1
UNIT 1 & COMMON ISI ISOMETRIC AND COMPONENT DRAWINGS

DRAWING NUMBER	SHEET NUMBER	DRAWING TITLE
1SI-1-ISI	28	Safety Injection Lines 1SI09AB-10" & 1SI09AC-10"
1SI-1-ISI	29	Safety Injection Line 1SI08JC-1½"
1SI-1-ISI	31	Safety Injection Lines 1SI08JA-1½", 1RC30AA-1½", and 1RC45AA-3"
1SI-1-ISI	32	Safety Injection Line 1SI05AB-8"
1SI-1-ISI	33	Safety Injection Line 1SI34A-8"
1SI-1-ISI	34	Safety Injection Lines 1SI02A-8", 1SI01B-24", and 1SI82AB-12"
1SI-1-ISI	35	Safety Injection Lines 1SI82AA-12", 1SI01A-8", 1SI53AA-14", and 1SI01B-24"
1SI-1-ISI	36	Safety Injection Lines 1SI02BB-6", 1SIF9A-8", and 1SI02BA-6"
1SI-1-ISI	37	Safety Injection Lines 1SI13A-6", 1SI13BA-6", and 1SI13BB-6"
1SI-1-ISI	38	Safety Injection Lines 1SI08D-3", 1SI08B-4", 1SI08CA-4", and 1SI08CB-4"
1SX-1-ISI	1	Essential Service Water Lines 1SX06EA-10", 1SX06CA-14", and 1SX06BA-16"
1SX-1-ISI	2	Essential Service Water Lines 1SX06DC-10", 1SX06EC-10", 1SX08AC-10", and 1SX08BC-10"
1SX-1-ISI	3	Essential Service Water Lines 1SX06EA-10", 1SX06FA-10", 1SX08AA-10", and 1SX08BA-10"
1SX-1-ISI	4	Essential Service Water Lines 1SX06EB-10", 1SX06CB-14", and 1SX06BB-16"
1SX-1-ISI	5	Essential Service Water Lines 1SX06DD-10", 1SX06ED-10", 1SX08AD-10", and 1SX08BD-10"
1SX-1-ISI	6	Essential Service Water Lines 1SX06EB-10", 1SX06FB-10", 1SX08AB-10", and 1SX08BB-10"
1SX-1-ISI	7	Essential Service Water Lines 1SX07CB-10", 1SX07EB-14", and 1SX07FB-16"
1SX-1-ISI	8	Essential Service Water Lines 1SX07BB-10", 1SX07CB-10", 1SX09CB-10", and 1SX09BB-10"
1SX-1-ISI	9	Essential Service Water Lines 1SX07BD-10", 1SX07CD-10", 1SX09BD-10", and 1SX09CD-10"
1SX-1-ISI	10	Essential Service Water Lines 1SX07CA-10", 1SX07EA-14", and 1SX07FA-16"
1SX-1-ISI	11	Essential Service Water Lines 1SX07BA-10", 1SX07CA-10", 1SX09CA-10", and 1SX09BA-10"
1SX-1-ISI	12	Essential Service Water Lines 1SX07CC-10", 1SX07BC-10", 1SX09CC-10", and 1SX09BC-10"
1VCT-1-ISI	---	Containment Spray Pumps 1CS-01-PA-1 and 1CS-01-PB-2
1VQ-1-ISI	1	Primary Containment Purge Lines 1VQ03A-8", 1VQ04A-8", 1VQ05A-8", 1VQ01A-48", and 1VQ02A-48"

TABLE 2.4-2
UNIT 2 ISI ISOMETRIC AND COMPONENT DRAWINGS

DRAWING NUMBER	SHEET NUMBER	DRAWING TITLE
2AF-1-ISI	1	Auxiliary Feedwater Lines 2AF02DA-4", 2AF02DE-4", and 2AF02EA-4"
2AF-1-ISI	2	Auxiliary Feedwater Lines 2FW06AA-4" and 2FW87BA-3"
2AF-1-ISI	3	Auxiliary Feedwater Lines 2AF02DB-4", 2AF02DF-4", and 2AF02EB-4"
2AF-1-ISI	4	Auxiliary Feedwater Lines 2FW06AB-4" and 2FW87BB-3"
2AF-1-ISI	5	Auxiliary Feedwater Lines 2AF02DC-4", 2AF02DG-4", and 2AF02EC-4"
2AF-1-ISI	6	Auxiliary Feedwater Lines 2FW06AC-4" and 2FW87BC-3"
2AF-1-ISI	7	Auxiliary Feedwater Lines 2AF02DD-4", 2AF02DH-4", and 2AF02ED-4"
2AF-1-ISI	8	Auxiliary Feedwater Lines 2FW06AD-4" and 2FW87BD-3"
2CS-1-ISI	1	Containment Spray Line 2CS02AA-10"
2CS-1-ISI	2	Containment Spray Line 2CS10AA-6"
2CS-1-ISI	3	Containment Spray Lines 2CS01AA-16" and 2CS23AA-14"
2CS-1-ISI	4	Containment Spray Lines 2CS01AB-16" and 2CS23AB-14"
2CS-1-ISI	5	Containment Spray Line 2CS02AB-10"
2CS-1-ISI	6	Containment Spray Lines 2CS02AB-10" and 2CS10AB-6"
2CS-1-ISI	7	Containment Spray Line 2CS02AA-10"
2CS-1-ISI	8	Containment Spray Lines 2CS06AA-6" and 2CS06AB-6"
2CV-1-ISI	1	Chemical & Volume Control Line 2CVB7A-3"
2CV-1-ISI	2	Chemical & Volume Control Lines 2RY18A-2" and 2CV45B-2"
2CV-1-ISI	3	Chemical & Volume Control Lines 2CV14FB-2" and 2CV14GB-1½"
2CV-1-ISI	4	Chemical & Volume Control Lines 2CVA5AB-2" and 2CVA6AB-2"
2CV-1-ISI	5	Chemical & Volume Control Line 2CVA3B-2"
2CV-1-ISI	6	Chemical & Volume Control Lines 2CV14FA-2", 2CV14FD-2", and 2CV14GB-1½
2CV-1-ISI	7	Chemical & Volume Control Line 2CVA3B-2"
2CV-1-ISI	8	Chemical & Volume Control Line 2CVA5AA-2"
2CV-1-ISI	9	Chemical & Volume Control Lines 2CVA3B-2", 2CVA3AB-2", and 2CVA7AB-2"
2CV-1-ISI	10	Chemical & Volume Control Line 2CVA3AB-2"
2CV-1-ISI	11	Chemical & Volume Control Lines 2CVA3B-2" and 2CVA6AA-2"
2CV-1-ISI	12	Chemical & Volume Control Line 2CV45B-2"
2CV-1-ISI	13	Chemical & Volume Control Line 2CVA3B-2"
2CV-1-ISI	14	Chemical & Volume Control Line 2CVA3B-2"
2CV-1-ISI	15	Chemical & Volume Control Line 2CVA3B-2"
2CV-1-ISI	16	Chemical & Volume Control Lines 2CV14FC-2" and 2CV14GC-1½"
2CV-1-ISI	17	Chemical & Volume Control Lines 2CV99A-8", 2CV05B-8", and 2CVA1A-6"
2CV-1-ISI	18	Chemical & Volume Control Lines 2CV05B-8", 2CV05CA-6", 2CV98BA-8", 2CV98BB-8", and 2CV98BC-8"
2CV-1-ISI	19	Chemical & Volume Control Line 2CV05CB-6"
2CV-1-ISI	20	Chemical & Volume Control Lines 2CV08AB-4", 2CV12AA-3", and 2CV42AA-2"
2CV-1-ISI	21	Chemical & Volume Control Lines 2CVJ4A-4", 2CV09A-4", and 2CV08BA-4"
2FW-1-ISI	1	Feedwater Lines 2FW03DD-16" and 2FW86AD-16"
2FW-1-ISI	2	Feedwater Lines 2FW03DA-16" and 2FW86AA-16"
2FW-1-ISI	3	Feedwater Lines 2FW86AB-16" and 2FW03DB-16"
2FW-1-ISI	4	Feedwater Lines 2FW03DC-16" and 2FW86AC-16"
2FW-1-ISI	5	Feedwater Lines 2FW81AB-6", 2FW81BB-6", and 2FW87CB-6"
2FW-1-ISI	6	Feedwater Line 2FW87CB-6"
2FW-1-ISI	7	Feedwater Line 2FW87CC-6"
2FW-1-ISI	8	Feedwater Line 2FW87CD-6"

TABLE 2.4-2
UNIT 2 ISI ISOMETRIC AND COMPONENT DRAWINGS

DRAWING NUMBER	SHEET NUMBER	DRAWING TITLE
2FW-1-ISI	9	Feedwater Line 2FW87CA-6"
2FW-1-ISI	10	Feedwater Lines 2FW81AC-6", 2FW81BC-6", and 2FW87CC-6"
2FW-1-ISI	11	Feedwater Lines 2FW81AA-6", 2FW81BA-6", and 2FW87CA-6"
2FW-1-ISI	12	Feedwater Lines 2FW81AD-6", 2FW81BD-6", and 2FW87CD-6"
2MS-1-ISI	1	Main Steam Line 2MS01AD-30 1/4" (Loop 4)
2MS-1-ISI	2	Main Steam Lines 2MS01BD-30 1/4", 2MS07AD-28", 2MS13AD-8", 2MS07BD-28", and 2MS143AD-12" (Loop 4)
2MS-1-ISI	3	Main Steam Line 2MS01AA-30 1/4" (Loop 1)
2MS-1-ISI	4	Main Steam Lines 2MS01BA-30 1/4", 2MS07AA-28", 2MS13AA-8", 2MS07BA-28", and 2MS143AA-12" (Loop 1)
2MS-1-ISI	5	Main Steam Line 2MS01AB-32 3/4" (Loop 2)
2MS-1-ISI	6	Main Steam Lines 2MS01BB-32 3/4", 2MS07AB-28", 2MS13AB-8", and 2MS143AB-12" (Loop 2)
2MS-1-ISI	7	Main Steam Line 2MS01AC-32 3/4" (Loop 3)
2MS-1-ISI	8	Main Steam Lines 2MS01BC-32 3/4", 2MS07AC-28", 2MS13AC-8", and 2MS143AC-12"
2RC-1-ISI	1	Primary Coolant System Loop 1 To Steam Gen. No. 2RC-01-BA
2RC-1-ISI	2	Primary Coolant System Loop 2 To Steam Gen. No. 2RC-01-BB
2RC-1-ISI	3	Primary Coolant System Loop 3 To Steam Gen. No. 2RC-01-BC
2RC-1-ISI	4	Primary Coolant System Loop 4 To Steam Gen. No. 2RC-01-BD
2RC-1-ISI	5	Reactor Coolant Surge Line 2RY11A-14"
2RC-1-ISI	6	Reactor Coolant Lines 2RC21AA-8" and 2RC21BA-8"
2RC-1-ISI	7	Reactor Coolant Lines 2RC28A-3", 2CV10DA-3", 2RC37A-3", 2CV10DB-3", and 2RC36A-3"
2RC-1-ISI	9	Reactor Coolant Lines 2RC21AB-8" and 2RC21BB-8"
2RC-1-ISI	11	Reactor Coolant Lines 2RC04AB-12" and 2RC05AB-6"; Residual Heat Removal Line 2RH01AB-12"
2RC-1-ISI	12	Reactor Coolant Lines 2RC21AC-8" and 2RC21BC-8"
2RC-1-ISI	14	Reactor Coolant Lines 2RC24AB-4" and 2RY01AB-4"
2RC-1-ISI	15	Reactor Coolant Lines 2RC21AD-8" and 2RC21BD-8"
2RC-1-ISI	16	Reactor Coolant Lines 2RY01B-6" and 2RY01C-4"
2RC-1-ISI	17	Reactor Coolant Lines 2RC24AA-4" 2RY01AA-4", 2RY01AB-4", and 2RY01B-6"
2RC-1-ISI	19	Reactor Coolant Lines 2RC22AB-1½" and 2RC46AB-3"
2RC-1-ISI	20	Reactor Coolant Lines 2RC22AD-1½" and 2RC46AD-3"
2RC-1-ISI	21	Reactor Coolant Line 2RC22AB-1½"
2RC-1-ISI	22	Reactor Coolant Lines 2RC05AA-6" (Loop 2) and 2RC35AB-6" (Loop 4)
2RC-1-ISI	23	Reactor Coolant Lines 2RC22AA-1½" and 2RC46AA-3"
2RC-1-ISI	24	Reactor Coolant Lines 2RC22AC-1½" and 2RC46AC-3"
2RC-1-ISI	27	Reactor Coolant Lines 2RC22AA-1½" and 2RC22AC-1½"
2RC-1-ISI	29	Reactor Coolant Lines 2RC16AC-2" (Loop 3) and 2RC16AD-2" (Loop 4)
2RC-1-ISI	30	Reactor Coolant Lines 2RC13AA-2", 2RC13AB-2", 2RC13AC-2", and 2RC13AD-2"
2RC-1-ISI	31	Reactor Coolant Lines 2RC14AB-2" (Loop 2) and 2RC26A-2" (Loop 4)
2RC-1-ISI	32	Reactor Coolant Lines 2RY03AA-6", 2RY03AB-6", 2RY03AC-6", 2RY03BA-6", 2RY03BB-6", and 2RY03BC-6"
2RC-1-ISI	35	Reactor Coolant Lines 2RY02A-6", 2RY06A-3", and 2RY02B-3"
2RC-1-ISI	36	Reactor Coolant Lines 2RC14AA-2" and 2CVA3AA-2"
2RC-1-ISI	37	Reactor Coolant Lines 2RC14AD-2" and 2CVA7AA-2"
2RC-1-ISI	41	Reactor Coolant Lines 2RC16AA-2" (Loop 1) and 2RC16AB-2" (Loop 2)
2RC-1-ISI	42	Reactor Coolant Line 2RC14AC-2"

TABLE 2.4-2
UNIT 2 ISI ISOMETRIC AND COMPONENT DRAWINGS

DRAWING NUMBER	SHEET NUMBER	DRAWING TITLE
2PZR-1-ISI	---	Pressurizer No. 2RY-01-S
2RCP-1-ISI	---	Reactor Coolant Pumps 2RC-01-PA, 2RC-01-PB, 2RC-01-PC, and 2RC-01-PD
2RPV-1-ISI	---	Reactor Pressure Vessel No. 2RC-01-R
2SG-1-ISI	1	Steam Generator No. 2RC-01-BA
2SG-1-ISI	2	Steam Generator No. 2RC-01-BB
2SG-1-ISI	3	Steam Generator No. 2RC-01-BC
2SG-1-ISI	4	Steam Generator No. 2RC-01-BD
2RH-1-ISI	1	Residual Heat Removal Line 2RH01AB-12"
2RH-1-ISI	2	Residual Heat Removal Line 2RH01AA-12"
2RH-1-ISI	3	Residual Heat Removal Line 2RH03AA-8"
2RH-1-ISI	4	Residual Heat Removal Line 2RH01CA-16"
2RH-1-ISI	5	Residual Heat Removal Lines 2RH02AA-8" and 2RH09AA-8"
2RH-1-ISI	6	Residual Heat Removal Line 2RH03AB-8"
2RH-1-ISI	7	Residual Heat Removal Lines 2RH03AB-8", 2RH14A-8", and 2RH03AA-8"
2RH-1-ISI	8	Residual Heat Removal Line 2RH01CB-16"
2RH-1-ISI	9	Residual Heat Removal Line 2RH02AB-8"
2RH-1-ISI	10	Residual Heat Removal Lines 2RH03AA-8" and 2RH12A-8"
2RH-1-ISI	11	Residual Heat Removal Line 2RH01BC-12" and 2SI82BB-12"
2RH-1-ISI	12	Residual Heat Removal Line 2RH01BA-12"
2RH-1-ISI	13	Residual Heat Removal Line 2RH02AB-8" and 2RH09AB-8"
2RHP-1-ISI	---	Residual Heat Removal Pumps 2RH01PA-1-1A and 2RH01PB-2-1B
2RHX-1-ISI	---	Residual Heat Exchanger Nos. 2RH02AA and 2RH02AB
2SI-1-ISI	1	Safety Injection Lines 2RC29AA-10" and 2SI09BA-10"
2SI-1-ISI	2	Safety Injection Lines 2SIA4B-8", 2SI03FA-2", 2RC04AA-12", and 2RC35AA-6"
2SI-1-ISI	3	Safety Injection Line 2SI05DA-6"
2SI-1-ISI	4	Safety Injection Lines 2SI05BA-8", 2SI05CA-8", and 2SI05CD-8"
2SI-1-ISI	5	Safety Injection Lines 2RC29AB-10" and 2SI09BB-10"
2SI-1-ISI	6	Safety Injection Lines 2SI05DB-6" and 2SI18FB-2"
2SI-1-ISI	7	Safety Injection Lines 2SI08FA-3", 2SI08FB-3", and 2SI08E-3"
2SI-1-ISI	8	Safety Injection Line 2SI08FA-3"
2SI-1-ISI	9	Safety Injection Lines 2RC29AC-10" and 2SI09BC-10"
2SI-1-ISI	10	Safety Injection Lines 2SI05DC-6" and 2SI18FC-2"
2SI-1-ISI	11	Safety Injection Lines 2SI04D-8" and 2SI03DB-2"
2SI-1-ISI	12	Safety Injection Lines 2SI04A-12", 2SI04B-12", 2SI04C-8", and 2SIA4A-8"
2SI-1-ISI	13	Safety Injection Lines 2RC29AD-10" and 2SI09BD-10"
2SI-1-ISI	14	Safety Injection Line 2SI05DD-6"
2SI-1-ISI	15	Safety Injection Lines 2SI08JC-1½" 2RC45AC-3", and 2RC30AC-1½"
2SI-1-ISI	16	Safety Injection Lines 2SI08JD-1½", 2RC45AD-3", and 2RC30AD-1½"
2SI-1-ISI	17	Safety Injection Lines 2SI08JB-1½", 2RC45AB-3", and 2RC30AB-1½"
2SI-1-ISI	18	Safety Injection Lines 2SI08HB-2", 2SI08GB-1½", and 2SI08JB-1½"
2SI-1-ISI	19	Safety Injection Lines 2SI08GA-1½", 2SI08HA-2", and 2SI08JA-1½"
2SI-1-ISI	20	Safety Injection Lines 2SI08GC-1½", 2SI08HC-2", 2SI08JC-1½", 2SI08GD-1½", 2SI08HD-2", and 2SI08JD-1½"
2SI-1-ISI	21	Safety Injection Line 2SI03DA-2"
2SI-1-ISI	22	Safety Injection Line 2SI03FB-2"
2SI-1-ISI	23	Safety Injection Lines 2SI18FA-2" and 2SI18FD-2", and Reactor Coolant Line 2RY76A-2"

TABLE 2.4-2
UNIT 2 ISI ISOMETRIC AND COMPONENT DRAWINGS

DRAWING NUMBER	SHEET NUMBER	DRAWING TITLE
2SI-1-ISI	24	Safety Injection Lines 2SI06BA-24" and 2SI06BB-24"
2SI-1-ISI	25	Safety Injection Line 2SI05AA-8"
2SI-1-ISI	26	Safety Injection Lines 2SI05BB-8", 2SI05CB-8", and 2SI05CC-8"
2SI-1-ISI	27	Safety Injection Line 2SI08JD-1½"
2SI-1-ISI	29	Safety Injection Line 2SI08JC-1½"
2SI-1-ISI	31	Safety Injection Lines 2SI08JA-1½", 2RC30AA-1½", and 2RC45AA-3"
2SI-1-ISI	32	Safety Injection Line 2SI05AB-8"
2SI-1-ISI	33	Safety Injection Line 2SI34A-8"
2SI-1-ISI	34	Safety Injection Line 2SI05CB-8"
2SX-1-ISI	1	Essential Service Water Lines 2SX06BA-16", 2SX06CA-14", 2SX06DC-10", 2SX06EA-10", 2SX08AA-10", and 2SX08AC-10"
2SX-1-ISI	2	Essential Service Water Lines 2SX06DC-10", 2SX06EC-10", 2SX08AC-10", and 2SX08BC-10"
2SX-1-ISI	3	Essential Service Water Lines 2SX06EA-10", 2SX06FA-10", 2SX08AA-10", and 2SX08BA-10"
2SX-1-ISI	4	Essential Service Water Lines 2SX06BB-16", 2SX06CB-14", 2SX06EB-10", 2SX08AB-10", and 2SX08AD-10"
2SX-1-ISI	5	Essential Service Water Lines 2SX06DD-10", 2SX06ED-10", 2SX08AD-10", and 2SX08BD-10"
2SX-1-ISI	6	Essential Service Water Lines 2SX06EB-10", 2SX06FB-10", 2SX08AB-10", and 2SX08BB-10"
2SX-1-ISI	7	Essential Service Water Lines 2SX07CB-10", 2SX07EB-14", 2SX07FB-16", 2SX09CB-10", and 2SX09CD-10"
2SX-1-ISI	8	Essential Service Water Lines 2SX07BB-10", 2SX07CB-10", 2SX09BB-10", and 2SX09CB-10"
2SX-1-ISI	9	Essential Service Water Lines 2SX07BD-10", 2SX07CD-10", 2SX09BD-10", and 2SX09CD-10"
2SX-1-ISI	10	Essential Service Water Lines 2SX07CA-10", 2SX07EA-14", and 2SX07FA-16"
2SX-1-ISI	11	Essential Service Water Lines 2SX07BA-10", 2SX07CA-10", 2SX09BA-10", and 2SX09CA-10"
2SX-1-ISI	12	Essential Service Water Lines 2SX07BC-10", 2SX07CC-10", 2SX09BC-10", and 2SX09CC-10"
2VCT-1-ISI	---	Containment Spray Pumps 2CS-01-PA-1 and 2CS-01-PB-2
2VQ-1-ISI	1	Primary Containment Purge Lines 2VQ03A-8", 2VQ04A-8", 2VQ05A-8", 2VQ01A-48", and 2VQ02A-48"

TABLE 2.4-3
UNIT 1 CONTAINMENT ISI DRAWINGS

CISI DWG. NO.	CISI DRAWING TITLE
1-CISI-1000 SH.1	IWE Component Rollout Inside Containment Liner View Looking Out 0° To 180° Azimuth
1-CISI-1000 SH.2	IWE Component Rollout Inside Containment Liner View Looking Out 180° To 360° Azimuth
1-CISI-1000 SH. 3	IWE Component Drawing Inside Containment Mat Plan View - EL. 377' - 0"
1-CISI-1000 SH. 4	IWE Component Drawing Containment Dome Liner View Looking UP
1-CISI-1000 SH. 5	IWE Component Detail Recirc. Sump A & B Guard Pipe & Bellows Assembly
1-CISI-1000 SH. 7A	IWE Component Detail Fuel Transfer Tube Pen. (P-98) Reactor Pool Area
1-CISI-1000 SH. 7B	IWE Component Sections Fuel Transfer Tube Pen. (P-98) Reactor Pool Area
1-CISI-1000 SH. 9A	IWE Component Detail Equipment Hatch/Personnel Air Lock
1-CISI-1000 SH. 9B	IWE Component Detail Equipment Hatch/Personnel Air Lock
1-CISI-1000 SH. 9C	IWE Component Detail Equipment Hatch/Personnel Air Lock
1-CISI-1000 SH. 9D	IWE Component Detail Equipment Hatch/Personnel Air Lock
1-CISI-1000 SH. 10A	IWE Component Detail Emergency Personnel Air Lock
1-CISI-1000 SH. 10B	IWE Component Detail Emergency Personnel Air Lock
1-CISI-1000 SH. 10C	IWE Component Detail Emergency Personnel Air Lock
1-CISI-1000 SH. 10D	IWE Component Detail Emergency Personnel Air Lock
1-CISI-1000 SH. 11	Typical IWE Component Surface and Attachment Details
1-CISI-1000 SH. 12	Typical Penetration Details Inside Containment Configuration No.'s 1, 2 & 3
1-CISI-1000 SH. 13	Typical Penetration Details Inside Containment Configuration No.'s 4 & 5
1-CISI-1001, SH. A1	ISI Identifier Format and Explanation
1-CISI-1001 SH. 1A THRU 1F	IWE Component Information Table Piping Penetrations
1-CISI-1001 SH. 1G THRU 1J	IWE Component Information Table Electrical Penetrations
1-CISI-1001 SH. 1K	IWE Component Information Table Instrument Penetrations
1-CISI-1001 SH. 1L THRU 1R	IWE Component Information Table Miscellaneous Components
1-CISI-1001 SH 2A	Electrical Penetration Details Outside Containment Configuration No. 1
1-CISI-1001 SH 2B	Electrical Penetration Section Outside Containment Configuration No. 1
1-CISI-1001 SH 3A	Electrical Penetration Details Outside Containment Configuration No. 2
1-CISI-1001 SH 3B	Electrical Penetration Sections Outside Containment Configuration No. 2
1-CISI-1001 SH 4A	Electrical Penetration Details Outside Containment Configuration No. 3
1-CISI-1001 SH 4B	Electrical Penetration Sections Outside Containment Configuration No. 3
1-CISI-1001 SH 5A	Electrical Penetration Details Outside Containment Configuration No. 4
1-CISI-1001 SH 5B	Electrical Penetration Section Outside Containment Configuration No. 4
1-CISI-1001 SH 6A	Electrical Penetration Details Personnel Air Locks Configuration No. 5
1-CISI-1001 SH 6B	Electrical Penetration Section Outside Containment Configuration No. 5
1-CISI-1001 SH. 7	Instrument Penetration Details Outside Containment Configuration No's 1, 2 & 3
1-CISI-1001 SH. 8	Piping Penetration Details Outside Containment Configuration No's 1 & 2
1-CISI-1001 SH. 9	Piping Penetration Details Outside Containment Configuration No's 3 & 4
1-CISI-1001 SH. 10	Piping Penetration Detail Outside Containment Configuration No. 5
1-CISI-1001 SH. 11	Piping Penetration Detail Outside Containment Configuration No. 6
1-CISI-1001 SH. 12	Piping Penetration Detail Outside Containment Configuration No. 7
1-CISI-2000 SH. 1	IWL/IWE Component Rollout Outside Containment 0° To 180° Azimuth
1-CISI-2000 SH. 2	IWL/IWE Component Rollout Outside Containment 180° To 360° Azimuth
1-CISI-2000 SH. 3	IWL Component Drawing Containment Dome Exterior Plan View
1-CISI-2000 SH. 4	IWL Component Drawing Tendon Gallery Plan View
1-CISI-2000 SH. 5	IWL Component Detail Tendon Anchorage Assembly
1-CISI-2000 SH. 6	IWL Component Drawing Dome Tendon Layout

TABLE 2.4-4
UNIT 2 CONTAINMENT ISI DRAWINGS

CISI DWG. NO.	CISI DRAWING TITLE
2-CISI-1000 SH.1	IWE Component Rollout Inside Containment Liner View Looking Out 0° To 180° Azimuth
2-CISI-1000 SH.2	IWE Component Rollout Inside Containment Liner View Looking Out 180° To 360° Azimuth
2-CISI-1000 SH. 3	IWE Component Drawing Inside Containment Mat Plan View - EL. 377' - 0"
2-CISI-1000 SH. 4	IWE Component Drawing Containment Dome Liner View Looking UP
2-CISI-1000 SH. 5	IWE Component Detail Recirc. Sump A & B Guard Pipe & Bellows Assembly
2-CISI-1000 SH. 7A	IWE Component Detail Fuel Transfer Tube Penetration (P-98) Reactor Pool Area
2-CISI-1000 SH. 7B	IWE Component Sections Fuel Transfer Tube Penetration (P-98) Reactor Pool Area
2-CISI-1000 SH. 9A	IWE Component Detail Equipment Hatch/Personnel Air Lock
2-CISI-1000 SH. 9B	IWE Component Detail Equipment Hatch/Personnel Air Lock
2-CISI-1000 SH. 9C	IWE Component Detail Equipment Hatch/Personnel Air Lock
2-CISI-1000 SH. 9D	IWE Component Detail Equipment Hatch/Personnel Air Lock
2-CISI-1000 SH. 10A	IWE Component Detail Emergency Personnel Air Lock
2-CISI-1000 SH. 10B	IWE Component Detail Emergency Personnel Air Lock
2-CISI-1000 SH. 10C	IWE Component Detail Emergency Personnel Air Lock
2-CISI-1000 SH. 10D	IWE Component Detail Emergency Personnel Air Lock
2-CISI-1000 SH. 11	Typical IWE Component Surface and Attachment Details
2-CISI-1000 SH. 12	Typical Penetration Details Inside Containment Configuration No.'s 1, 2 & 3
2-CISI-1000 SH. 13	Typical Penetration Details Inside Containment Configuration No.'s 4 & 5
2-CISI-1001, SH. A1	ISI Identifier Format and Explanation
2-CISI-1001 SH. 1A THRU 1F	IWE Component Information Table Piping Penetrations
2-CISI-1001 SH. 1G THRU 1P	IWE Component Information Table Electrical Penetrations
2-CISI-1001 SH. 1Q	IWE Component Information Table Instrument Penetrations
2-CISI-1001 SH. 1R THRU 1W	IWE Component Information Table Miscellaneous Components
2-CISI-1001 SH 2A	Electrical Penetration Details Outside Containment Configuration No. 1
2-CISI-1001 SH 2B	Elect. Penetration Sections Outside Containment Configuration No. 1
2-CISI-1001 SH 3A	Electrical Penetration Details Outside Containment Configuration No. 2
2-CISI-1001 SH 3B	Elect. Penetration Sections Outside Containment Configuration No. 2
2-CISI-1001 SH 4	Electrical Penetration Details Personnel Air Locks Configuration No. 3
2-CISI-1001 SH 5A	Electrical Penetration Details Outside Containment Configuration No. 4
2-CISI-1001 SH 5B	Elect. Penetration Sections Outside Containment Configuration No. 4
2-CISI-1001 SH. 6	Instrument Penetration Details Outside Containment Configuration No's 1, 2 & 3
2-CISI-1001 SH. 7	Piping Penetration Details Outside Containment Configuration No's 1 & 2
2-CISI-1001 SH. 8	Piping Penetration Details Outside Containment Configuration No's 3 & 4
2-CISI-1001 SH. 9	Piping Penetration Detail Outside Containment Configuration No. 5
2-CISI-1001 SH. 10	Piping Penetration Detail Outside Containment Configuration No. 6
2-CISI-1001 SH. 11	Piping Penetration Detail Outside Containment Configuration No. 7
2-CISI-2000 SH. 1	IWL/IWE Component Rollout Outside Containment 0° To 180° Azimuth
2-CISI-2000 SH. 2	IWL/IWE Component Rollout Outside Containment 180° To 360° Azimuth
2-CISI-2000 SH. 3	IWL Component Drawing Containment Dome Exterior Plan View
2-CISI-2000 SH. 4	IWL Component Drawing Tendon Gallery Plan View
2-CISI-2000 SH. 5	IWL Component Detail Tendon Anchorage Assembly
2-CISI-2000 SH. 6	IWL Component Drawing Dome Tendon Layout

2.5 TECHNICAL APPROACH AND POSITIONS

When the requirements of ASME Section XI are not easily interpreted, Byron Station has reviewed general licensing/regulatory requirements and industry practice to determine a practical method of implementing ASME Section XI requirements. The Technical Approach and Position (TAP) documents contained in this section have been provided to clarify Byron Station's implementation of ASME Section XI requirements. An index which summarizes each TAP is included in Table 2.5-1.

TABLE 2.5-1
TECHNICAL APPROACH AND POSITIONS INDEX

POSITION NUMBER	REVISION/ DATE[2]	STATUS[1]	(PROGRAM) DESCRIPTION OF TECHNICAL APPROACH AND POSITION
I4T-01	0 7/29/16	Active	**(ISI)** RI-ISI Examination Volumes and Methods.
I4T-02	0 7/29/16	Active	**(ISI)** Determination of Additional Examinations per ASME Code Case N-578-1, Paragraph -2430.
I4T-03	0 7/29/16	Active	**(SPT)** System Leakage Testing of Non-Isolable Buried Components.
I4T-04	0 7/29/16	Active	**(SPT)** Valve Seats/Discs as Pressurization Boundaries.
I4T-05	0 7/29/16	Active	**(ISI)** Unit 1 Steam Generator Lower Shell-to-Transition Cone Welds.
I4T-06	0 7/29/16	Active	**(ISI)** Preservice (PSI) Requirements Under the RI-ISI Program for Butt and Branch Connection Welds.
I4T-07	0 7/29/16	Active	**(ISI)** Implementation of ASME Code Case N-706-1 for RHR Heat Exchangers.
I4T-08	0 7/29/16	Active	**(ISI)** Repair Requirements for ISI Class 1 Repairs in Piping > 3/8" Nominal Pipe Size and Tubing Size > 1/2" in Diameter.
I4T-09	0 7/29/16	Active	**(ISI)** Repair/Replacement Requirements for New ISI Class 2 and 3 Branch Connections 1" and Smaller.
I4T-10	0 7/29/16	Active	**(ISI)** Examination Requirements for ASME Section XI, IWA-5244, "Buried Components.

Note 1: ISI Program Technical Approach and Position Status Options: Active - Current Technical Approach and Position is being utilized at Byron Station; Deleted - Technical Approach and Position is no longer being utilized at Byron Station

Note 2: The revision listed is the latest revision of the subject Technical Approach and Position. The date noted in the second column is the date of the ISI Program Plan revision when the Technical Approach and Position was incorporated into the document.

TECHNICAL APPROACH AND POSITION: I4T-01
Revision 0

Component Identification

Code Class:	1 and 2
Reference:	Byron Station Request for Relief I4R-01, *Alternative to the ASME Section XI Requirements for Class 1 and Class 2 Piping Welds* Executive Summary, Risk Informed Inservice Inspection Program Plan Byron Nuclear Power Station Units 1 and 2 ASME Code Case N-578-1: *Risk-Informed Requirements for Class 1, 2, or 3 Piping, Method B Section XI, Division 1* Electric Power Research Institute (EPRI) Topical Report (TR) 112657 Rev. B-A, *Revised Risk-Informed Inservice Inspection Evaluation Procedure*
Examination Category:	Previously B-F, B-J, C-F-1, and C-F-2 now incorporated into R-A
Description:	RI-ISI Examination Volumes and Methods

Code Requirement

The requirements for examination methods and areas/volumes are assembled from several sources other than the station's base edition of the ASME Code.

Relief Request I4R-01:

For this application, the guidance for the examination volume for a given degradation mechanism is provided by the EPRI Topical Report while the guidance for the examination method is provided by ASME Code Case N-578-1 (N-578-1).

Executive Summary, Section 3.5 *Inspection Location Selection and NDE Selection*:

N-578-1 Table 1, "Examination Category R-A, Risk-Informed Piping Examinations" will also be used in conjunction with Table 4-1 of EPRI TR-112657 to categorize the parts examined under the RI-ISI Program. N-578-1 Table 1 provides examination requirements, examination method, acceptance standards, examination extent and frequency for piping structural elements not subject to a damage mechanism.

N-578-1, Section I-5.2 *Examination Volumes and Methods*:

Examination programs developed in accordance with this Case shall use NDE techniques suitable for specific degradation mechanisms and examination locations. The examination volumes and methods that are appropriate for each degradation mechanism are provided in Table 1 of this Case. The methods and procedures used for the examinations shall be qualified to reliably detect and size the relevant degradation mechanisms identified for each elements.

TR-112657, Section 4 *Mechanism Specific Examination Volumes and Methods*:

Application of RI-ISI uses NDE techniques that are designed to be effective for specific degradation mechanisms and examination locations. This inspection for cause approach involves identification of specific damage mechanisms that are likely to be operative, the location where they may be operative, and the appropriate examination methods and volumes specific to address the damage mechanism. ...

TECHNICAL APPROACH AND POSITION: I4T-01
Revision 0

Position

Table I4T-01-1: Degradation Mechanisms with Examination Methods and Volumes

DEGRADATION MECHANISM (DM) OR COMPONENT TYPE	N-578-1 TABLE 1 EXAM METHOD	TR-112657 TABLE 4-1 EXAM VOLUME OR AREA	COMMENTS
Thermal Fatigue	Volumetric	Figure 4-1 thru 4-4	Includes expanded examination volume for piping. See Note[5].
High Cycle Mechanical Fatigue	Visual, VT-2	Not Applicable, Note[1]	None currently identified at station.
Erosion Cavitation	Volumetric	Figure 4-16 thru 4-22	None currently identified at station.
Crevice Corrosion Cracking	Volumetric	Figure 4-6 and 4-7	None currently identified at station.
Primary Water Stress Corrosion Cracking	See Note[2]	See Note[2]	See Note[2]
Intergranular or Transgranular Stress Corrosion Cracking	Volumetric	Figure 4-10 thru 4-14	Effected components not subject to an additional DM. Only SCC type examinations required for components.
Microbiologically Corrosion	Volumetric	Figure 4-15	See Note[3]
Flow Accelerated Corrosion	Volumetric	Figure 4-16 thru 4-22	In accordance w/ FAC Program
External Chloride Stress Corrosion Cracking	Surface	Affected Surface	None currently identified at station.
No Damage Mechanism	Volumetric	Figure 4-1 IWB-2500-8(c) IWB-2500-9, 10, 11 IWC-2500-7(a) See Notes[4,5,6]	Includes expanded examination volume for piping. See Notes[4,5,6]
Socket Welds (All DM)	Visual, VT-2	Not Applicable, Note[1]	See Note[1]

Note 1: VT-2 visual examinations are performed during each refueling cycle. VT-2 visual examination area is not identified in N-578-1 or TR-112657 (TR-RI-ISI). Socket welds are not specifically addressed in TR-RI-ISI with the exception of FAC examinations. N-578-1 Table 1 Note 12 specifies that socket welds require only a VT-2 visual examination.

Note 2: N-578-1 requires a VT-2 visual examination for this DM while TR-112657 requires a volumetric or visual method. Recent industry events necessitated the change to volumetric examination techniques (where qualified examination techniques are available) for detection prior to through-wall leakage. TR-RI-ISI identifies Figures 4-8 and 4-9 for the required examination volumes based on component configuration. Figure 4-8 would not be applicable to components incorporated into RI-ISI. At Byron Station, all components previously subject to PWSCC (8 in each unit) are now classified DM None and as Medium-Risk Group, Risk Category 4.

Note 3: DM currently limited to SX system components. These components have been removed from the RI-ISI inspection population and default by incorporation into the Service Water Inspection program.

TECHNICAL APPROACH AND POSITION: I4T-01
Revision 0

Note 4: Examination of components without an identified DM is not addressed in TR-RI-ISI. N-578-1 requires that these components receive the same examination as components subject to thermal fatigue. For no-DM components, the examination requirements of N-578-1 will be used.

Note 5: For piping butt welds with no DM, the length for the examination volume shall be increased to include ½" beyond each side of the detectable base metal thickness transition or counterbore. For components without a detectable base metal thickness transition or counterbore, the basic examination volume specified in TR-RI-ISI Figure 4-1 shall be used. The figure applicable for use shall be based on the detectable presence of a counterbore regardless of the pipe size.

Note 6: For branch connection piping without a DM, the examination volume shall be determined using the figures specified in N-578-1 (Figures IWB-2500-9, 10, 11 of the 2007 Edition with the 2008 Addenda).

TECHNICAL APPROACH AND POSITION: I4T-02
Revision 0

Component Identification

Code Class:	1, 2, and 3
Reference:	Byron Station Request for Relief I4R-01 ASME Code Case N-578-1: *Risk-Informed Requirements for Class 1, 2, or 3 Piping, Method B Section XI, Division 1*
Examination Category:	Previously B-F, B-J, C-F-1, and C-F-2 now incorporated into R-A
Description:	Determination of Additional Examinations per ASME Code Case N-578-1, Paragraph -2430

Code Requirement

-2430 Additional Examinations

(a) Examinations performed in accordance with -2500 that reveal flaws or relevant conditions exceeding the acceptance standards of -3000 shall be extended to include additional examinations. The additional examinations shall include piping structural elements described in Table 1 with the same postulated failure mode and the same or higher failure potential.

(1) The number of additional elements shall be the number of piping structural elements with the same postulated failure mode originally scheduled for that fuel cycle.

(2) The scope of the additional examinations may be limited to those High-Safety-Significant (HSS) piping structural elements within systems, whose materials and service conditions are determined by an evaluation to have the same postulated failure mode as the piping structural element that contained the original flaw or relevant condition.

(b) If the additional examinations required by -2430(a) reveal flaws or relevant conditions exceeding the acceptance standards of -3000, the examination shall be further extended to include additional examinations.

(1) These examinations shall include all remaining piping elements within Table 1 whose postulated failure modes are the same as the piping structural elements originally examined in -2430(a)

(2) An evaluation shall be performed to establish when those examinations are to be conducted. The evaluation must consider failure mode and potential.

(c) For the inspection period following the period in which the examinations of -2430(a) or (b) were completed, the examinations shall be performed as originally scheduled in accordance with -2400.

Underlined portions of the requirements of the code case identify issues addressed in this technical approach.

TAP I4T-02 Basis Sections of N-578-1

A. -9000 Glossary

failure mode - a condition or degradation mechanism that can cause a failure

B. Figure I-1 Risk Evaluation Process

Failure Mode Assessment:
Design & Operating Conditions
Service Experience
Degradation Mechanisms

C. Appendix I: Requirements for Risk-Informed Selection Process

TECHNICAL APPROACH AND POSITION: I4T-02
Revision 0

I-3.1 Failure Potential Assessment

I-3.1.1 Identification of Degradation Mechanisms. Potential active degradation mechanisms for each pipe segment within the selected system boundaries shall be identified. The following conditions shall be considered.

(a) Design characteristics, including material, pipe size and schedule, component type (e.g., fitting type or ANSI standard) and other attributes related to the system configuration.

(b) Fabrication practices, including welding and heat treatment.

(c) Operating conditions, including temperatures and pressures, fluid conditions (e.g., stagnant, laminar flow, and turbulent flow), fluid quality (e.g., primary water, raw water, dry steam, and chemical control), and service environment (e.g., humidity and radiation).

(d) Industry-wide service experience with the systems being evaluated.

(e) Results of preservice, inservice, and augmented examinations, and the presence of prior repairs in the system.

(f) Degradation mechanisms identified in Table I-1.

Underlined portions of the requirements of the code case identify issues addressed in this technical approach.

TECHNICAL APPROACH AND POSITION: I4T-02
Revision 0

Position

-2430 (a)(1) Additional Examination Selection Criteria by Failure Mode of Additional Examinations

The criteria of additional selection are based upon the failure mode of the initially rejected element. The following aspects may restrict the potential population of the additional elements.

Failure Mode Evaluation (determining element attributes)

(a) Design characteristics: material
pipe size and schedule
component type (joint configuration)

(b) Operating conditions: temperature
pressure
fluid quality

(c) Degradation mechanisms: shown in N-578-1 Table I-1

This evaluation may be performed prior to the outage in which the initial rejection occurs. The station population of RI-ISI elements may be organized into predetermined groups.

-2430 (a)(2) High-Safety-Significance and Failure Potential of Additional Examinations

Additional selections are not restricted by the Risk Category of the rejected element. High-Safety-Significant piping structural elements are identified as those components included in Risk Categories 1, 2, 3, 4, and 5. The additional examinations include elements with the same or higher failure potential. Because consequence is not considered, selections along the horizontal axis are not restricted by N-578-1. The Failure Potential of the rejected element restricts selections along the vertical axis to the same or higher position.

Table I4T-02-1: Unit 1 System Distribution in N-578-1 Risk Matrix Categories Subject to Examination[1]

N-578-1 TABLE I-8		CONSEQUENCE CATEGORY		
		LOW	MEDIUM	HIGH
FAILURE POTENTIAL	HIGH	CATEGORY 5(H) None	**CATEGORY 3 FW**	CATEGORY 1 None
	MEDIUM		**CATEGORY 5(M) AF, CV, SI**	**CATEGORY 2 RC[2]**
	LOW			**CATEGORY 4 CS, CV, RH, RC[2], SI**
RISK GROUPS		MEDIUM - CAT 4 & 5		HIGH - CAT 1, 2, & 3

NOTES:
(1) Table does not include elements subsumed into other station programs. Table does include BER elements incorporated into the RI-ISI Program.
(2) The RC System includes both the RC and RY System elements.

TECHNICAL APPROACH AND POSITION: I4T-02
Revision 0

Table I4T-02-2: Unit 2 System Distribution in N-578-1 Risk Matrix Categories Subject to Examination[1]

N-578-1 TABLE I-8		CONSEQUENCE CATEGORY		
		LOW	MEDIUM	HIGH
FAILURE POTENTIAL	HIGH	CATEGORY 5(H) None	**CATEGORY 3 FW**	CATEGORY 1 None
	MEDIUM		**CATEGORY 5(M) AF, CV, SI**	**CATEGORY 2 RC[2]**
	LOW			**CATEGORY 4 CS, CV, MS, RC[2], RH, SI**
RISK GROUPS		MEDIUM - CAT 4 & 5		HIGH - CAT 1, 2, & 3

NOTES:
(1) Table does not include elements subsumed into other station programs. Table does include BER elements incorporated into the RI-ISI Program.
(2) The RC System includes both the RC and RY System elements.

In addition to the restrictions identified in -2430(a)(1), the potential population for additional examinations is limited by the following factors from the N-578-1 Table I-8 *Risk Matrix* for Failure Potential.

CATEGORY 3: Selections remain within Category 3.

CATEGORY 5: Selections may be taken from Categories 3, 5(M) and 2.

CATEGORY 2: Selections may be taken from Categories 3, 5(M) and 2.

CATEGORY 4: Selections may be taken from Categories 3, 5(M), 2 and 4.

-2430(b)(1): Second Expansion Scope of Additional Examinations

The second expansion scope includes the remaining elements in the original group determined under the -2430(a) criteria.

-2430(b)(2): Scheduling of the Second Expansion Scope

Per the response to the second I4R-01 RAI, the second expansion selections will be examined in the current refueling cycle.

-2430(c): Return to Original Schedule of Component Selection and Examination

In the initial expansion population, credit may be taken for examinations performed on components scheduled later in the same Inspection Period (i.e., the initial expansion may include components scheduled for the next refueling outage). The scheduling of components with other postulated failure modes are not affected by the additional examination scope(s).

TECHNICAL APPROACH AND POSITION: I4T-03
Revision 0

Component Identification

Code Class:	2 and 3
Reference:	IWA-5244(b)(2)
Examination Category:	C-H, D-B
Item Number:	C7.10, D2.10
Description:	System Leakage Testing of Non-Isolable Buried Components
Component Number:	Non-Isolable Buried Pressure Retaining Components

Code Requirement

IWA-5244(b)(2) requires non-isolable buried components be tested to confirm that flow during operation is not impaired.

Position

Article IWA-5000 provides no guidance in setting acceptance criteria for what can be considered "adequate flow". In lieu of any formal guidance provided by the Code, Byron Station has established the following acceptance criteria:

- For open ended lines on systems that require Inservice Testing (IST) or performance testing of pumps, adherence to IST or performance testing acceptance criteria is considered as reasonable proof of adequate flow through the lines.
- For lines in which the open end is accessible to visual examination while the system is in operation, visual evidence of flow discharging the line is considered as reasonable proof of adequate flow through the open ended line.
- For open ended portions of systems where the process fluid is pneumatic, evidence of gaseous discharge shall be considered reasonable proof of adequate flow through the open ended line. Such test may include passing smoke through the line, hanging balloons or streamers, using a remotely operated blimp, using thermography to detect hot air, etc.

This acceptance criteria will be utilized as proof of adequate flow in order to meet the requirements of IWA-5244(b)(2).

Byron Station's position is that proof of adequate flow is all that is required for testing the buried pipe segments of these open ended lines and that no further visual examination is necessary. This is consistent with the requirements for buried piping, which is not subject to visual examination.

TECHNICAL APPROACH AND POSITION: I4T-04
Revision 0

Component Identification

Code Class:	1, 2, and 3
Reference:	IWA-5221
	IWA-5222
Examination Category:	B-P, C-H, D-B
Item Number:	B15.10, B15.20, C7.10, D2.10
Description:	Valve Seats/Discs as Pressurization Boundaries
Component Number:	All Pressure Testing Boundary Valves

Code Requirement

IWA-5221 requires the pressurization boundary for system leakage testing extend to those pressure retaining components under operating pressures during normal system service.

Position

Byron Station's position is that the test pressurization boundary extends up to the valve seat/disc of the valve utilized for isolation. For example, in order to pressure test the ISI Class 1 components, the valve that provides the Class break would be utilized as the isolation point. In this case the true pressurization boundary, and Class break, is actually at the valve seat/disc.

Any requirement to test beyond the valve seat/disc is dependent only on whether or not the piping on the other side of the valve seat/disc is ISI Class 1, 2, or 3.

In order to simplify examination of classed components, Byron Station will perform a VT-2 visual examination of the entire boundary valve body and bonnet (during pressurization up to the valve seat/disc).

TECHNICAL APPROACH AND POSITION: I4T-05
Revision 0

Component Identification

Code Class:	2
Reference:	IWB-2500-1
Examination Category:	C-A
Item Number:	C1.10
Description:	Unit 1 Steam Generator Lower Shell-to-Transition Cone Welds
Component Number:	1RC-01-BA, SGW-05, 1RC-01-BB, SGW-05, 1RC-01-BC, SGW-05 and 1RC-01-BD, SGW-05

Code Requirement

Table IWC-2500-1 "Examination Category C-A, Pressure Retaining Welds in Pressure Vessels", Item Number C1.10, Shell Circumferential Welds (Pressure Vessels) requires a volumetric examination of vessel cylindrical-shell-to-conical- shell-junction welds and shell (or head)-to-flange welds.

Position

The weld configuration show in Figure IWC-2500-1(c) was typically used in older steam generator designs. The weld joining the lower shell to the transition cone is positioned at the junction where the vessel diameter begins to increase towards the diameter of the larger steam drum. The joint configuration of the SGW-05 welds is of the type normally found at intermediate shell joints that consist of butted, parallel plates. Intermediate shell welds do not require examination. In previous ISI Intervals, the intermediate shell welds were exempted from examination due to the weld joint being categorized as a non-gross structural discontinuity location. Steam generator welds where the joints are shell-to-tube sheet, shell-to-head, and shell-to-transition cone (per Figure IWC-2500-1(c)) were categorized as being located at gross structural discontinuities and required examination.

For the Second and Third ISI Intervals, Byron Station exempted the SGW-05 weld based on an evaluation of the weld location. Babcock & Wilcox, Canada (BWI) Engineering Evaluation CM9015189 - B2 *Exelon Generation Company RSG - Shell Circumferential Weld Evaluation with Respect to Section XI ISI Rules* was used to determine the classification of SGW-05. The evaluation determined that this weld should be not classified as being located at a gross structural discontinuity as defined in ASME Section III, NB-3213.2 and therefore is removed from the Item Number C1.10 population. EGC Owner's Review of this evaluation was performed under EC 354211 *Owner Review of B&W CALC # CM9015189-B2 RSG Shell Circumferential Weld Evaluation with Respect to Section XI ISI Rules.* This evaluation showed the stresses of SGW-05 resemble the intermediate shell weld locations and not the location of the base of the transition cone.

Since the joint configuration is a butted-plate type rather than the configuration seen in IWC-2500-1(c) and the stresses evaluated in CM9015189-B2 show the location is like those found at remote intermediate shell welds, this weld will be exempted from examination in this ISI Interval by removal from the C1.10 population.

TECHNICAL APPROACH AND POSITION: I4T-06
Revision 0

Component Identification

Code Class:	1, 2, and 3
Reference:	Byron Station Relief Request I4R-02 ASME Code Case N-578-1: *Risk-Informed Requirements for Class 1, 2, or 3 Piping, Method B Section XI, Division 1*
Examination Category:	Previously B-F, B-J, C-F-1, and C-F-2 now incorporated into R-A
Description:	Preservice Inspection (PSI) Requirements Under the RI-ISI Program for Butt and Branch Connection Welds

Code Requirement

IWB-2200 PRESERVICE EXAMINATION

(a) Examinations required by this Article (with the exception of Examination Category B-P, and the VT-3 visual examination of the internal surfaces of Examination Categories B-L-2 and B-M-2, of Table IWB-2500-1) shall be completed prior to initial plant startup. In addition, these preservice examinations shall be extended to include essentially 100% of the pressure retaining welds in all Class 1 components, except in those components exempted from examination by IWB-1220(a), (b), or (c). However, in the case of Examination Category B-O (Table IWB-2500-1), the examination shall be extended to include essentially 100% of the welds in the installed peripheral control rod drive housings only.

(b) Shop and field examinations may serve in lieu of the on-site preservice examinations provided:

(2) such examinations are conducted under conditions and with equipment and techniques equivalent to those that are expected to be employed for subsequent inservice examinations;

IWC-2200 PRESERVICE EXAMINATION

(a) All examinations required by this Article (with the exception of Examination Category C-H of Table IWC-2500-1) for those components initially selected for examination in accordance with Inspection Program and not exempt from inservice examinations by IWC-1220 shall be completed prior to initial plant startup.

(b) Shop and field examinations may serve in lieu of the on-site preservice examinations, provided:

(2) such examinations are conducted under conditions and with equipment and techniques equivalent to those which are expected to be employed for subsequent inservice examinations;

IWD-2200 PRESERVICE EXAMINATION

All examinations required by this Article (with the exception of Examination Category D-B of Table IWD-2500-1) shall be performed completely, once, as a preservice examination requirement prior to initial plant startup.

ASME CODE CASE N-578-1 (N-578-1)

PSI issue is not addressed.

EPRI TR-112657

PSI issue is not addressed.

RI-ISI EXECUTIVE SUMMARY

PSI issue is not addressed.

TECHNICAL APPROACH AND POSITION: I4T-06
Revision 0

Position

The replacement of Table IWB-2500-1 (Examination Categories B-F and B-J) and Table IWC-2500-1 (Examination Categories C-F-1 and C-F-2) by the RI-ISI Program does not include the PSI examination requirements. The requirements for PSI are now determined by the requirements specified by the RI-ISI Program for ISI examinations. Since surface examinations of welds are excluded from RI-ISI, no PSI surface examination is required. The following guidance meets the intent of ISI Class 1, 2, 3, and Non-Class components and incorporates the examination aspects of the RI-ISI Program.

ISI Class 1 RI-ISI Categories 1 through 5:

RI-ISI Item Number requirements for 100% of welds. Examinations that result in limitations of 10% or more will require a relief request.

ISI Class 1 RI-ISI Categories 6 and 7:

RI-ISI required examination volume for 100% of welds. If no item number is assigned to the weld, then the examination requirements of Item Number R1.11 will be used (based on possible change in risk category at later date). Examinations that result in limitations of 10% or more will require a relief request.

IWC-1220 Non-Exempt ISI Class 2 RI-ISI Categories 1 through 5:

Required per RI-ISI Item Number for 100% of welds. Examinations on those components selected for examination by RI-ISI that result in limitations of 10% or more will require a relief request. Examinations on those components not selected for examination by RI-ISI that result in limitations of 10% or more will not require a relief request.

IWC-1220 Non-Exempt ISI Class 2 RI-ISI Categories 6 and 7:

Required per RI-ISI Item Number for 100% of welds.

ISI Class 2 does not require 100% examination for PSI. However, augmented examinations may be required if applicable. The recommendation is to perform the PSI examination due to possible changes in the initially assigned examination categories. If no item number is assigned to the weld, then the examination requirements of Item Number R1.11 will be used (based on possible change in risk category at later date).

IWC-1220 Exempt ISI Class 2 RI-ISI Categories 1 through 7:

Not required.

ISI Class 2 does not require 100% examination for PSI. However, augmented examinations may be required if applicable.

ISI Class 3 or Non-Class RI-ISI Categories 1 through 5:

Required per RI-ISI Item Number for 100% of welds per corporate mandate.

ISI Class 3 or Non-Class RI-ISI Categories 6 and 7:

Not required.

ISI Class 3 or Non-Class does not require surface or volumetric examination for PSI or ISI. However, augmented examinations may be required if applicable.

TECHNICAL APPROACH AND POSITION: I4T-07
Revision 0

Component Identification

Code Class: 2
Reference: ASME Code Case N-706-1: *Alternative Examination Requirements of Table IWB-2500-1 and Table IWC-2500-1 for PWR Stainless Steel Residual and Regenerative Heat Exchangers Section XI, Division 1*
Examination Category: C-A and C-B
Description: Implementation of ASME Code Case N-706-1 for RHR Heat Exchangers

Code Requirement

The ISI Program is based on the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel (B&PV) Code, Section XI, 2007 Edition with the 2008 Addenda. Volumetric and surface examinations are specified for these components per IWC-2500 for Examination Categories C-A and C-B.

The applicable Residual Heat Exchanger welds are classified per Table IWC-2500-1. These welds are shown below.

Table I4T-07-1: RHR Heat Exchanger Welds

VESSEL WELD	DESCRIPTION	EXAM CATEGORY	ITEM NO.	EXAMINATION	COMMENTS
RHEC-01	Shell to Flange	C-A	C1.10	Volumetric	Note (1)
RHEC-02	Shell to Head	C-A	C1.20	Volumetric	
RHXN-01	Inlet Nozzle	C-B	C2.21	Volumetric & Surface	Note (1)
RHXN-01-NIR	Nozzle Inner Radius	C-B	C2.22	Volumetric	Note (2)
RHXN-02	Outlet Nozzle	C-B	C2.21	Volumetric & Surface	Note (1)
RHXN-02-NIR	Nozzle Inner Radius	C-B	C2.22	Volumetric	Note (2)

NOTES:
(1) Limited volumetric (UT) examination due to component configuration. Single-sided scanning access only.
(2) Configuration prevents examination to Item Number C2.22 requirements. The nozzle inner radius section as depicted in the IWC-2500 examination figures is not present in the Byron Station RHR Heat Exchanger design.

Position

ASME Code Case N-706-1 (N-706-1)

Inquiry: What alternative to the requirements of Table IWB-2500-1, Examination Categories B-B, B-D, and B-J, and Table IWC-2500-1, Examination Categories C-A, C-B, and C-F-1, may be used for PWR stainless steel regenerative and residual heat exchangers?

Reply: It is the opinion of the Committee that the requirements of Table 1 may be used for PWR stainless steel regenerative and residual heat exchangers, in lieu of the requirements of Table IWB-2500-1, Examination Categories B-B, B-D, and B-J, and Table IWC-2500-1, Examination Categories C-A, C-B, and C-F-1.

This Code Case may not be applied to any heat exchanger nor to any heat exchanger design or configuration that has experienced a through-wall leak, such as heat exchangers with an inner shell (inner barrel). The Owner shall evaluate industry experience to determine which heat exchanger designs or configurations have leaked. If any leakage is detected, it shall be corrected in accordance with IWA-4000 or (IWA-7000 prior to the 1991 Addenda). Use of this Code Case shall be discontinued

TECHNICAL APPROACH AND POSITION: I4T-07
Revision 0

for that heat exchanger design or configuration. The affected heat exchanger and others of the same design or configuration shall be examined in accordance with IWB-2500 or IWC-2500, as applicable.

Table I4T-07-2: N-706-1 Table 1 and Byron Station Applicability

PRESSURE RETAINING WELDS IN PWR STAINLESS STEEL RESIDUAL AND REGENERATIVE HEAT EXCHANGERS						
ITEM NO.	PARTS EXAMINED [NOTES (1), (2)]	EXAMINATION METHOD	ACCEPTANCE STANDARD	EXTENT AND FREQUENCY OF EXAMINATION		DEFERRAL OF EXAMINATION TO END OF INTERVAL
				FIRST INSPECTION INTERVAL	SUCCESSIVE INSPECTION INTERVALS	
1.10	Residual and regenerative heat exchangers					
1.11	Not Applicable to Byron Station	-	-	-	-	-
1.12	Not Applicable to Byron Station	-	-	-	-	-
1.13	Not Applicable to Byron Station	-	-	-	-	-
1.14	Examination Category C-A welds [Note (4)]	VT-2	IWC-3516	All welds	Same as for 1st interval	Not permissible
1.15	Examination Category C-B welds [Note (4)]	VT-2	IWC-3516	All welds	Same as for 1st interval	Not permissible
1.16	Not Applicable to Byron Station	-	-	-	-	-

NOTES:

(1) Application of the requirements of this table is limited to those welds that are part of the as-received heat exchanger assembly. The regenerative heat exchanger assembly may be formed from multiple smaller heat exchanger subcomponents connected by sections of piping. All of the smaller heat exchanger subcomponents and the connecting piping are within the boundary of the heat exchanger assembly.

(2) All welds, other than reinforcing plate welds, shall have received at least one volumetric examination; the preservice or Construction Code volumetric examination may be used to meet this requirement. Reinforcing plate welds shall have received at least one surface examination. This does not apply to nozzle inside-radius sections.

(3) Not Applicable to Byron Station.

(4) Component shall be examined for evidence of leakage while undergoing the system leakage test (IWC-5220) as required by Examination Category C-H, to be performed every inspection period.

Specified Conditions for Use of N-706-1

a. This Code Case may not be applied to any heat exchanger nor to any heat exchanger design or configuration that has experienced a through-wall leak, such as heat exchangers with an inner shell (inner barrel). The Owner shall evaluate industry experience to determine which heat exchanger designs or configurations have leaked.

The industry experience was evaluated in the following documents.

1. Westinghouse Owner's Group (WOG) project MUHP 5093, Working Group Inservice Inspection Optimization Action 97-01, ISI-03-06, BC03-338, *Technical Basis for Revision of Inspection Requirements for Regenerative and Residual Heat Exchangers*, August, 2003.
2. Pacific Northwest National Laboratory PVP2005-71633 *Assessment of ASME Code Examinations on Regenerative, Letdown, and Residual Heat Removal Heat Exchangers.*

These studies did not identify leakage events for the Byron Station RHR Heat Exchanger design.

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b. Note (2): All welds shall have received at least one volumetric examination; the preservice or Construction Code volumetric examination may be used to meet this requirement.

Table I4T-07-3: Most Recent RHR Heat Exchanger Volumetric Examination

COMPONENT	EXAMINATION			
	STAGE	DATE	METHOD	REPORT #
Vessel: 1RH-02-AA				
RHEC-01	Fabrication	11/26/1975	Radiographic	Job# J-2267-1A
RHEC-02	Fabrication	11/26/1975	Radiographic	Job# J-2267-1A
RHXN-01	B1R08 – ISI	12/23/1997	Ultrasonic	97BY1-UTD-148
RHXN-02	B1R05 – ISI	02/03/1993	Ultrasonic	93BY1-UT-029
Vessel: 1RH-02-AB				
RHEC-01	B1R14 – ISI	08/29/2006	Ultrasonic	B1R14-UT-010
RHEC-02	B1R14 – ISI	08/29/2006	Ultrasonic	B1R14-UT-011
RHXN-01	B1R05 – ISI	02/02/1993	Ultrasonic	93BY1-UT-026
RHXN-02	B1R05 – ISI	02/02/1993	Ultrasonic	93BY1-UT-027
Vessel: 2RH-02-AA				
RHEC-01	B2R12 – ISI	09/22/2005	Ultrasonic	B2R12-UT-008
RHEC-02	B2R12 – ISI	09/22/2005	Ultrasonic	B2R12-UT-008
RHXN-01	B2R05 – ISI	02/20/2095	Ultrasonic	95BY2-UTD-088
RHXN-02	B2R09 – ISI	04/04/2001	Ultrasonic	B2R09-UT-081
Vessel: 2RH-02-AB				
RHEC-01	Preservice	07/26 - 07/31/1986	Ultrasonic	UT-A-01, UT-C-01
RHEC-02	Preservice	08/04/1986	Ultrasonic	UT-A/C-02
RHXN-01	B2R05 – ISI	02/28/1995	Ultrasonic	95BY2-UTD-090
RHXN-02	B2R05 – ISI	02/28/1995	Ultrasonic	95BY2-UTD-091

c. Note (4): Component shall be examined for evidence of leakage while undergoing the system leakage test (IWC-5220) as required by Examination Category C-H, to be performed every inspection period.

Table I4T-07-4: System Pressure Test Implementation

Vessel	PRESSURE TEST EXAMINATION INFORMATION			
	P&ID	TEST BLOCK	PMID	
1RH-02-AA	M-62	RH-2-1	122551	Performed with 1RH01PA pump run.
1RH-02-AB	M-62	RH-2-2	122552	Performed with 1RH01PB pump run.
2RH-02-AA	M-137	RH-2-1	124070	Performed with 2RH01PA pump run.
2RH-02-AB	M-137	RH-2-2	124071	Performed with 2RH01PB pump run.

TECHNICAL APPROACH AND POSITION: I4T-08
Revision 0

Component Identification

Code Class:	1
References:	IWA-4131(a)(2)
Examination Category:	NA
Item Number:	NA
Description:	Repair Requirements for ISI Class 1 Repairs in Piping > 3/8" Nominal Pipe Size and Tubing Size > 1/2" in Diameter
Component Number:	Not Applicable

Code Requirement

IWA-4131.1(a)(2) requires that "the size and design such that, in the event of postulated failure during normal plant operating conditions, the reactor can be shut down and cooled in an orderly manner, assuming makeup is provided by normal reactor coolant makeup systems operable from on-site emergency power."

Position

ISI Class 1 Repairs and Replacements on NPS 3/8 (3/8" nominal pipe size) and less diameter, and tubing ½" diameter and less may apply the small items alternative requirements of IWA-4131.1(a)(2).

Reference Byron/Braidwood UFSAR Section 3.9.1.1

TECHNICAL APPROACH AND POSITION: I4T-09
Revision 0

Component Identification

Code Class:	2 and 3
References:	IWA-4000 ASME Section XI Code Interpretation
Examination Category:	NA
Item Number:	NA
Description:	Repair/Replacement Requirements for New ISI Class 2 and 3 Branch Connections 1" and Smaller
Component Number:	N/A

Code Requirement

IWA-4131 provides for alternate Repair/Replacement requirements for ISI Class 2 and 3 piping less than or equal to 1 inch. The alternate requirements remove the need for a repair/replacement plan, NIS-2A, and system pressure test (VT-2 visual examination).

Position

The installation of branch connections 1 inch and smaller onto any other pipe diameter in a ISI Class 2 or 3 system is governed by alternate requirements of IWA-4131. This includes the original pipe (greater than 1 inch diameter) to branch connection weld.

TECHNICAL APPROACH AND POSITION: I4T-10
Revision 0

Component Identification

Code Class:	3
Reference:	IWA-5244 ASME Interpretation XI-1-07-37
Examination Category:	D-B
Item Number:	D2.10
Description:	Alternative Examination Requirements of ASME Section XI, IWA-5244, "Buried Components"
Component Number:	Supply Lines: 0SX01AA-48", 0SX01AB-48", 0SXA8AA-3/4", 0SXA8AB-3/4", 1SX01BA-36", 1SX01BB-36", 2SX01BA-36", 2SX01BB-36", Return Lines: 0SX03CA-48", 0SX03CB-48", 0SX79AA-6", 0SX79AB-6", 0SX97AA-24", 0SX97AB-24", 0SX97AC-24", 0SX97AD-24", 0SX97AE-24", 0SX97AF-24", 0SX97AG-24", 0SX97AH-24", 0SX98AA-24", 0SX98AB-24", 0SX98AC-24", and 0SX98AD-24"
Drawing Number:	M-42-1A, M-42-1B, M-42-2A, M-42-2B, M-42-6, and M-42-7

Code Requirement

IWA-5244(b)(1) requires buried components that are isolable by means of valves be tested to determine the rate of pressure loss. Alternatively, the test may determine the change in flow between the ends of the buried components and the Owner shall establish the acceptable rate of pressure loss or flow.

ASME Interpretation XI-1-07-37, approved by the NRC in October, 2008, states the following - "Is it the intent of IWA-5244(b)(1) that the configuration of isolable by means of valves applies to buried components with butterfly valves that are not designed to be leak tight? No"

The justification for ASME Interpretation XI-1-07-37, also supported a ASME Section XI, 2009 Addenda Code revision to IWA-5244(b)(1) and (2) for buried components not isolable by valves that are required to be essentially leak tight.

Position

The buried piping in question consists of two 48" common (i.e., Unit 0) supply headers and two 48" Unit 0 return headers between the Essential Service Water Cooling Towers (SXCT) and the Auxiliary Building. Each 48" supply header with 3/4" sampling lines, branches into two 36" pump supply lines (i.e., each unit). Each 48" return header branches into four 24" risers and two 24" hot water bypass lines, and has a 6" blowdown line connection. Both 48" return headers and each of the 24" risers have a line-stop fitting that was previously installed for maintenance of the system. These components are all buried between the SXCT and the Turbine Building (TB) or encased in the TB foundation. There is no access to the buried sections without excavation. In addition, no annulus was provided during original construction that would allow for examination of these buried sections of piping.

IWA-5244(b)(1) requires a test that isolates the buried sections of piping to conduct a pressure decay test or to perform a test that determines the change in flow between the buried ends. In order to perform a pressure decay test, it would be necessary to close three large butterfly valves[1] to isolate the buried portion of each supply header. For the return header piping, it would be necessary to close

[1] A-Train: 0SX138A, 1SX001A, and 2SX001A.
B-Train: 0SX138B, 1SX001B, and 2SX001B.

TECHNICAL APPROACH AND POSITION: I4T-10
Revision 0

several large butterfly valves[2] to isolate the buried portions. This would also result in the isolation of an entire return train of SX, which is a configuration not allowed by the Byron Station Technical Specifications (TS). These butterfly valves on both the supply and return headers are not designed or required to be leak tight.

Consistent with ASME Interpretation XI-1-07-37 and the latest editions and addenda of ASME Section XI, for the buried piping sections required to provide flow from the SXCT through the 48" headers and each of the 36" supply lines to the SX Pumps (i.e., Supply Headers) and the buried piping sections required to return flow from the SX System through the 48" headers to the 24" branch lines into the SXCT (i.e., Return Header), a test will be conducted to confirm unimpaired flow in accordance with IWA-5244(b)(2). These requirements call for a test that confirms flow is unimpaired in nonisolable buried components. To confirm that flow is unimpaired in these buried pipes, Byron Station IST Program will be used to ensure adequate flow. Byron Station will use the Owner established minimum flow rate specified in the site IST surveillances, currently specified at 24,000 gallons per minute (gpm) for all SX pumps, as the acceptance criteria for IWA-5244 pressure testing of SX System buried piping.

[2] A-Train: 1SX010, 2SX010, 1SX015A, 2SX015A, 1SX057A, 2SX057A, 1SX114A, 2SX114A, 1SX147A, 2SX147A, 0SX162A, 0SX162C, 0SX163A, 0SX163B, 0SX163C, and 0SX163D.
B-Train: 1SX015B, 2SX015B, 1SX057B, 2SX057B, 1SX114B, 2SX114B, 1SX136, 2SX136, 2SX147B, 1SX147B, 0SX162B, 0SX162D, 0SX163E, 0SX163F, 0SX163G, and 0SX163H.

3.0 COMPONENT ISI PLAN

The Byron Station Component ISI Plan includes ASME Section XI nonexempt pressure retaining welds, piping structural elements, pressure retaining bolting, welded attachments, pump casings, valve bodies, reactor vessel interior, reactor vessel interior attachments, reactor vessel removable core support structures, and steam generator tubing of ISI Class 1, 2, and 3 components that meet the criteria of Subarticle IWA-1300. These components are identified on the ISI CBD's listed in Section 2.3, Tables 2.3-1 and 2.3-2. Procedure ER-AA-330-002, "Inservice Inspection of Section XI Welds and Components," implements the ASME Section XI Component ISI Plan. This Component ISI Plan also includes augmented examination program requirements specified by documents other than ASME Section XI as referenced in Section 2.2 of this document.

3.1 NONEXEMPT ISI CLASS COMPONENTS

The Byron Station ISI Class 1, 2, and 3 nonexempt components subject to examination identified on ISI CBD's are those which are not exempted under the criteria of Paragraphs IWB-1220, IWC-1220, and IWD-1220 of ASME Section XI, respectively. A summary of Byron Station ASME Section XI nonexempt components is included in Section 7.0.

The process for scoping Byron Station components for inclusion in the Component ISI Plan is included in the applicable sections of the ISI Classification Basis Document.

3.1.1 Identification of ISI Class 1, 2, and 3 Nonexempt Components

ISI Class 1, 2, and 3 nonexempt components are identified on the ISI Isometric and Component Drawings listed in Section 2.4, Tables 2.4-1 and 2.4-2. Welded attachments are also identified by controlled individual support detail drawings.

3.1.2 Components Exempt From Examination

Certain components or parts of components may be exempted from examination based on design and accessibility per the requirements of Paragraphs IWB-1220, IWC-1220, and IWD-1220.

The process for exempting Byron Station components from the Component ISI Plan per Paragraphs IWB-1220, IWC-1220, and IWD-1220 is included in the applicable sections of the ISI Classification Basis Document. These sections include discussions of exempt components and the bases for those exemptions.

3.2 RISK-INFORMED EXAMINATION REQUIREMENTS

The RI-ISI Program element examinations are performed in accordance with Relief Request I4R-01.

3.2.1

Piping structural elements that fall under RI-ISI Examination Category R-A are risk ranked as High (1, 2, and 3), Medium (4 and 5), and Low (6 and 7). Per the EPRI Topical Reports TR-112657, Rev. B-A, TR-1006937, Rev. 0-A, and N-578-1, piping structural elements ranked as High or Medium Risk are subject to examination while piping structural elements ranked as Low Risk are not subject to examinations (except for pressure testing). Thin-wall welds that were excluded from volumetric examination under ASME Section XI rules per Table IWC-2500-1 are included in the element scope that is potentially subject to RI-ISI examination at Byron Station.

3.2.2

Piping structural elements may be excluded from examination (other than pressure testing) under the RI-ISI Program if the only degradation mechanism present for a given location is inspected for cause under certain other Byron Station programs such as the Flow Accelerated Corrosion (FAC) or Microbiologically Induced Corrosion (MIC) Programs. These

piping structural elements will remain part of the assigned programs that already perform "for cause" inspections to detect these degradation mechanisms. Piping structural elements susceptible to FAC or MIC and pitting along with another degradation mechanism (e.g., thermal fatigue) are retained as part of the RI-ISI scope and are included in the element selection for the purpose of performing examinations to detect the additional degradation mechanism.

3.2.3 Weld Locations with Full-Structural Overlays

a. Alloy 600/82/182 locations with applied full-structural weld overlays where the degradation mechanism assessment of the overlaid weld identified PWSCC, or PWSCC and another degradation mechanism as determined by the RI-ISI Program, will be removed from the RI-ISI Program and administered solely under the Byron Station Alloy 600 Augmented Examination Program. These locations will receive examinations as specified under N-770-x separate from the RI-ISI Program in order to maintain compliance with 10 CFR 50.55a(g)(6)(ii)(F).
b. Non Alloy 600/82/182 locations with applied full-structural weld overlays will be removed from the RI-ISI Program and treated solely under the requirements of the ASME Section XI, 2007 Edition with the 2008 Addenda, Nonmandatory Appendix Q.

3.2.4 Weld Locations Mitigated with Mechanical Stress Improvement Process

For Alloy 600/82/182 locations where the PWSCC degradation mechanism has been mitigated with a Mechanical Stress Improvement Process, the elements will remain in the RI-ISI Program and are subject to the normal RI-ISI element selection process. These welds will also be governed by the Byron Station Alloy 600 Augmented Examination Program under N-770-x. The selection and examination of these welds will comply with both RI-ISI and the N-770-x requirements. The examinations in the Fourth Inspection Interval may be credited to both programs.

3.3. Weld Numbering

3.3.1. Upon request for a repair/modification weld number, obtain the applicable information (line number and location) from the requestor.

3.3.2. Original welds are nominally numbered sequentially in the direction of flow. The numbering scheme shall be followed as closely as possible for welds added to a line.

3.3.3. When an existing weld is repaired/modified, the new weld will be determined by using the original weld number followed by a decimal point and a two-digit numeral. The first two digit numeral assigned will be "01". If the same weld requires additional repair later, the two-digit numeral shall be incremented by one to reflect the repair.

3.3.4. When a repair/modification requires a new weld to be added to a line, the new weld number will be determined as follows:

1. Locate the nearest upstream weld (NUW) from the new weld.
2. Add an alphabetic designator to the original weld number of the NUW. The first alphabetic designator will be "A", and sequential lettering will be used for multiple new welds. For example, two welds added between C2.01 and C3 will be identified as C2A and C2B.
3. If weld which has no ISI weld number is to be incorporated into the ISI program (i.e. lines previously exempt from ISI), the welds in that line will be sequentially numbered beginning with 1.

4.0 SUPPORT ISI PLAN

The Byron Station Support ISI Plan includes the supports of ASME Section XI nonexempt ISI Class 1, 2, 3, and MC components as described in Section 3.0. Procedure ER-AA-330-003, "Inservice Inspection of Section XI Component Supports," implements the ASME Section XI Support ISI Plan. (**CM-3**)

4.1 NONEXEMPT ISI CLASS SUPPORTS

The Byron Station ISI Class 1, 2, 3, and MC nonexempt supports are those which do not meet the exemption criteria of Paragraph IWF-1230 of ASME Section XI. A summary of the ASME Section XI nonexempt supports is included in Section 7.0. (**CM-3**)

4.1.1 Identification of ISI Class 1, 2, 3, and MC Nonexempt Supports

ISI Class 1, 2, 3, and MC nonexempt supports are identified on the ISI Isometrics and Component Drawings listed in Section 2.4, Tables 2.4-1 and 2.4-2. Supports are also identified by controlled individual support detail drawings. (**CM-3**)

4.2 SNUBBER EXAMINATION AND TESTING REQUIREMENTS

4.2.1 As allowed by 10 CFR 50.55a(b)(3)(v)(B), Byron Station will use Subsection ISTD, "Inservice Testing of Dynamic Restraints (Snubbers) In Light Water Reactor Power Plants," ASME Operation and Maintenance of Nuclear Power Plants Code (ASME OM Code), 2004 Edition through the 2006 Addenda, to meet the visual examination, functional testing, and service life monitoring requirements for safety related and important to safety snubbers. This approach is consistent with ASME Section XI, Paragraph IWF-1220, which excludes inservice inspection of snubbers and defers to the ASME OM Code for visual examination (ISTD-4000), functional testing (ISTD-5000), and service life monitoring (ISTD-6000) requirements. For a detailed discussion of the ASME OM Code Snubber Program, see the Snubber Program Document.

4.2.2 The ASME Section XI visual examination boundary of a support containing a snubber is defined in Figure IWF-1300-1(f). This boundary does not include the snubber pin-to-pin and does not include the connections to the snubber assembly (pins) per Paragraph IWF-1300(h).

This results in the remaining ASME Section XI requirements for VT-3 visual examination of the snubber attachment hardware including bolting and clamps. The ASME Section XI ISI Program uses Subsection IWF to define the inspection requirements for all ISI Class 1, 2, 3, and MC supports, regardless of type. The ISI Program maintains the Code Class snubbers in the support populations subject to inspection per Subsection IWF. This is done to facilitate scheduling, preparation including insulation removal, and inspection requirements of the snubber attachment hardware (e.g., bolting and clamps).

It should be noted that the examination of snubber welded attachments will be performed in accordance with the ASME Section XI Subsections IWB, IWC, and IWD welded attachment examination requirements (e.g., Examination Categories B-K, C-C, and D-A).

4.3 HIGH STRENGTH BOLTS - CLASS 1 COMPONENT SUPPORTS - (CM-3)

4.3.1 In order to meet commitments associated with License Renewal, high strength bolts (ASME SA 540 and ASTM A490 materials), greater than 1" in diameter, used on the ISI Class 1 component supports, steam generator, reactor coolant pump, and pressurizer supports, require an Owner augmented, periodic visual examination as follows:

1. Perform periodic visual examinations to detect a corrosive environment that supports SCC potential for all (100%) of high strength bolting greater than one-inch nominal

diameter used for ISI Class 1 component supports, prior to the period of extended operation, and then each inspection interval of 10 years thereafter.

2. These examinations of high strength bolting, greater than one-inch nominal diameter used for ISI Class 1 component supports, shall not be considered as completed examination credit for the current inspection period.

4.3.2 The periodic visual examinations will include criteria to identify if the bolting has been exposed to moisture or other contaminants by evidence of moisture, residue, foreign substance, or corrosion.

4.3.3 Adverse conditions identified during the examinations should be evaluated by engineering to determine if the bolt has been exposed to a corrosive environment with the potential to cause Stress Corrosion Cracking (SCC).

1. The additional parameters and criteria to address the qualitative and quantitative acceptance criteria are described below:

   A. If moisture is present at or near a bolt or stud, factors considered by engineering include, but will not be limited to:

      1. The source of leakage or condensation that supplied the moisture.
      2. The proximity of the moisture to the bolt or stud.
      3. The probable or analyzed chemical characteristics of the moisture, including the presence of contaminants.
      4. The visible or likely pathway, if any, that the liquid traversed to arrive at or near the bolt or stud.
      5. The amount of any corrosion on or near the bolt or stud.
      6. The material condition of the coatings on the bolt or stud, and associated support.
      7. The characteristics of any corrosion on or near the bolt or stud.
      8. The proximity to the bolt or stud of any nearby evidence of corrosion.

   B. The material condition of accessible concrete or grout near the bolt or stud. If there is evidence that moisture had been present at or near a bolt or stud, but no moisture is present at or near a bolt or stud, factors considered by engineering include, but will not be limited to:

      1. The probable sources of past leakage or condensation that could have supplied the moisture.
      2. The proximity to the bolt or stud to the evidence that moisture had been present.
      3. The probable or analyzed chemical characteristics of any moisture residue, including the presence of contaminants.
      4. The visible or likely pathway, if any, that the liquid may have traversed to arrive at or near the bolt or stud.
      5. The amount of any corrosion on or near the bolt or stud.
      6. The material condition of any coatings on the bolt or stud, and associated support.
      7. The characteristics of any corrosion on or near the bolt or stud.

8. The proximity to the bolt or stud of any nearby evidence of corrosion.
9. The material condition of concrete or grout near the bolt or stud.

2. The extent to which each of the above environmental indicators will be considered and weighed in the engineering evaluation will be determined by the conditions that are observed during the initial visual examinations of the bolting locations and during any follow up visual examination or analysis. Some of the listed environmental indicators may not be present, e.g., moisture. Some of the factors that are observed may have minimal impact on the outcome of the evaluation. Environmental indicators, which are present at each evaluated high strength bolt, will be evaluated together to provide the most accurate characterization of the environment. If the engineering evaluation concludes that the bolting material had been subjected to an environment with the potential to cause SCC, then the affected bolts will be included in the sample population subject to supplemental volumetric examinations.

4.3.4 The bolts determined to have been exposed to corrosive environment with the potential to cause SCC should be included in a sample population for each specific bolt material where SCC is a concern. A sample size equal to 20 percent (rounded up to the nearest whole number) of the bolts in the sample population, with a maximum sample size of 25 bolts will be subject to supplemental volumetric examination to determine if SCC is present. The selection of the samples will consider susceptibility to stress corrosion cracking (e.g., actual measured yield strength) and ALARA principles.

4.3.5 Volumetric examinations should be performed in accordance with the requirements of ASME Section XI, Appendix VIII, Supplement 8. The results of the volumetric examinations should be evaluated by engineering to determine if additional actions are warranted such as expansion of sample size, scope, and frequency of any additional supplemental visual or volumetric examinations, as well as any ASME Section XI requirements.

5.0 SYSTEM PRESSURE TESTING ISI PLAN

The Byron Station System Pressure Testing ISI Plan includes pressure retaining ASME Section XI, ISI Class 1, 2, and 3 components, with the exception of those specifically exempted by Paragraphs IWA-5110(c), IWC-5222(b), and IWD-5222(c). RI-ISI piping structural elements, regardless of risk classification, remain subject to pressure testing as part of the current ASME Section XI program.

The SPT ISI Plan performs system pressure tests and required VT-2 visual examinations on the ISI Class 1, 2, and 3 pressure retaining components to verify system and component structural integrity. This program conducts both Periodic and Interval (10-year frequency) pressure tests as defined in ASME Section XI Inspection Program. Procedure ER-AA-330-001, "Section XI Pressure Testing," as well as Byron Station site-specific test procedures, implement the ASME Section XI System Pressure Testing ISI Plan. This System Pressure Testing ISI Plan also includes augmented examination program requirements specified by documents other than ASME Section XI as referenced in Section 2.2 of this document.

5.1 ISI CLASS SYSTEMS

All ISI Class 1 pressure retaining components, typically defined as the reactor coolant pressure boundary, are required to be tested. Those portions of ISI Class 2 and 3 systems that are required to be tested include the pressure retaining boundaries of components required to operate or support the system safety functions. ISI Class 2 open ended discharge piping and components are excluded from the examination requirements per Paragraph IWC-5222(b). ISI Class 3 open ended discharge piping and components are subject to the examination requirements per Paragraph IWD-5222(b). Also, Paragraph IWA-5244 defines buried component pressure testing methods. ASME Interpretation XI-1-10-06 clarifies that Paragraph IWA-5244 only applies to buried components that fall within the boundaries of Paragraphs IWC-5222 and IWD-5222, and thus buried component testing is not required for open ended discharge piping when the buried section is beyond the last shutoff valve.

5.1.1 Identification of ISI Class 1, 2, and 3 Components

Components subject to ASME Section XI System Pressure Testing and augmented pressure testing are shown on the color coded ISI CBD's listed in Section 2.3, Tables 2.3-1 and 2.3-2.

Additional information on the classification of various system boundaries is provided in the ISI Classification Basis Document.

5.1.2 Identification of System Pressure Tests

The System Pressure Test Boundary Drawings used to define which systems, or portions of systems, fall under a specific test are also shown on the color coded ISI CBD's listed in Section 2.3, Tables 2.3-1 and 2.3-2. Individual tests are identified and maintained in the Byron Station ISI Database.

5.2 RISK-INFORMED EXAMINATIONS OF SOCKET WELDS

Socket welds selected for examination under the RI-ISI Program are to be inspected with a VT-2 visual examination each refueling outage per N-578-1 (see footnote 12 in Table 1 of the Code Case). To facilitate this, socket welds selected for inspection under the RI-ISI Program are pressurized each refueling outage during a system pressure test in accordance with Paragraph IWA-5211(a).

6.0 CONTAINMENT ISI PLAN

The Byron Station Containment ISI Plan includes ASME Section XI ISI Class MC pressure retaining components and their integral attachments (including the ISI Class CC metal liner), and ISI Class CC components and structures, and post-tensioning systems that meet the criteria of Subarticle IWA-1300. This Containment ISI Plan also includes information related to augmented examination areas, component accessibility, and examination review.

The inspection of containment structures, components, and post-tensioning systems are performed per procedures ER-AA-330-005, "Visual Examination of Section XI Class CC Concrete Containment Structures," ER-AA-330-006, "Inservice Inspection and Testing of the Pre-Stressed Concrete Containment Post Tensioning Systems," and ER-AA-330-007, "Visual Examination of Section XI Class MC Surfaces and Class CC Liners". In addition, vendor procedures are used to complete more complex surveillances such as tendon testing.

6.1 NONEXEMPT ISI CLASS COMPONENTS

The Byron Station ISI Class MC and CC components identified on the Containment ISI Drawings are those not exempted under the criteria of Paragraphs IWE-1220 and IWL-1220 in the 2007 Edition with the 2008 Addenda of ASME Section XI. A summary of Byron Station ASME Section XI nonexempt CISI components is included in Section 7.0.

The process for scoping Byron Station components for inclusion in the Containment ISI Plan is included in the containment sections of the ISI Classification Basis Document. These sections include a listing and detailed basis for inclusion of containment components.

Components that are classified as ISI Class MC and CC must meet the requirements of ASME Section XI in accordance with 10 CFR 50.55a(g)(4). ISI Class MC supports of Subsection IWE components are not required to be examined in accordance with 10 CFR 50.55a(g)(4)(v).

6.1.1 Identification of ISI Class MC and CC Nonexempt Components

ISI Class MC and CC components are identified on the Containment ISI Drawings listed in Section 2.4, Tables 2.4-3 and 2.4-4.

6.1.2 Identification of ISI Class MC and CC Exempt Components

Certain containment components or parts of components may be exempted from examination based on design and accessibility per the requirements of Paragraphs IWE-1220 and IWL-1220.

The process for exempting Byron Station components from the Containment ISI Plan per Paragraphs IWE-1220 and IWL-1220 is included in the containment sections of the ISI Classification Basis Document. These sections include discussions of exempt components and the bases for those exemptions.

6.2 AUGMENTED EXAMINATIONS AREAS

The containment sections of the ISI Classification Basis Document discuss the containment design and components. Metal containment surface areas subject to accelerated degradation and aging require augmented examination per Examination Category E-C and Paragraph IWE-1240.

Similarly, concrete surfaces may be subject to Detailed Visual examination in accordance with Paragraph IWL-2310(b), if declared to be 'Suspect Areas'.

A significant condition is a condition that is identified as requiring application of additional augmented examination requirements under Paragraphs IWE-1240 or IWL-2310.

No significant conditions were identified in the First CISI Interval; however, significant conditions were identified in the Second CISI Interval as requiring application of additional augmented examination requirements under Paragraph IWE-2420 or IWL-2310.

In the Second CISI Interval, metal loss in excess of 10% of the Byron Station Unit 1 containment liner at two locations below the moisture barrier at elevation 377' have been identified as augmented surface areas requiring successive examinations in accordance with Paragraph IWE-2420(b). The indications were evaluated and accepted but re-examination of these two locations in the next inspection period (First Period, Third CISI Interval) is required. These surface areas have been categorized in accordance with Table IWE-2500-1, Examination Category E-C, Item Number E4.11, requiring detailed visual examinations (i.e., VT-1) of 100% of the identified surface area each inspection period until the areas examined remain essentially unchanged for the next inspection period. When/If such areas no longer require augmented examination in accordance with Paragraph IWE-2420(d), the examination requirements and associated extent and frequency of Examination Category E-A apply for the remainder of the interval.

6.3 COMPONENT ACCESSIBILITY

ISI Class MC and CC components subject to examination shall remain accessible for either direct or remote visual examination from at least one side per the requirements of ASME Section XI, Paragraph IWE-1230.

Paragraph IWE-1231(a)(3) requires 80% of the pressure-retaining boundary that was accessible after construction to remain accessible for either direct or remote visual examination, from at least one side of the vessel, for the life of the plant.

Byron Station Calculation BYR2000-181 addresses compliance with this requirement by calculating the containment pressure boundary surface area that was accessible for examination at the beginning of the CISI Program and determining the limit for surface area which may be made inaccessible for the balance of plant life.

Portions of components embedded in concrete or otherwise made inaccessible during construction are exempted from examination, provided that the requirements of ASME Section XI, Paragraph IWE-1232 have been fully satisfied.

In addition, inaccessible surface areas exempted from examination include those surface areas where visual access by line of sight with adequate lighting from permanent vantage points is obstructed by permanent plant structures, equipment, or components; provided these surface areas do not require examination in accordance with the inspection plan, or augmented examination in accordance with Paragraph IWE-1240.

6.4 RESPONSIBLE INDIVIDUAL AND ENGINEER

ASME Section XI Subsection IWE requires the Responsible Individual to be involved in the development, performance, and review of the CISI examinations. The Responsible Individual shall meet the requirements of ASME Section XI, Paragraph IWE-2320.

ASME Section XI Subsection IWL requires the Responsible Engineer to be involved in the development, approval, and review of the CISI examinations. The Responsible Engineer shall meet the requirements of ASME Section XI, Paragraph IWL-2330.

7.0 COMPONENT SUMMARY TABLES

7.1 INSERVICE INSPECTION SUMMARY TABLES

Tables 7.1-1 and 7.1-2 provide a summary of the ASME Section XI pressure retaining components, supports, containment structures, metal liners, post-tensioning systems, system pressure testing, and augmented examination program components for the Fourth ISI Interval and the Third CISI Interval at Byron Station. If a particular Examination Category and Item Number do not apply to Byron Station, they are not included in these tables.

The format of the Inservice Inspection Summary Tables is as depicted below and provides the following information:

EXAMINATION CATEGORY (WITH EXAMINATION CATEGORY DESCRIPTION)	ITEM NUMBER (OR RISK CATEGORY NUMBER OR AUGMENTED NUMBER)	DESCRIPTION	EXAM REQUIREMENTS	TOTAL NUMBER OF COMPONENTS BY SYSTEM	RELIEF REQUEST/ TAP NUMBER	NOTES
(1)	(2)	(3)	(4)	(5)	(6)	(7)

(1) Examination Category (with Examination Category Description):

Provides the Examination Category and description as identified in ASME Section XI, Tables IWB-2500-1, IWC-2500-1, IWD-2500-1, IWE-2500-1, IWF-2500-1, and IWL-2500-1. Only those examination categories applicable to Byron Station are identified.

Examination Category "R-A" from N-578-1 is used in lieu of ASME Section XI Examination Categories B-F, B-J, C-F-1, and C-F-2 to identify ISI Class 1 and 2 piping structural elements for the RI-ISI program.

Examination Category "NA" is used to identify Augmented Examination Programs and other Byron Station requirements.

(2) Item Number (or Risk Category Number or Augmented Number):

Provides the Item Number as identified in ASME Section XI, Tables IWB-2500-1, IWC-2500-1, IWD-2500-1, IWE-2500-1, IWF-2500-1, and IWL-2500-1. Only those Item Numbers applicable to Byron Station are identified.

For piping structural elements under the RI-ISI Program, the Risk Category Number (e.g., 1 through 5) is used in place of the Item Number.

Specific abbreviations such as RG1.14, ECCS, 0737, GL8805, APP Q, MRP-146, MRP-192, MRP-227, N-722-1, N-729-1, and N-770-1 are used to identify Augmented Examination Programs and other Byron Station requirements.

(3) Item Number (or Risk Category Number or Augmented Number) Description:

Provides the description as identified in ASME Section XI, Tables IWB-2500-1, IWC-2500-1, IWD-2500-1, IWE-2500-1, IWF-2500-1, and IWL-2500-1.

For Risk-Informed piping structural elements, a description of the Risk Category Number is provided.

For Augmented Examination Programs, a description of the augmented requirement is provided.

(4) Examination Requirements:

Provides the examination methods required by ASME Section XI, Tables IWB-2500-1, IWC-2500-1, IWD-2500-1, IWE-2500-1, IWF-2500-1, and IWL-2500-1.

Provides the examination requirements for piping structural elements under the RI-ISI Program that are in accordance with the EPRI Topical Reports TR-112657, Rev. B-A, TR-1006937, Rev. 0-A, and N-578-1.

Provides the examination requirements for Augmented Examination Program components.

The examination requirements described in this document are reflected in the ISI Database code pages.

(5) Total Number of Components by System:

Provides the system designator (abbreviations). See Section 2.3, Tables 2.3-1 and 2.3-2 for a list of these systems.

This column also provides the number of components within a particular system for that Item Number, Risk Category Number, or Augmented Number.

Note that the total number of components by system are subject to change after completion of plant modifications, design changes, and ISI system classification updates and will be maintained within the ISI Database.

(6) Relief Request/Technical Approach and Position Number:

Provides a listing of Relief Request/ TAP Numbers applicable to specific components, the ASME Section XI Item Number, Risk Category Number, or Augmented Number. Relief Requests and TAP Numbers that generically apply to all components, or an entire class are not listed. If a Relief Request/ TAP Number is identified, see the corresponding relief request in Section 8.0 or the TAP Number in Section 2.5.

(7) Notes:

Provides a listing of program notes applicable to the ASME Section XI Item Number, Risk Category Number, or Augmented Number. If a program note number is identified, see the corresponding program note in Table 7.1-3.

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Inservice Inspection Summary Table 7.1-1

EXAMINATION CATEGORY	ITEM NUMBER	DESCRIPTION	EXAM REQUIREMENTS	TOTAL NUMBER BY SYSTEM	RELIEF REQ./ TAP NUMBER	NOTES
B-A Pressure Retaining Welds in Reactor Vessel	B1.11	Circumferential Shell Welds (Reactor Vessel)	Volumetric	RPV: 3		
	B1.21	Circumferential Head Welds (Reactor Vessel)	Volumetric	RPV: 2		
	B1.30	Shell-to-Flange Weld (Reactor Vessel)	Volumetric	RPV: 1		
	B1.40	Head-to-Flange Weld (Reactor Vessel)	Volumetric & Surface	RPV: 1		25
B-B Pressure Retaining Welds in Vessels Other Than Reactor Vessels	B2.11	Circumferential Shell-To-Head Welds (Pressurizer)	Volumetric	PZR: 2		
	B2.12	Longitudinal Shell-To-Head Welds (Pressurizer)	Volumetric	PZR: 2		
	B2.40	Tube Sheet-To-Head Weld (Steam Generator)	Volumetric	SG: 4		
B-D Full Penetration Welds of Nozzles in Vessels	B3.90	Nozzle-to-Vessel Welds (Reactor Vessel)	Volumetric	RPV: 8		11
	B3.100	Nozzle Inside Radius Section (Reactor Vessel)	See Note	RPV: 8		12
	B3.110	Nozzle-to-Vessel Welds (Pressurizer)	Volumetric	PZR: 6		
	B3.120	Nozzle Inside Radius Section (Pressurizer)	See Note	PZR: 6		14
	B3.140	Nozzle Inside Radius Section (Steam Generator)	See Note	SG: 8		14

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Inservice Inspection Summary Table 7.1-1

EXAMINATION CATEGORY	ITEM NUMBER	DESCRIPTION	EXAM REQUIREMENTS	TOTAL NUMBER BY SYSTEM	RELIEF REQ./ TAP NUMBER	NOTES
B-G-1 Pressure Retaining Bolting, Greater Than 2" In Diameter	B6.10	Closure Head Nuts (Reactor Vessel)	Visual, VT-1	RPV: 3		3
	B6.20	Closure Studs (Reactor Vessel)	Volumetric	RPV: 3		3 4
	B6.40	Threads in Flange (Reactor Vessel)	Volumetric	RPV: 1		3
	B6.50	Closure Washers, Bushings (Reactor Vessel)	Visual, VT-1	RPV: 3		3
	B6.90	Bolts & Studs (Steam Generator)	Volumetric	SG: 8		3
	B6.100	Flange Surface, When Connection Disassembled (Steam Generator)	Visual, VT-1	SG: 8		3
	B6.110	Nuts, Bushings, and Washers (Steam Generator)	Visual, VT-1	SG: 8		3
	B6.180	Bolts & Studs (Pumps)	Volumetric	RC: 4		3 34
	B6.190	Flange Surface, When Connection Disassembled (Pumps)	Visual, VT-1	RC: 4		3 34
	B6.200	Nuts, Bushings, and Washers (Pumps)	Visual, VT-1	RC: 1		3 21 34
	B6.210	Bolts & Studs (Valves)	Volumetric	RC: 8		3 34
	B6.220	Flange Surface, When Connection Disassembled (Valves)	Visual, VT-1	RC: 8		3 34
	B6.230	Nuts, Bushings, and Washers (Valves)	Visual, VT-1	RC: 8		3 34

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Inservice Inspection Summary Table 7.1-1

EXAMINATION CATEGORY	ITEM NUMBER	DESCRIPTION	EXAM REQUIREMENTS	TOTAL NUMBER BY SYSTEM	RELIEF REQ./ TAP NUMBER	NOTES
B-G-2 Pressure Retaining Bolting, 2" and Less In Diameter	B7.10	Bolts, Studs, & Nuts (Reactor Vessel)	Visual, VT-1	RPV: 1		3
	B7.20	Bolts, Studs, & Nuts (Pressurizer)	Visual, VT-1	PZR: 1		3
	B7.50	Bolts, Studs, & Nuts (Piping)	Visual, VT-1	CV: 4 RC: 4 RY: 4 SI: 8		3
	B7.60	Bolts, Studs, & Nuts (Pumps)	Visual, VT-1	RC: 4		3 35
	B7.70	Bolts, Studs, & Nuts (Valves)	Visual, VT-1	RC: 4 RH: 4 SI: 18		3 35
B-K Welded Attachments for Vessels, Piping, Pumps, and Valves	B10.10	Welded Attachments (Pressure Vessels)	Surface or Volumetric	PZR: 2		15
	B10.20	Welded Attachments (Piping)	Surface	CV: 1 SI: 6		16
B-L-2 Pump Casings	B12.20	Pump Casing (Pumps)	Visual, VT-3	RC: 4		34 35
B-M-2 Valve Bodies	B12.50	Valve Body, Exceeding NPS 4 (Valves)	Visual, VT-3	RC: 12 RH: 4 RY: 3 SI: 18		34 35

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Inservice Inspection Summary Table 7.1-1

EXAMINATION CATEGORY	ITEM NUMBER	DESCRIPTION	EXAM REQUIREMENTS	TOTAL NUMBER BY SYSTEM	RELIEF REQ./ TAP NUMBER	NOTES
B-N-1 Interior of Reactor Vessel	B13.10	Vessel Interior (Reactor Vessel)	Visual, VT-3	RPV: 1		
B-N-2 Welded Core Support Structures and Interior Attachments to Reactor Vessels	B13.60	Interior Attachments Beyond Beltline Region (Reactor Vessel)	Visual, VT-3	RPV: 1		
B-N-3 Removable Core Support Structures	B13.70	Core Support Structure (Reactor Vessel)	Visual, VT-3	RPV: 1		
B-O Pressure Retaining Welds in Control Rod Housings	B14.20	Welds in CRD Housing (Reactor Vessel) (10% of Peripheral CRD Housing welds to be inspected. 45 of 78 welds are identified as peripheral. Examine 5.)	Volumetric or Surface	RPV: 45		27
B-P All Pressure Retaining Components	B15.10	Pressure Retaining Components [IWB-5222(a)] System Leakage Test (IWB-5220) (Outage)	Visual, VT-2	RC: 2 (Includes CV, RH, RY, and SI)	I4T-04	22 32
	B15.20	Pressure Retaining Components [IWB-5222(b)] System Leakage Test (IWB-5220) (Interval)	Visual, VT-2	RC: 1 (Includes CV, RH, RY, and SI)	I4T-04	22 32
B-Q Steam Generator Tubing	B16.20	Steam Generator Tubing in U-Tube Design (Steam Generator)	Volumetric Per Tech Specs	SG: 4		

Unit 1 & Common

Inservice Inspection Summary Table 7.1-1

EXAMINATION CATEGORY	ITEM NUMBER	DESCRIPTION	EXAM REQUIREMENTS	TOTAL NUMBER BY SYSTEM	RELIEF REQ./ TAP NUMBER	NOTES
C-A Pressure Retaining Welds in Pressure Vessels	C1.10	Shell Circumferential Welds (Pressure Vessels)	Volumetric	RH: 2 SG: 4	I4T-07 I4T-05	13
	C1.20	Head Circumferential Welds (Pressure Vessels)	Volumetric	RH: 2 SG: 4	I4T-07	13
	C1.30	Tubesheet-to-Shell-Welds (Pressure Vessels)	Volumetric	SG: 4		
C-B Pressure Retaining Nozzle Welds in Vessels	C2.21	Nozzle-to-Shell (Nozzle to Head or Nozzle to Nozzle) Welds Without Reinforcing Plate, Greater Than 1/2" Nominal Thickness (Pressure Vessels)	Volumetric & Surface	RH: 4 SG: 8	I4T-07	13
	C2.22	Nozzle Inside Radius Section Without Reinforcing Plate, Greater Than 1/2" Nominal Thickness (Pressure Vessels)	Volumetric	RH: 0 SG: 4	I4T-07	6 13
C-C Welded Attachments for Vessels, Piping, Pumps, and Valves	C3.10	Welded Attachments (Pressure Vessels)	Surface	RH: 2		
	C3.20	Welded Attachments (Piping)	Surface	CS: 2 CV: 2 MS: 22 RH: 8 SI: 10 SX: 12 VQ: 4		
	C3.30	Welded Attachments (Pumps)	Surface	CS: 6 CV: 8 RH: 6		

Unit 1 & Common

Inservice Inspection Summary Table 7.1-1

EXAMINATION CATEGORY	ITEM NUMBER	DESCRIPTION	EXAM REQUIREMENTS	TOTAL NUMBER BY SYSTEM	RELIEF REQ./ TAP NUMBER	NOTES
C-H All Pressure Retaining Components (Periodic)	C7.10	Pressure Retaining Components System Leakage Test (IWC-5220)	Visual, VT-2	AF: 2 CS: 5 CV: 10 FC: 1 FP: 1 FW: 2 IA: 1 MS: 2 OG: 1 PC: 1 PR: 1 PS: 6 RC: 1 RE: 3 RF: 1 RH: 6 RY: 4 SA: 1 SD: 1 SI: 9 SX: 2 VQ: 6 WM: 1 WO: 2	I4T-03 I4T-04	22

Unit 1 & Common

Inservice Inspection Summary Table 7.1-1

EXAMINATION CATEGORY	ITEM NUMBER	DESCRIPTION	EXAM REQUIREMENTS	TOTAL NUMBER BY SYSTEM	RELIEF REQ./ TAP NUMBER	NOTES
D-A Welded Attachments for Vessels, Piping, Pumps, and Valves	D1.10	Welded Attachments (Pressure Vessels)	Visual, VT-1	CC: 4+2 DG: 12 RH: 2 SX: 8		2
	D1.20	Welded Attachments (Piping)	Visual, VT-1	AF: 3 CC: 60+4 SX: 43+10		2
	D1.30	Welded Attachments (Pumps)	Visual, VT-1	AF: 8 SX: 0+4		2
D-B All Pressure Retaining Components (Periodic)	D2.10	Pressure Retaining Components System Leakage Test (IWD-5220)	Visual, VT-2	AB: 2 AF: 3 CC: 7 DG: 10 DO: 4 FC: 2 RY: 2 SX: 17 WO: 2	I4T-03 I4T-04 I4T-10	22

Unit 1 & Common

Inservice Inspection Summary Table 7.1-1

EXAMINATION CATEGORY	ITEM NUMBER	DESCRIPTION	EXAM REQUIREMENTS	TOTAL NUMBER BY SYSTEM	RELIEF REQ./ TAP NUMBER	NOTES
E-A Containment Surfaces	E1.11	Containment Vessel Pressure Retaining Boundary - Accessible Surface Area	General Visual	CC: 5 CS: 6 CV: 6 FC: 2 FP: 1 FW: 8 IA: 1 MS: 4 NT: 56 OG: 3 PR: 1 PS: 5 RE: 2 RF: 1 RH: 2 RY: 3 SA: 1 SD: 8 SI: 8 SX: 4 VQ: 5 WM: 1 WO: 4 XX: 47		7
	E1.30	Containment Vessel Pressure Retaining Boundary - Moisture Barriers	General Visual	1		7
E-C Containment Surfaces Requiring Augmented Examination	E4.11	Containment Surface Areas - Visible Surfaces	Visual, VT-1	2		7
	E4.12	Containment Surface Areas - Surface Area Grid, Minimum Wall Thickness Location	Volumetric (Ultrasonic Thickness)	0		7

Unit 1 & Common

Inservice Inspection Summary Table 7.1-1

EXAMINATION CATEGORY	ITEM NUMBER	DESCRIPTION	EXAM REQUIREMENTS	TOTAL NUMBER BY SYSTEM	RELIEF REQ./ TAP NUMBER	NOTES
E-G Bolted Connections	E8.10	Containment Vessel Pressure Retaining Boundary - Bolted Connections, Surfaces	Visual, VT-1	NT: 47 XX: 28		7
F-A Supports	F1.10	Class 1 Piping Supports	Visual, VT-3	CV: 136 RC: 89 RH: 20 RY: 34 SI: 190		1
	F1.20	Class 2 Piping Supports	Visual, VT-3	AF: 34 CS: 52 CV: 66 FW: 39 MS: 27 RH: 65 SI: 157 SX: 157 VQ: 5		1
	F1.30	Class 3 Piping Supports	Visual, VT-3	AF: 34 CC: 326+26 SX: 374+248		1 2
	F1.40	Supports Other Than Piping Supports (Class 1, 2, 3, and MC)	Visual, VT-3	AF: 2 CC: 4+2 CS: 6 CV: 8 DG: 2 RC: 29 RH: 10 RY: 5 SI: 4 SX: 12		1 2

Unit 1 & Common

Inservice Inspection Summary Table 7.1-1

EXAMINATION CATEGORY	ITEM NUMBER	DESCRIPTION	EXAM REQUIREMENTS	TOTAL NUMBER BY SYSTEM	RELIEF REQ./ TAP NUMBER	NOTES
L-A Concrete	L1.11	Concrete Surfaces - All Accessible Surface Areas	General Visual	42		7
	L1.12	Concrete Surfaces - Suspect Areas (No Suspect Areas Identified)	Detailed Visual	----		7
L-B Unbonded Post-Tensioning System	L2.10	Tendon	IWL-2522	483		7
	L2.20	Tendon - Wire or Strand	IWL-2523.2	483		7
	L2.30	Tendon - Anchorage Hardware and Surrounding Concrete	Detailed Visual	966		7
	L2.40	Tendon - Corrosion Protection Medium	IWL-2525.2(a), IWL-2526	----		7
	L2.50	Tendon - Free Water	IWL-2525.2(b)	----		7
R-A Risk-Informed Piping Examinations	2	Risk Category 2 Elements	See Notes	RC: 199	I4R-01	8
	3	Risk Category 3 Elements	See Notes	FW: 128	I4T-01	9
	4	Risk Category 4 Elements	See Notes	CS: 172	I4T-02	10
				CV: 197	I4T-06	17
				RC: 488		18
				RH: 200		20
				SI: 249		
	5	Risk Category 5 Elements	See Notes	AF: 20		
				CV: 131		
				SI: 170		

Unit 1 & Common

Inservice Inspection Summary Table 7.1-1

EXAMINATION CATEGORY	ITEM NUMBER	DESCRIPTION	EXAM REQUIREMENTS	TOTAL NUMBER BY SYSTEM	RELIEF REQ./ TAP NUMBER	NOTES
NA Augmented Components	3.6.2	Examination of High Energy Circumferential and Longitudinal Piping Welds (MEB 3-1, UFSAR 3.6.1 and 3.6.2).	Volumetric or Surface	NA		5 10
	RG1.14	Augmented Examination of Reactor Coolant Pump Flywheel Per Regulatory Guide 1.14 as modified by Surface Byron Station License Amendment #118 and Technical Requirements Manual Appendix G.	Volumetric or Surface	RC: 4		28
	ECCS	Information Notice 79-19, Pipe Cracks in Stagnant Borated Water Systems at PWR Plants.	Volumetric	SI: 94		29
	0737	Leak Testing and Periodic Visual Examinations of Systems Outside of Primary Containment Which Could Contain Highly Radioactive Fluids During a Serious Transient or Accident (NUREG 0737).	Visual, VT-2	CS CV FC GW OG PS RH SI		30
	GL8805	Generic Letter 88-05, Boric Acid Corrosion of Carbon Steel Reactor Pressure Boundary Components in PWR Plants.	Visual, VT-2	RC		31
	APP Q	Weld Overlay of PZR Nozzle to Safe-Ends and First Piping Welds.	Volumetric	RY: 6		17
	MRP-146	EPRI Materials Reliability Program, *Management of Thermal Fatigue in Normally Stagnant Non-Isolable Reactor Coolant Branch Lines* (MRP-146).	Visual & Volumetric	RC: 6		23
	MRP-192	EPRI Materials Reliability Program, *Assessment of RHR Mixing Tee Thermal Fatigue in PWR Plants* (MRP-192).	Volumetric	NA		24
	MRP-227	Augmented Examination of Pressurized Water Reactor Internals (MRP-227).	Visual & Volumetric	RC: 1		26
	N-722-1	B15.80 RPV Bottom-Mounted Instrument Penetrations	Visual	RC: 1		18
	N-729-1	B4.10 Reactor Head Exterior Surface B4.20 Reactor Head Penetrations	Visual Volumetric & Surface	RPV: 1 RPV: 1		19
	N-770-1	Examination of Class 1 piping and nozzle dissimilar-metal butt welds per 10 CFR 50.55a(g)(6)(ii)(F).	Visual, Volumetric & Surface	PZR: 6 RPV: 8	I4T-08	20

Unit 2

Inservice Inspection Summary Table 7.1-2

EXAMINATION CATEGORY	ITEM NUMBER	DESCRIPTION	EXAM REQUIREMENTS	TOTAL NUMBER BY SYSTEM	RELIEF REQ./ TAP NUMBER	NOTES
B-A Pressure Retaining Welds in Reactor Vessel	B1.11	Circumferential Shell Welds (Reactor Vessel)	Volumetric	RPV: 3	I4R-08	
	B1.21	Circumferential Head Welds (Reactor Vessel)	Volumetric	RPV: 2	I4R-08	
	B1.30	Shell-to-Flange Weld (Reactor Vessel)	Volumetric	RPV: 1	I4R-08	
	B1.40	Head-to-Flange Weld (Reactor Vessel)	Volumetric & Surface	RPV: 1	I4R-08	25
B-B Pressure Retaining Welds in Vessels Other Than Reactor Vessels	B2.11	Circumferential Shell-To-Head Welds (Pressurizer)	Volumetric	PZR: 2		
	B2.12	Longitudinal Shell-To-Head Welds (Pressurizer)	Volumetric	PZR: 2		
	B2.40	Tube Sheet-To-Head Weld (Steam Generator)	Volumetric	SG: 4		
B-D Full Penetration Welds of Nozzles in Vessels	B3.90	Nozzle-to-Vessel Welds (Reactor Vessel)	Volumetric	RPV: 8	I4R-08	11
	B3.100	Nozzle Inside Radius Section (Reactor Vessel)	See Note	RPV: 8	I4R-08	12
	B3.110	Nozzle-to-Vessel Welds (Pressurizer)	Volumetric	PZR: 6		
	B3.120	Nozzle Inside Radius Section (Pressurizer)	See Note	PZR: 6		14
	B3.140	Nozzle Inside Radius Section (Steam Generator)	See Note	SG: 8		14
B-G-1 Pressure Retaining Bolting, Greater Than 2" In Diameter	B6.10	Closure Head Nuts (Reactor Vessel)	Visual, VT-1	RPV: 3		3
	B6.20	Closure Studs (Reactor Vessel)	Volumetric	RPV: 3		3 4
	B6.40	Threads in Flange (Reactor Vessel)	Volumetric	RPV: 1		3
	B6.50	Closure Washers, Bushings (Reactor Vessel)	Visual, VT-1	RPV: 3		3
	B6.180	Bolts & Studs (Pumps)	Volumetric	RC: 4		3 34
	B6.190	Flange Surface, When Connection Disassembled (Pumps)	Visual, VT-1	RC: 4		3 34
	B6.210	Bolts & Studs (Valves)	Volumetric	RC: 8		3 34
	B6.220	Flange Surface, When Connection Disassembled (Valves)	Visual, VT-1	RC: 8		3 34
	B6.230	Nuts, Bushings, and Washers (Valves)	Visual, VT-1	RC: 8		3 34

Unit 2

Inservice Inspection Summary Table 7.1-2

EXAMINATION CATEGORY	ITEM NUMBER	DESCRIPTION	EXAM REQUIREMENTS	TOTAL NUMBER BY SYSTEM	RELIEF REQ./ TAP NUMBER	NOTES
B-G-2 Pressure Retaining Bolting, 2" and Less In Diameter	B7.10	Bolts, Studs, & Nuts (Reactor Vessel)	Visual, VT-1	RPV: 2		3
	B7.20	Bolts, Studs, & Nuts (Pressurizer)	Visual, VT-1	PZR: 1		3
	B7.30	Bolts, Studs, & Nuts (Steam Generator)	Visual, VT-1	SG: 4		3
	B7.50	Bolts, Studs, & Nuts (Piping)	Visual, VT-1	CV: 4		3
				RC: 4		
				RY: 4		
				SI: 8		
	B7.60	Bolts, Studs, & Nuts (Pumps)	Visual, VT-1	RC: 4		3 35
	B7.70	Bolts, Studs, & Nuts (Valves)	Visual, VT-1	RC: 4		3 35
				RH: 4		
				SI: 18		
B-K Welded Attachments for Vessels, Piping, Pumps, and Valves	B10.10	Welded Attachments (Pressure Vessels)	Surface or Volumetric	PZR: 2		15
	B10.20	Welded Attachments (Piping)	Surface	CV: 1		16
				SI: 7		
B-L-2 Pump Casings	B12.20	Pump Casing (Pumps)	Visual, VT-3	RC: 4		34 35
B-M-2 Valve Bodies	B12.50	Valve Body, Exceeding NPS 4 (Valves)	Visual, VT-3	RC: 12		34 35
				RH: 4		
				RY: 3		
				SI: 18		

Unit 2

Inservice Inspection Summary Table 7.1-2

EXAMINATION CATEGORY	ITEM NUMBER	DESCRIPTION	EXAM REQUIREMENTS	TOTAL NUMBER BY SYSTEM	RELIEF REQ./ TAP NUMBER	NOTES
B-N-1 Interior of Reactor Vessel	B13.10	Vessel Interior (Reactor Vessel)	Visual, VT-3	RPV: 1		
B-N-2 Welded Core Support Structures and Interior Attachments to Reactor Vessels	B13.60	Interior Attachments Beyond Beltline Region (Reactor Vessel)	Visual, VT-3	RPV: 1		
B-N-3 Removable Core Support Structures	B13.70	Core Support Structure (Reactor Vessel)	Visual, VT-3	RPV: 1		
B-O Pressure Retaining Welds in Control Rod Housings	B14.20	Welds in CRD Housing (Reactor Vessel) (10% of Peripheral CRD Housing welds to be inspected. 45 of 78 welds are identified as peripheral. Examine 5.)	Volumetric or Surface	RPV: 45		27
B-P All Pressure Retaining Components	B15.10	Pressure Retaining Components [IWB-5222(a)] System Leakage Test (IWB-5220) (Outage)	Visual, VT-2	RC: 2 (Includes CV, RH, RY, and SI)	I4T-04	22 32
	B15.20	Pressure Retaining Components [IWB-5222(b)] System Leakage Test (IWB-5220) (Interval)	Visual, VT-2	RC: 1 (Includes CV, RH, RY, and SI)	I4T-04	22 32
B-Q Steam Gen. Tubing	B16.20	Steam Generator Tubing in U-Tube Design (Steam Generator)	Volumetric Per Tech Specs	SG: 4		

Unit 2

Inservice Inspection Summary Table 7.1-2

EXAMINATION CATEGORY	ITEM NUMBER	DESCRIPTION	EXAM REQUIREMENTS	TOTAL NUMBER BY SYSTEM	RELIEF REQ./ TAP NUMBER	NOTES
C-A Pressure Retaining Welds in Pressure Vessels	C1.10	Shell Circumferential Welds (Pressure Vessels)	Volumetric	RH: 2 SG: 12	I4T-07	13
	C1.20	Head Circumferential Welds (Pressure Vessels)	Volumetric	RH: 2 SG: 4	I4T-07	13
	C1.30	Tubesheet-to-Shell-Welds (Pressure Vessels)	Volumetric	SG: 4		
C-B Pressure Retaining Nozzle Welds in Vessels	C2.21	Nozzle-to-Shell (Nozzle to Head or Nozzle to Nozzle) Welds Without Reinforcing Plate, Greater Than 1/2" Nominal Thickness (Pressure Vessels)	Volumetric & Surface	RH: 4 SG: 12	I4T-07	13
	C2.22	Nozzle Inside Radius Section Without Reinforcing Plate, Greater Than 1/2" Nominal Thickness (Pressure Vessels)	Volumetric	RH: 0 SG: 4	I4T-07	6 13
C-C Welded Attachments for Vessels, Piping, Pumps, and Valves	C3.10	Welded Attachments (Pressure Vessels)	Surface	RH: 2		
	C3.20	Welded Attachments (Piping)	Surface	CS: 3 CV: 2 FW: 4 MS: 32 RH: 6 SI: 12 SX: 13 VQ: 4		
	C3.30	Welded Attachments (Pumps)	Surface	CS: 6 CV: 8 RH: 6		

Unit 2

Inservice Inspection Summary Table 7.1-2

EXAMINATION CATEGORY	ITEM NUMBER	DESCRIPTION	EXAM REQUIREMENTS	TOTAL NUMBER BY SYSTEM	RELIEF REQ./ TAP NUMBER	NOTES
C-H All Pressure Retaining Components (Periodic)	C7.10	Pressure Retaining Components System Leakage Test (IWC-5220)	Visual, VT-2	AF: 2	I4T-03 I4T-04	22
				CS: 5		
				CV: 10		
				FC: 1		
				FP: 1		
				FW: 2		
				IA: 1		
				MS: 2		
				OG: 1		
				PC: 1		
				PR: 1		
				PS: 6		
				RC: 1		
				RE: 3		
				RF: 1		
				RH: 6		
				RY: 4		
				SA: 1		
				SD: 1		
				SI: 9		
				SX: 2		
				VQ: 6		
				WM: 1		
				WO: 2		

Unit 2

Inservice Inspection Summary Table 7.1-2

EXAMINATION CATEGORY	ITEM NUMBER	DESCRIPTION	EXAM REQUIREMENTS	TOTAL NUMBER BY SYSTEM	RELIEF REQ./ TAP NUMBER	NOTES
D-A Welded Attachments for Vessels, Piping, Pumps, and Valves	D1.10	Welded Attachments (Pressure Vessels)	Visual, VT-1	CC: 4 DG: 12 RH: 2 SX: 8		
	D1.20	Welded Attachments (Piping)	Visual, VT-1	AF: 2 CC: 4 SX: 15		
	D1.30	Welded Attachments (Pumps)	Visual, VT-1	AF: 8		
D-B All Pressure Retaining Components (Periodic)	D2.10	Pressure Retaining Components System Leakage Test (IWD-5220)	Visual, VT-2	AB: 1 AF: 3 CC: 6 DG: 10 DO: 3 FC: 1 RY: 2 SX: 5	I4T-03 I4T-04 I4T-10	22

Unit 2

Inservice Inspection Summary Table 7.1-2

EXAMINATION CATEGORY	ITEM NUMBER	DESCRIPTION	EXAM REQUIREMENTS	TOTAL NUMBER BY SYSTEM	RELIEF REQ./ TAP NUMBER	NOTES
E-A Containment Surfaces	E1.11	Containment Vessel Pressure Retaining Boundary - Accessible Surface Area	General Visual	CC: 5 CS: 6 CV: 6 FC: 2 FP: 1 FW: 8 IA: 1 MS: 4 NT: 56 OG: 3 PR: 1 PS: 5 RE: 2 RF: 1 RH: 2 RY: 3 SA: 1 SD: 8 SI: 8 SX: 4 VQ: 5 WM: 1 WO: 4 XX: 47		7
	E1.30	Containment Vessel Pressure Retaining Boundary - Moisture Barriers	General Visual	1		7
E-C Containment Surfaces Requiring Augmented Examination	E4.11	Containment Surface Areas - Visible Surfaces	Visual, VT-1	0		7
	E4.12	Containment Surface Areas - Surface Area Grid, Minimum Wall Thickness Location	Volumetric (Ultrasonic Thickness)	0		7

Unit 2

Inservice Inspection Summary Table 7.1-2

EXAMINATION CATEGORY	ITEM NUMBER	DESCRIPTION	EXAM REQUIREMENTS	TOTAL NUMBER BY SYSTEM	RELIEF REQ./ TAP NUMBER	NOTES
E-G Bolted Connections	E8.10	Containment Vessel Pressure Retaining Boundary - Bolted Connections, Surfaces	Visual, VT-1	NT: 92 XX: 28		7
F-A Supports	F1.10	Class 1 Piping Supports	Visual, VT-3	CV: 143 RC: 86 RH: 26 RY: 37 SI: 175		1
	F1.20	Class 2 Piping Supports	Visual, VT-3	AF: 36 CS: 55 CV: 57 FW: 97 MS: 32 RH: 78 SI: 147 SX: 155 VQ: 5		1
	F1.30	Class 3 Piping Supports	Visual, VT-3	AF: 41 CC: 52 SX: 277		1
	F1.40	Supports Other Than Piping Supports (Class 1, 2, 3, and MC)	Visual, VT-3	AF: 2 CC: 4 CS: 6 CV: 8 DG: 2 RC: 29 RH: 10 RY: 5 SI: 4 SX: 4		1

Unit 2

Inservice Inspection Summary Table 7.1-2

EXAMINATION CATEGORY	ITEM NUMBER	DESCRIPTION	EXAM REQUIREMENTS	TOTAL NUMBER BY SYSTEM	RELIEF REQ./ TAP NUMBER	NOTES
L-A Concrete	L1.11	Concrete Surfaces - All Accessible Surface Areas	General Visual	42		7
	L1.12	Concrete Surfaces - Suspect Areas (No Suspect Areas Identified)	Detailed Visual	----		7
L-B Unbonded Post-Tensioning System	L2.10	Tendon	IWL-2522	483		7
	L2.20	Tendon - Wire or Strand	IWL-2523.2	483		7
	L2.30	Tendon - Anchorage Hardware and Surrounding Concrete	Detailed Visual	966		7
	L2.40	Tendon - Corrosion Protection Medium	IWL-2525.2(a), IWL-2526	----		7
	L2.50	Tendon - Free Water	IWL-2525.2(b)	----		7
R-A Risk-Informed Piping Examinations	2	Risk Category 2 Elements	See Notes	RC: 186	I4R-01	8
	3	Risk Category 3 Elements	See Notes	FW: 242	I4T-01	9
	4	Risk Category 4 Elements	See Notes	CS: 164	I4T-02	10
				CV: 203	I4T-06	17
				RC: 465		18
				RH: 215		20
				SI: 241		
	5	Risk Category 5 Elements	See Notes	AF: 20		
				CV: 127		
				SI: 159		

Unit 2

Inservice Inspection Summary Table 7.1-2

EXAMINATION CATEGORY	ITEM NUMBER	DESCRIPTION	EXAM REQUIREMENTS	TOTAL NUMBER BY SYSTEM	RELIEF REQ./ TAP NUMBER	NOTES
NA Augmented Components	3.6.2	Examination of High Energy Circumferential and Longitudinal Piping Welds (MEB 3-1, UFSAR 3.6.1 and 3.6.2).	Volumetric or Surface	NA		5 10
	RG1.14	Augmented Examination of Reactor Coolant Pump Flywheel Per Regulatory Guide 1.14 as modified by Surface Byron Station License Amendment #118 and Technical Requirements Manual Appendix G.	Volumetric or Surface	RC: 4		28
	ECCS	Information Notice 79-19, Pipe Cracks in Stagnant Borated Water Systems at PWR Plants.	Volumetric	SI: 98		29
	0737	Leak Testing and Periodic Visual Examinations of Systems Outside of Primary Containment Which Could Contain Highly Radioactive Fluids During a Serious Transient or Accident (NUREG 0737).	Visual, VT-2	CS CV FC GW OG PS RH SI		30
	GL8805	Generic Letter 88-05, Boric Acid Corrosion of Carbon Steel Reactor Pressure Boundary Components in PWR Plants.	Visual, VT-2	RC		31
	APP Q	Weld Overlay of PZR Nozzle to Safe-Ends and First Piping Welds.	Volumetric	RY: 6		17
	MRP-146	EPRI Materials Reliability Program, *Management of Thermal Fatigue in Normally Stagnant Non-Isolable Reactor Coolant Branch Lines* (MRP-146).	Visual & Volumetric	RC: 6		23
	MRP-192	EPRI Materials Reliability Program, *Assessment of RHR Mixing Tee Thermal Fatigue in PWR Plants* (MRP-192).	Volumetric	NA		24
	MRP-227	Augmented Examination of Pressurized Water Reactor Internals (MRP-227).	Visual & Volumetric	RC: 1		26
	N-722-1	B15.80 RPV Bottom-Mounted Instrument Penetrations	Visual	RC: 1		18
	N-729-1	B4.10 Reactor Head Exterior Surface B4.20 Reactor Head Penetrations	Visual Volumetric & Surface	RPV: 1 RPV: 1		19
	N-770-1	Examination of Class 1 piping and nozzle dissimilar-metal butt welds per 10 CFR 50.55a(g)(6)(ii)(F).	Visual, Volumetric & Surface	PZR: 6 RPV: 8	I4T-08	20

Inservice Inspection Program Notes

Inservice Inspection Summary Table 7.1-3

NOTE #	NOTE SUMMARY
1	Snubber visual examinations, functional testing, and service life monitoring are performed in accordance with ASME OM Code, Subsections ISTA and ISTD. For a detailed discussion of the Byron Station Snubber Program, refer to the Snubber Program Document and Section 4.2 of this document.
2	The Byron Station Unit 1 population counts include those components that are common to both units (typically designated as "Common". These Common components are referenced in Table 7.1-1 following a "+" symbol to designate the Common Unit.
3	Bolting is characterized by one entry per valve, pump, piping flanges, or vessel manways not by the actual total number of bolts or studs. When the examination is required for a given item's bolting, all bolts shall be inspected. The reactor vessel closure head studs, nuts, and washers (54 total for each item) are examined during more than one Inspection Period. The number of separate examinations for each item identifies the population of these components.
4	Examination Category B-G-1, Item Numbers B6.20 "Closure Studs, In Place" and B6.30 "Closure Studs, When Removed" have been combined into and renamed as Item Number B6.20 "Closure Studs", in Table IWB-2500-1 of ASME Section XI, 2007 Edition with the 2008 Addenda.
5	The population counts reported represents the number of non-exempt circumferential welds. Longitudinal welds are also subject to examination, but actual counts are not reported here. Byron Station examines the portion of the longitudinal weld that falls within the intersecting circumferential weld examination volume.
6	Subsection IWC, Table IWC-2500-1, Examination Category C-B, Item Number C2.22 requires volumetric examination of the nozzle inner radii of nozzles without reinforcing plates in vessels with nominal thickness > 1/2 in. a. The Main Steam nozzle was designed with an internal multiple venture-type flow restrictor with an equivalent throat diameter of 16 inches. This design is used to limit the flow in the event of a postulated steam line break. b. The Residual Heat Removal Heat Exchanger nozzle unique configuration with the reinforcing pads being on the internal surface, the nozzle inner radius section is inaccessible for examination. These designs do not utilize a radius nozzle as described in Figures IWC-2500-4(a) and (b), and therefore is not considered as an Examination Category C-B, Item Number C2.22 component. However, these nozzles will receive a system leakage test during each inspection period to verify structural integrity.

Inservice Inspection Program Notes

Inservice Inspection Summary Table 7.1-3

NOTE #	NOTE SUMMARY
7	Examination requirements of Examination Category E-A components Includes all unique identified inspectable surface areas, i.e., Each penetration is one component (total 158). Examination requirements of Examination Category E-G components Bolted Connections: Each connection bolt group is counted as 1 item (i.e., 20 bolt flange connection equals 1 item). Examination requirements of Examination Category L-A components Counted three main Areas (Exterior wall, Exterior Dome, and Tendon gallery ceiling) Examination requirements of Examination Category L-B components Equals total number of bearing plates (each bearing plate includes Anchorage hardware and surrounding concrete) Includes (4) Distinct Areas: Horizontal Wall Tendons — 402 bearing plates Dome Tendons — 240 bearing plates Upper Vertical Tendons — 162 bearing plates Lower Vertical Tendons — 162 bearing plates (Total) — (966 bearing plates)
8	For the Fourth ISI Interval, Byron Station's ISI Class 1 and 2 piping inspection program will be governed by risk-informed regulations. The RI-ISI Program methodology is described in the EPRI Topical Reports TR-112657, Rev. B-A, TR-1006937, Rev. 0-A, and N-578-1. The RI-ISI Program scope has been implemented as an alternative to the 2007 Edition with the 2008 Addenda of the ASME Section XI examination program for ISI Class 1 B-F and B-J welds and ISI Class 2 C-F-1 and C-F-2 welds in accordance with 10 CFR 50.55a(z).
9	Examination requirements for ISI Class 1 and 2 piping structural elements within the RI-ISI Program are determined by the various degradation mechanisms present at each individual piping structural element. See EPRI Topical Reports TR-112657, Rev. B-A, TR-1006937, Rev. 0-A, and N-578-1 for specific examination method requirements.
10	For the Fourth ISI Interval, the RI-ISI Program scope continues to include welds in the BER piping, also referred to as the HELB region, which includes several non-class welds that fall within the BER augmented inspection program. All BER augmented welds have been evaluated under the RI-ISI methodology and have been integrated into the RI-ISI Program. Additional guidance for adaptation of the RI-ISI evaluation process to BER piping is given in EPRI TR-1006937, Rev. 0-A. Thus, these welds have been categorized and selected for examination in accordance with the EPRI Topical Reports TR-112657, Rev. B-A, TR-1006937, Rev. 0-A, and N-578-1 in lieu of the original requirement to NUREG 0800 in UFSAR Section 3.6.2. The populations are identified with the applicable systems within the RI-ISI section of the tables.
11	As allowed by ASME Code Case N-613-1 (N-613-1), Byron Station will perform a volumetric examination using a reduced examination volume (A-B-C-D-E-F-G-H) of Figures 1, 2, and 3 of the Code Case in lieu of the previous examination volumes of ASME Section XI, Figures IWB-2500-7(a), (b), and (c).
12	As allowed by ASME Code Case N-648-1, Byron Station will perform a VT-1 visual examination in lieu of a volumetric examination in ASME Section XI utilizing the allowable flaw length criteria of Table IWB-3512-1 with limiting assumptions on the flaw aspect ratio. For Item B3.100, a VT-1 visual examination may be performed per conditionally approved ASME Code Case N-648-1 (N-648-1). (See Note 12 above for details on N-648-1.)

Inservice Inspection Program Notes

Inservice Inspection Summary Table 7.1-3

NOTE #	NOTE SUMMARY
13	As allowed by N-706-1, Byron Station will perform a VT-2 visual examination each period in lieu of the volumetric and/or volumetric and surface examinations of ASME Section XI. Note that the alternative requirements detailed in Table 1 of the Code Case apply only to the PWR stainless steel regenerative and residual heat exchanger components. (See TAP I4T-07 in Section 2.5 for details on this Code Case.)
14	Per 10 CFR 50.55a(b)(2)(xxi)(A), *Table IWB-2500-1 examination requirements*, the provisions of Table IWB-2500-1, Examination Category B-D, Item Numbers B3.120 and B3.140 in the 1998 Edition must be applied when using the 1999 Addenda through the latest Edition and Addenda, and requires that a visual examination with magnification may be performed on the inside radius section instead of an ultrasonic examination.
15	The examination requirements for the pressurizer support skirt to vessel weld is identified as Figure IWB-2500-13. The examination surfaces are A-B for the outer portion or C-D for the inner portion of the weld. As shown on the fabrication records for this weld, the inner portion is not accessible for the surface examination of C-D. A backing ring was used during the welding of the support weld. This design does not utilize an exposed inner surface as shown in Figure IWB-2500-13 and therefore is not considered subject to the inner surface examination.
16	For ISI Class 1 penetration closure plate welds (Item Number B10.20), the examination surfaces are A-B for the outer portion and C-D for the inner portion of the weld. As shown on the fabrication records, the inner portion is not accessible for the surface examination of C-D. A backing ring was used during the welding of a single-V support weld. This design does not utilize an exposed inner surface as shown in Figure IWB-2500-15 and therefore is not considered subject to the inner surface examination.
17	Butt welds fabricated with Alloy 600 materials and overlayed with PWSCC resistant materials are incorporated into programs required by: ASME Section XI Nonmandatory Appendix Q for full structural weld overlays.
18	Per 10 CFR 50.55a(g)(6)(ii)(E)(*1*), all licensees of pressurized water reactors shall augment their inservice inspection program by implementing N-722-1 subject to the conditions specified in paragraphs (g)(6)(ii)(E)(2) through (4) of this section. The inspection requirements do not apply to components with pressure retaining welds that have been mitigated by weld overlay or stress improvement.
19	Per 10 CFR 50.55a(g)(6)(ii)(D)(*1*), all licensees of pressurized water reactors shall augment their inservice inspection program with N-729-1 subject to the conditions specified in paragraphs (g)(6)(ii)(D)(*2*) through (*6*) of this section.
20	Per 10 CFR 50.55a(g)(6)(ii)(F), all licensees of pressurized water reactors shall augment their inservice inspection program by implementing N-770-1 subject to the conditions specified in paragraphs (g)(6)(ii)(F)(*2*) through (*10*) of this section.
21	The replacement of the Reactor Coolant Pump 1RC01PB main flange bolting in B1R17 with studs, nuts, and washers added Item Number B6.200 to the examination tables.
22	The Total Number By System represents the total number by system pressure test blocks for Examination Category B-P, C-H, and D-B components.
23	MRP-146 Augmented Examination Program for the screening, evaluation, and inspection requirements for potential thermal fatigue cracking that may occur in normally stagnant non-isolable piping systems attached to pressurized water reactor (PWR) main reactor coolant system (RCS) piping. Currently, the examinations are limited to the following locations: Cold leg charging lines 1/2RC28A-3" and 1/2RC37A-3". Loop Drain lines 1/2RC14AX-2" (Loops A, B, C, and D).

Inservice Inspection Program Notes

Inservice Inspection Summary Table 7.1-3

NOTE #	NOTE SUMMARY
24	MRP-192 Augmented Examination Program was issued as a "good practice" industry guideline per NEI 03-08 classification. Current operating conditions for temperature differentials of the mixing flows and cumulative operating time in mixing mode, are within the limits specified in MRP-192 (< 144°F), therefore, no examinations are currently scheduled.
25	Byron Station will utilize the alternative requirements of ASME Code Case N-747 to provide the reactor vessel head-to-flange weld to be inspected by surface examination once each ten-year inspection interval, using the current surface examination area shown in Figure IWB-2500-5. This alternative requirement may only be implemented after the weld has received at least one inservice volumetric examination, which may be performed as part of the preservice inspection, with no service-induced flaws having been identified. Hence, there have been no defects detected at Byron Station on this weld during pre-service or inservice examinations. It is therefore concluded that the concurrent volumetric and surface examination requirement may be eliminated for the reactor vessel head-to-flange weld, and that the outer surface examination discussed above will be performed.
26	The RPV interior requires examination per ASME Section XI requirements for Examination Categories B-N-1, B-N-2, and B-N-3. In addition to the ASME Section XI requirements, the Byron Station PWR Internals Program for the inspection, repair, replacement, degradation evaluation, and mitigation of the PWR Reactor Internals will ensure that Materials Reliability Program (MRP) and PWR Owners' Group (PWROG) Guidelines are met. Augmented examination requirements associated with the Byron Station PWR Internals Program are maintained and controlled in procedures ER-AP-333, "Pressurized Water Reactor Internals Management Program" and ER-AP-333-1001, "Pressurized Water Reactor Internals Program".
27	Examination Category B-O (Pressure-Retaining Welds In Control Rod Housings), Item Number B14.20 (Welds in CRD Housing) - the scope of examination is for pressure retaining welds in 10% of the peripheral CRD Housings. A total of 45 out of the 78 CRD Housings are classified as peripheral components. Byron Station is required to select the welds on 5 Peripheral CRD Housings to be examined during the interval (10% of 45).
28	The Byron Station requirement to NRC Regulatory Guide 1.14, Reactor Coolant Pump Flywheel Integrity, has been modified by Byron Station License Amendment #118 and Technical Requirements Manual Appendix G. (See Section 2.2.2 of the ISI Program Plan for details on this Augmented Examination Program.)
29	The NRC has expressed a concern in lines that contain stagnant borated water. Byron Station will perform augmented volumetric examinations on ISI Class 2 ECCS system; Safety Injection (SI) that is not currently subject to volumetric examination as required by ASME Section XI. The inspections shall include seven and one-half percent (7.5%) sampling of the total population of circumferential welds > 4" nominal pipe size which contain stagnant borated water. Nominal pipe wall thickness and pressure/temperature exemptions do not apply.

Inservice Inspection Program Notes

Inservice Inspection Summary Table 7.1-3

NOTE #	NOTE SUMMARY
30	Byron Station UFSAR Section E.77 addresses the requirement to implement a station leakage inspection program. The program is required as part of Byron Station's commitment to NUREG-0737, TMI Action Plan, Section III.D.1.1, Integrity of Systems Outside Containment Likely to Contain Radioactive Material for Pressurized Water Reactors and Boiling Water Reactors. UFSAR Section E.77 outlines the specific inspection requirements of the leakage inspection program and the systems, or portions of systems, which the program shall inspect. This documentation provides the licensing basis for the scope of Byron Station's NUREG-0737 program. Systems inspected are limited to those listed in E.77. To define a "system", Byron Station component numbers and piping line numbers, as shown on the P&IDs, shall detail which system an individual component or line is a part of for the purpose of applying the inspection requirements of UFSAR Section E.77 and NUREG-0737. Byron Station Unit 1 Systems or portions of systems subject to the augmented testing of NUREG-0737 are included on P&IDs M-46 Sheets1A, 1B, and 1C; M-47 Sheet 2; M-48 Sheet 18; M-61 Sheets 1A, 1B, 2, 3 and 4; M-62; M-63 Sheets 1A, 1B, and 1C; M-64 Sheets 1, 2, 3A, 3B, 4A, 4B, 5, 6, and 7; N-65 Sheets 1B and 2A; M-68 Sheets 1A, 1B, and 6; M-69 Sheets 1, 2, and 3; M-70 Sheet 1; M-82 Sheet 1, 2, 3, 5, and 14; and M-152 Sheet 6. Byron Station Unit 2 Systems or portions of systems subject to the augmented testing of NUREG-0737 are included on P&IDs M-82 Sheet 6; M-129 Sheet s1A and 1C; M-136 Sheets 1, 2, 3, and 4; M-137; M-138 Sheets 1, 2, 3, 3A, 3B, 4, 5A, 6, and 7; M-140 Sheets 1 and 5; M-141 Sheet 1; M-150 Sheet 2; and M-152 Sheet 6.
31	Generic Letter 88-05 dated March 17, 1988 addresses boric acid corrosion of carbon steel reactor pressure boundary components in pressurized water reactors. Per the Byron Station response to Generic Letter 88-05, Commonwealth Edison letter from W. E. Morgan to A. B. Davis dated May 31, 1988 (NTS Item #456-104-88-00500), a pre-outage VT-2 visual examination shall be performed to locate evidence of boric acid leakage from the reactor coolant pressure boundary. ASME Section XI also requires a VT-2 visual examination of all ISI Class 1 components prior to reactor start-up. For those portions of the reactor coolant pressure boundary that are ASME Class 2 as defined by UFSAR Section 5.2, a post-outage VT-2 visual examination shall also be performed to locate evidence of boric acid leakage. Leakage from systems containing boric acid results in residue and crystallization accumulations. By performing a VT-2 visual inspection prior to entering an outage (a station augmented inspection commitment as outlined above), any evidence of boric acid accumulations will be found and investigated to determine the source of leakage before normal outage maintenance activities can clean off the crystals and residue. These visual examinations are performed using certified VT-2 visual examiners in accordance with the Exelon VT-2 procedure. This procedure utilizes ASME Section XI VT-2 certified visual examiners and has proven successful in locating evidence of boric acid leakage in the past. Since this augmented inspection is performed solely for the purpose of detecting evidence of boric acid leakage, the system is not required to be pressurized provided any evidence of boric acid accumulations is evaluated and the source of the leakage is determined. This action may require pressurizing the system as part of the evaluation process. Byron Station Unit 1 systems or portions of systems subject to the augmented testing of Generic Letter 88-05 are included on P&IDs M-60 Sheets 1A, 1B, 2, 3, 4, and 5; M-61 Sheets 2, 3, 4, 5, and 6; M-62; M-64 Sheets 1, 2, 3B, and 5; M-68 Sheets 1A, 1B, and 7; and M-2060 Sheets 6, 7, 8, 17, and 18. Byron Station Unit 2 systems or portions of systems subject to the augmented testing of Generic Letter 88-05 are included on P&IDs M-135 Sheets 1A, 1B, 2, 3, 4, and 5; M-136 Sheets 2, 3, 4, 5, and 6; M-137; M-138 Sheets 1, 2, 3B, 5A, and 5B; M-140 Sheet 1; and M-2135 Sheets 6, 7, 8, 17, and 18.

Inservice Inspection Program Notes

Inservice Inspection Summary Table 7.1-3

NOTE #	NOTE SUMMARY
32	Paragraph IWB-5221(a) requires that for the 10-year interval system pressure test, the system shall be pressurized to a pressure not less than the pressure corresponding to 100% rated reactor power. Paragraph IWB-5222(b) requires that the boundary subject to test pressurization during this test shall extend to all ISI Class 1 pressure retaining components within the system boundary. Certain portions of the ISI Class 1 boundary are normally isolated during the periodic system leakage test. Per Paragraph IWB-5222(b), these portions of the system are required to be pressurized and inspected once per 10-year interval. Typically, these portions of the Class 1 boundary are emergency core cooling system (ECCS) injection lines which are isolated from the reactor coolant pressure boundary by two check valves or valves whose logic is linked together. During the ISI Class 1 system leakage test, the inboard valve is closed and these segments of lines are not pressurized. Also, the ECCS systems are not typically tested during an injection to the reactor vessel but rather during a test mode line up, and thus the ISI Class 1 isolated line segments are not pressurized during the ECCS system test either. 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 visual examination shall, however, extend to and include the second closed valve at the boundary extremity. Through the use of jumper hoses, an external test rig, or an abnormal valve line-up, the isolated portions of the ISI Class 1 boundary shall be pressurized once every 10-year inspection interval. The test pressure shall be the same test pressure as that of the ISI Class 1 system leakage test per Paragraph IWB-5222(b). These portions of lines are ISI Class 1 due to their reactor coolant isolation function. They are not made ISI Class 1 due to the connected ECCS system safety function. They are also designed and installed to withstand the pressures associated with isolating the Reactor Coolant System. Taking into account the ISI Class 1 boundary isolation function of these lines, the nominal operating pressure of these segments when performing their ISI Class 1 safety function would be the normal reactor coolant pressure as required by the Code Case. Therefore, any special tests performed on these lines shall be performed at minimum pressure associated with normal reactor coolant pressure (approx. 2235 psig).
33	Footnote 1 of table IWC-2500-1, Examination Category C-H, requires the system parts to be VT-2 visually examined be those other than open ended portions of systems. ASME Interpretation XI-1-89-30 supports the approach of excluding open ended portions of Class 2 systems from normal periodic VT-2 visual examination. The definition of "open ended" in ASME Section XI, Subsection IWA-9000 is a condition of piping which permits free discharge. Therefore, open ended piping up to the first isolation valve on ISI Class 2 systems is excluded from the system pressure testing program per Footnote 1 as discussed above. Since check valves in discharge lines still permit free discharge flow, these valves do not qualify as an isolation valve for the purpose of applying Footnote 1 of Table IWC-2500-1, Examination Category C-H. The excluded ISI Class 2 piping thus extends up to the next isolation point in discharge lines when the last valve in the piping is a check valve (Reference the Containment Spray discharge piping and ring headers for an example of this configuration).

Inservice Inspection Program Notes

Inservice Inspection Summary Table 7.1-3

NOTE #	NOTE SUMMARY
34	Table IWB-2500-1, Examination Category B-G-1, Note 4 allows limiting pressure retaining bolting examinations to those components selected for examination under Examination Categories B-B, B-L-2 and B-M-2. Pumps and valves shall be grouped in accordance with Examination Categories B-L-2 and B-M-2 as follows: **EXAMINATION CATEGORY B-L-2** 1RC01PA 2RC01PA 1RC01PB 2RC01PB 1RC01PC 2RC01PC 1RC01PD 2RC01PD **EXAMINATION CATEGORY B-M-2** 1RC8001A 2RC8001A 1RC8001B 2RC8001B 1RC8001C 2RC8001C 1RC8001D 2RC8001D 1RC8002A 2RC8002A 1RC8002B 2RC8002B 1RC8002C 2RC8002C 1RC8002D 2RC8002D

Inservice Inspection Program Notes

Inservice Inspection Summary Table 7.1-3

NOTE #	NOTE SUMMARY
35	Table IWB-2500-1, Examination Category B-G-2, Note 2 allows limiting pressure retaining bolting examinations to those components selected for examination under Examination Categories B-B, B-L-2 and B-M-2. Pumps and valves shall be grouped in accordance with Examination Categories B-L-2 and B-M-2 as follows:

EXAMINATION CATEGORY B-L-2

1RC01PA	2RC01PA
1RC01PB	2RC01PB
1RC01PC	2RC01PC
1RC01PD	2RC01PD

EXAMINATION CATEGORY B-M-2

1RC8003A	2RC8003A	1SI8841A	2SI8841A
1RC8003B	2RC8003B	1SI8841B	2SI8841B
1RC8003C	2RC8003C		
1RC8003D	2RC8003D	1SI8948A	2SI8948A
		1SI8948B	2SI8948B
1RH8701A	2RH8701A	1SI8948C	2SI8948C
1RH8701B	2RH8701B	1SI8948D	2SI8948D
1RH8702B	2RH8702B	1SI8956A	2SI8956A
1RH8702A	2RH8702A	1SI8956B	2SI8956B
		1SI8956C	2SI8956C
1RY8010A	2RY8010A	1SI8956D	2SI8956D
1RY8010B	2RY8010B		
1RY8010C	2RY8010C	1SI8949A	2SI8949A
		1SI8949B	2SI8949B
1SI8818A	2SI8818A	1SI8949C	2SI8949C
1SI8818B	2SI8818B	1SI8949D	2SI8949D
1SI8818C	2SI8818C		
1SI8818D	2SI8818D		

8.0 RELIEF REQUESTS FROM ASME SECTION XI

This section contains relief requests written per 10 CFR 50.55a(z)(1) for situations where alternatives to ASME Section XI requirements provide an acceptable level of quality and safety; per 10 CFR 50.55a(z)(2) for situations where compliance with ASME Section XI requirements results in a hardship or an unusual difficulty without a compensating increase in the level of quality and safety; per 10 CFR 50.55a(g)(5)(iii) for situations where ASME Section XI requirements are considered impractical; and for situations where use of a subsequent approved ASME Section XI Edition and Addenda is requested.

The following NRC guidance was utilized to determine the correct 10 CFR 50.55a Paragraph citing for Byron Station relief requests.

10 CFR 50.55a(z)(1): Cited in relief requests when alternatives to the ASME Section XI requirements which provide an acceptable level of quality and safety are proposed. Examples are relief requests which propose alternative NDE methods and/or examination frequency.

10 CFR 50.55a(z)(2): Cited in relief requests when compliance with the ASME Section XI requirements is deemed to be a hardship or unusual difficulty without a compensating increase in the level of quality and safety. Examples of hardship and/or unusual difficulty include, but are not limited to:

- Having to enter multiple Technical Specifications Limiting Conditions for Operation,
- As low as reasonably achievable (ALARA) concerns such as excessive radiation exposure,
- Replacing equipment or in-line components,
- Creating significant hazards to plant personnel,
- Disassembly of components solely to provide access for examinations, and
- Development of sophisticated tooling that would result in only minimal increases in examination coverage.

10 CFR 50.55a(g)(5)(iii): Cited in relief requests when conformance with ASME Section XI requirements is deemed impractical. Examples of impractical requirements are situations where the component would have to be redesigned, or replaced to enable the required inspection to be performed.

10 CFR 50.55a(g)(4)(iv): Cited in relief requests to use subsequent editions and addenda of ASME Section XI. These editions and addenda are incorporated by reference in 10 CFR 50.55a(b), subject to the limitations and modifications listed in paragraph 10 CFR 50.55a(b), and subject to Commission approval. Portions of editions or addenda may be used provided that all related requirements of the respective editions or addenda are met.

An index for Byron Station relief requests is included in Table 8.0-1. The "I4R-XX" relief requests are applicable to ISI, CISI, SPT, and PDI.

The following relief requests are subject to change throughout the inspection interval (e.g., NRC approval, withdrawal). Changes to NRC approved alternatives (other than withdrawal) require NRC approval.

TABLE 8.0-1
RELIEF REQUEST INDEX

RELIEF REQUEST	REVISION DATE[1]	STATUS[2]	(PROGRAM) DESCRIPTION OF RELIEF REQUEST/ NRC APPROVAL SUMMARY[3]
I3R-01	1 09/12/05	Authorized	**(ISI & CISI)** Synchronization of Ten-Year ISI Intervals between Unit 1 and Unit 2 for Class 1, 2, and 3. In addition, alignment of Containment Inservice Inspection (CISI) Ten-Year Intervals for Class MC and CC with the synchronized Unit 1 and 2 Ten-Year ISI Interval. **Authorized per NRC SER dated 09/07/06.** [Note that the start and end dates for the Third ISI Interval and Second CISI Interval were aligned, as well as subsequent intervals per the wording in previous Third ISI Interval and Second CISI Interval Relief Request I3R-01 that was authorized by the NRC per SER dated September 7, 2006. Therefore, a Fourth ISI Interval and Third CISI Interval relief request is not required. Previous Relief Request I3R-01 stated "Relief is requested to modify the end dates of the Byron Station Unit 2 Second ISI Interval and of the Byron Station Units 1 and 2 First CISI Intervals and the start and end dates of all subsequent ISI and CISI Intervals for Byron Station Units 1 and 2." I3R-01 also stated that "All inspection periods for Class 1, 2, 3, and MC components will commence for the next interval based on the modified common interval start date. Any examination methods unique to and specifically required in the third period under the previous interval, that will likewise be required in the next interval, will be scheduled and completed in the first period of the subsequent interval. The examinations will be conducted and credited under the rules of the new Code of Record (i.e., 2001 Edition through the 2003 Addenda of ASME Section XI). These examinations originally unique to the third period of the previous interval will henceforth be conducted in the first period of all subsequent ISI intervals, and deferral to the end of future intervals will not be available. In addition, the rolling five-year IWL frequency applicable to Class CC components that are subject to Subsection IWL requirements will be maintained as currently scheduled."] Thus, the Byron Station Unit 2 end of interval ISI and CISI examinations will be conducted at the end of the first period of the Fourth ISI Interval using the 2007 Edition with the 2008 Addenda of ASME Section XI.
I4R-01	0 7/29/16	Submitted 04/15/16	**(ISI)** Alternate Risk-Informed Selection and Examination Criteria for Examination Category B-F, B-J, C-F-1, and C-F-2 Pressure Retaining Piping Welds.
I4R-02	0 7/29/16	On Hold	**(ISI)** Repair of Control Rod Drive Mechanism (CRDM) Canopy Seal Welds in Accordance with IWA-4000.
I4R-03	0 7/29/16	Cancelled	**(SPT)** Alternative Examination Requirements of ASME Section XI, IWA-5244, "Buried Components". **Cancelled by Byron Station.**
I4R-04	0 7/29/16	On Hold	**(ISI)** Alternative Requirements for Limited Examination of the Reactor Vessel Head Penetration Welds.
I4R-05	0 7/29/16	Submitted 04/15/16	**(ISI)** Use of ASME Code Case N-789, Alternative Requirements for Pad Reinforcement of Class 2 and 3 Moderate-Energy Carbon Steel Piping for Raw Water Service.
I4R-06	0 7/29/16	Submitted 04/15/16	**(ISI)** Use of ASME Code Case N-786, Alternative Requirements for Sleeve Reinforcement of Class 2 and 3 Moderate-Energy Carbon Steel Piping.

TABLE 8.0-1
RELIEF REQUEST INDEX

RELIEF REQUEST	REVISION DATE[1]	STATUS[2]	(PROGRAM) DESCRIPTION OF RELIEF REQUEST/ NRC APPROVAL SUMMARY[3]
I4R-07	0 7/29/16	On Hold	**(ISI)** Request for Relief for Alternative Requirements for Pressure Retaining Boundary During System Leakage Test.
I4R-08	0 7/29/16	Submitted 04/15/16	**(ISI)** Alternative Requirements to Extend the Reactor Vessel Inservice Inspection Interval.
I4R-09	0 7/29/16	Submitted 01/28/16	**(ISI)** Use of ASME Code Case N-513-4, Evaluation Criteria for Temporary Acceptance Flaws in Moderate Energy Class 2 or 3 Piping. **Submitted as an EGC Fleet relief request under RS-16-041.**
I4R-10	0	Drafted	**(ISI)** Alternative Requirements for the Repair of the Reactor Vessel Head Penetrations In Accordance with 10 CFR 50.55a(a)(3)(i).

Note 1: The revision listed is the latest revision of the subject relief request. The date this revision became effective is the date of the approving SE that is listed in the fourth column of the table. The date noted in the second column is the date of the ISI Program Plan revision when the relief request was incorporated into the document.

Note 2: This column represents the status of the latest revision. Relief Request Status Options:
Authorized - Approved for use in an NRC SE (See Note 3);
Granted - Approved for use in an NRC SE (See Note 3);
Authorized Conditionally - Approved for use in a NRC SE that imposes certain conditions;
Granted Conditionally - Approved for use in a NRC SE that imposes certain conditions;
Denied - Use denied in a NRC SE;
Expired - Approval for relief request has expired;
Withdrawn - Relief request has been withdrawn by the Byron Station;
Not Required - The NRC has deemed the relief request unnecessary in an SE or RAI;
Cancelled - Relief request has been cancelled by the Byron Station prior to issue;
Drafted - Drafted relief request awaiting submittal and/or pending approval; and
Submitted - Relief request has been submitted to the NRC by the Byron Station and is awaiting approval.

Note 3: The NRC grants relief requests pursuant to 10 CFR 50.55a(g)(6)(i) under paragraph 10 CFR 50.55a(g)(5)(iii) when ASME Section XI requirements cannot be met and proposed alternatives do not meet the criteria of 10 CFR 50.55a(z). The NRC authorizes relief requests pursuant to 10 CFR 50.55a(z)(1) if the proposed alternatives would provide an acceptable level of quality and safety or under 10 CFR 50.55a(z)(2) if compliance with the specified requirements would result in hardship or unusual difficulties without a compensating increase in the level of safety. Relief requests under 10 CFR 50.55a(g)(5)(iii) are not to be submitted to the NRC for evaluation prior to the licensee performing the ASME Section XI-required examination. The NRC may also impose alternative requirements as it determines.

9.0 REFERENCES

The references used to develop this ISI Program Plan include:

9.1 NRC References

9.1.1 Code of Federal Regulations, Title 10, *Energy.*

- Part 50, Paragraph 50.55a, *Codes and Standards.*
- Part 50, Paragraph 2, *Definitions,* the definition of *Reactor Coolant Pressure Boundary.*
- Part 50, Appendix J, *Primary Reactor Containment Testing for Water Cooled Power Reactors.*
- SECY-96-080, *Issuance of Final Amendment to 10 CFR 50.55a to Incorporate by Reference the ASME Boiler and Pressure Vessel Code, Section XI, Division 1, Subsections IWE and IWL.*

9.1.2 NRC Mechanical Engineering Branch (MEB) Technical Position 3-1 (MEB 3-1), dated November 24, 1975, *High Energy Fluid Systems, Protection Against Postulated Piping Failures in Fluid Systems Outside Containment.*

9.1.3 Regulatory Guide 1.14, Revision 1, *Reactor Coolant Pump Flywheel Integrity,* as modified by the requirements of Byron Station License Amendment #118 and Technical Requirements Manual Appendix G.

9.1.4 NRC Regulatory Guide 1.26, Revision 3, *Quality Group Classifications and Standards for Water-, Steam-, and Radioactive Waste- Containing Components of Nuclear Power Plants.*

9.1.5 NRC Regulatory Guide 1.137, Revision 1, *Fuel-Oil Systems for Standby Diesel Generators.*

9.1.6 NRC Regulatory Guide 1.147, *Inservice Inspection Code Case Acceptability, ASME Section XI, Division 1* (See NRC.gov Reading Room for the most current revision).

9.1.7 NRC Regulatory Guide 1.192, *Operation and Maintenance Code Case Acceptability, ASME OM Code* (See NRC.gov Reading Room for the most current revision).

9.1.8 NRC Regulatory Guide 1.193, *ASME Code Cases Not Approved For Use* (See NRC.gov Reading Room for the most current revision).

9.1.9 NRC NUREG 0737, dated November 1980, *Clarification of TMI Action Plan Requirements.*

9.1.10 NRC SER related to EPRI Topical Report TR-112657, Rev. B, Final Report, *Revised Risk-Informed Inservice Inspection Evaluation Procedure, July 1999,* dated October 28, 1999.

9.1.11 NRC SER related to EPRI Topical Report TR-1006937, Rev. 0, *Extension of the EPRI Risk-Informed Inservice Inspection (RI-ISI) Methodology to Break Exclusion Region (BER) Programs,* dated June 27, 2002.

9.2 INDUSTRY REFERENCES

9.2.1 ASME Boiler and Pressure Vessel Code, Section XI, Division 1, *Inservice Inspection of Nuclear Power Plant Components,*

- 2007 Edition with the 2008 Addenda (including Appendix VIII) (4th ISI Interval and 3rd CISI Interval),
- 2004 Edition with No Addenda (Nonmandatory Appendix Q only),
- 2001 Edition through the 2003 Addenda (3rd ISI Interval and 2nd CISI Interval),
- 2001 Edition with No Addenda,
- 1998 Edition with No Addenda (1st CISI Interval),
- 1995 Edition through the 1997 Addenda,
- 1995 Edition with the 1995 Addenda,

- 1992 Edition with the 1992 Addenda (1st CISI Interval),
- 1989 Edition with No Addenda (2nd ISI Interval),
- 1983 Edition with Addenda through the Summer 1983 Addenda ('83/S'83) (1st ISI Interval) Byron Station Unit 2, and
- 1980 Edition with Addenda through the Winter 1981 Addenda ('80/W'81) (1st ISI Interval) Byron Station Unit 1.

9.2.2 ASME Boiler and Pressure Vessel Code, Section V, *Nondestructive Examination,* - 2007 Edition with the 2008 Addenda [The Edition and Addenda for ASME Section V are the same as the Edition and Addenda of ASME Section XI used for the inspection interval for both ISI and Non-ISI NDE examinations. Reference ASME Interpretation XI-1-89-02].

9.2.3 ASME OM Code, *Code for Operation and Maintenance of Nuclear Power Plants,* - 2004 Edition through the 2006 Addenda (Subsections ISTA and ISTD). (Fourth Snubber Interval).

9.2.4 MRP-146, EPRI Materials Reliability Program, *Management of Thermal Fatigue in Normally Stagnant Non-Isolable Reactor Coolant System Branch Lines,* Revision 1, Report 1022564, June 2011.

9.2.5 MRP-192, EPRI Materials Reliability Program, *Assessment of RHR Mixing Tee Thermal Fatigue in PWR Plants,* Revision 1, Report 1018395, November 2008.

9.2.6 EPRI Topical Report TR-112657, Rev. B-A, Final Report, *Revised Risk-Informed Inservice Inspection Evaluation Procedure,* December 1999.

9.2.7 EPRI Topical Report TR-1006937, Rev. 0-A, *Extension of the EPRI Risk-Informed Inservice Inspection (RI-ISI) Methodology to Break Exclusion Region (BER) Programs,* August 2002.

9.2.8 EPRI Containment Inspection Program Guide (TR-110698-R1).

9.2.9 INPO Engineering Program Guide EPG-11, Inservice Inspection Program.

9.3 LICENSEE REFERENCES

9.3.1 Byron Station Units 1 and 2, Updated Final Safety Analysis Report (UFSAR).

9.3.2 Byron Station Units 1 and 2, Technical Specifications, *Limiting Conditions for Operation and Surveillance Requirements.*

9.3.3 Byron Station Units 1 and 2, Technical Specifications (TS), *Bases.*

9.3.4 Byron Station Units 1 and 2, Technical Requirements Manual (TRM).

9.3.5 Byron Station Units 1 and 2, *ISI Classification Basis Document (BYR-525537-RP03), Fourth Ten-Year Inspection Interval.*

9.3.6 Byron Station Units 1 and 2, *ISI Selection Document (BYR-525537-RP05), Fourth Ten-Year Inspection Interval.*

9.3.7 Byron Station Units 1 and 2, *Exelon Risk-Informed Inservice Inspection Evaluation (Final Report) (BYR-525537-RP06), Fourth Ten-Year Inspection Interval.*

9.3.8 Byron Station Units 1 and 2, *Snubber Program Document (BYR-525537-RP07), Fourth Ten-Year Inspection Interval.*

9.3.9 Procedures ER-AA-330, *Conduct of Inservice Inspection Activities,* ER-AA-330-001, *Section XI Pressure Testing,* ER-AA-330-002, *Inservice Inspection of Section XI Welds and Components,* ER-AA-330-003, *Inservice Inspection of Section XI Component Supports,* ER-AA-330-004, *Visual Examination of Snubbers,* ER-AA-330-005, *Visual Examination of Section XI Class CC Concrete Containment Structures,* ER-AA-330-006, *Inservice*

Inspection and Testing of The Pre-Stressed Concrete Containment Post Tensioning Systems, ER-AA-330-007, *Visual Examination of Section XI Class MC Surfaces and Class CC Liners,* ER-AA-330-009, *ASME Section XI Repair/Replacement Program,* ER-AA-330-010, *Snubber Functional Testing,* and ER-AA-330-011, *Snubber Service Life Monitoring Program.*

9.3.10 NRC letter dated May 17, 1990, Stephen P. Sands, NRC to Thomas J. Kovach, Commonwealth Edison Company - *Safety Evaluation of Containment Leak Chase Channels,* Byron Station Unit Nos. 1 and 2, Braidwood Station Unit Nos. 1 and 2.

9.3.11 Calculation to Determine 80% of Primary Containment IWE/MC Surface Area Remains Accessible for Examination, BYR2000-181, for Byron Station, Units 1 and 2.

9.3.12 Unit 1 Steam Generator Lower Shell-to-Transition Cone Weld Exemption. Babcock & Wilcox, Canada Engineering Evaluation CM9015189 - B2, Exelon Generation Company RSG - Shell Circumferential Weld Evaluation With Respect To Section XI Rules. Exelon Generation Company Owner's Review of this evaluation was performed under EC 354211.

9.3.13 Curtiss-Wright Correspondence CPS-14-014: Byron Penetrant Test Evaluation (Re. IR 02393595).

9.3.14 Byron Station Units 1 and 2, License Renewal Application, July 2015.

9.3.15 NRC SE related to Relief Request I3R-01, Synchronization of Ten-Year ISI Intervals between Unit 1 and Unit 2 for Class 1, 2, and 3. In addition, alignment of Containment Inservice Inspection (CISI) Ten-Year Intervals for Class MC and CC with the synchronized Unit 1 and 2 Ten-Year ISI Interval, authorized per NRC SER dated 09/07/06.

9.3.16 BY-PRA-031, Rev. 0, Byron Nuclear Generating Station Units 1 and 2, PRA Capability Assessment for RI-ISI, (Summary: PRA Capability Assessment for Risk-Informed Inservice Inspection Applications), dated December 2015.

9.3.17 *Reactor Flange Leak Off Lines*, BYRON-98-5030, dated 02/04/98.

9.3.18 *Acceptance Criteria for Containment Liner Reduced Thickness*, NDIT No. BYR-88-226 dated 10/27/99.

9.4 LICENSE RENEWAL REFERENCES / COMMITMENTS

9.4.1 **CM-1** AR 01367499-29-05, License Renewal Aging Management- ASME Section XI, Subsection IWE program. (Section 1.9)

9.4.2 **CM-2** AR 01367499-30-01, License Renewal Aging Management- ASME Section XI, Subsection IWL program. (Section 1.9)

9.4.3 **CM-3** AR 01367499-31-07, License Renewal Aging Management- ASME Section XI, Subsection IWF program. (Sections 1.9, 2.2.15, 4.0, 4.1, 4.1.1, and 4.3)