PROGRAM PLAN FOR THE SECOND INSPECTION INTERVAL FOR CALVERT CLIFFS NUCLEAR POWER PLANT, UNITS 1 AND 2

SwRI Project 17-1168

Prepared for

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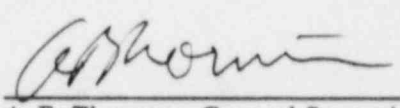

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Unit 1 Commercial Operation -
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Unit 2 Commercial Operation -
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1. INTRODUCTION

1.1 General

This Program Plan outlines the second inspection interval inservice examination (ISI) requirements for Class 1, Class 2, and Class 3 systems and components for Baltimore Gas & Electric Company's (BG&E) Calvert Cliffs Nuclear Power Plant (CCNPP), Units 1 and 2. The second inspection interval begins on April 1, 1987, for both units. As permitted by Paragraph IWA-2400 of ASME Code Section XI, the Unit 2 first interval concluded at the end of the spring 1987 refueling outage.

This plan was developed in accordance with the documents identified in Section 1.2 and provides summary information outlining the ISI program for CCNPP for the second inspection interval. This summary information includes:

- Class 1, Class 2, and Class 3 systems
- ASME Section XI examination requirements of Subsections IWA, IWB, IWC, IWD, and IWF
- Method and extent of nondestructive examinations
- Exemptions
- Relief requests
- Special requirements

1.2 Applicable Documents

BG&E has adopted the following documents as the basis for the second inspection interval and is committed to satisfying their requirements. This plan was developed in accordance with these documents:

1.2.1 ASME Boiler and Pressure Vessel Code

Section XI, "Rules for Inservice Inspection of Nuclear Power Plant Components," 1983 Edition with Addenda through Summer 1983; the 1974 Edition with Addenda through Summer 1975 was used for selecting the extent of Class 1 piping welds only.

1.2.2 U.S. NRC Regulatory Guides

- 1.14, Rev. 1, "Reactor Coolant Pump Flywheel Integrity"
- 1.26, Rev. 3, "Quality Group Classifications and Standards for Water-, Steam-, and Radioactive-Waste-Containing Components of Nuclear Power Plants"
- 1.147, "Inservice Inspection Code Case Acceptability-ASME Section XI, Division 1"

- 1.150, Rev. 1, "Ultrasonic Testing of Reactor Vessel Welds During Preservice and Inservice Examinations"

1.2.3 Technical Specifications

Paragraphs 4.0.5, 4.4.10.1.1, and 4.4.10.1.2 of the Technical Specifications for Calvert Cliffs Units 1 and 2.

1.2.4 Regulatory Guide 1.147-Approved ASME Section XI Code Cases

Code cases that will be utilized are contained in Section 6 of this document.

1.2.5 Relief Requests

Proposed Relief Requests from ASME Code Section XI requirements are contained in Section 6 of this document.

1.3 Responsibility

As specified in Paragraph IWA-1400 of ASME Section XI, BG&E bears the overall responsibility for implementation of an ISI program. Quality Assurance Procedures, Calvert Cliffs Instructions, and NDE Programs and Plans are in place to control and implement these inservice inspection requirements.

1.4 Records

Examination records and documentation of results provide the basis for evaluation and facilitate comparison with previous results and subsequent inspections. In accordance with Section XI, IWA-6000, these records will be maintained for the plant life.

1.5 Examination Methods

Examination methods which will be used to satisfy Code examination requirements have been listed for nonexempt Class 1, Class 2, and Class 3 components, as applicable. Provided below is a brief explanation of the methods which will be performed to satisfy the Code requirements. Personnel performing nondestructive examinations will be qualified in accordance with written procedures prepared as required by Paragraph IWA-2300 of ASME Code Section XI. Methods of examination will be further described in the Long-Term and Outage Examination ISI plans based on examination requirements, examination area access, joint configurations, and materials scheduled for examination.

1.5.1 Visual Examination Method

Visual examinations (VT) will be performed in accordance with IWA-2210 of ASME Section XI. IWA-2210 defines the four types of VT examinations as follows:

(1) VT-1 examinations are conducted to determine the condition of the part, component, or surface examined. The examination shall determine conditions such as cracks, wear, corrosion, erosion, or physical damage on the surfaces of the part or components. This type of examination may be performed by direct or remote methods as defined in IWA-2211.

(2) VT-2 examinations are conducted to detect leakage (or abnormal leakage) from pressure-retaining components during system pressure or functional tests as defined in IWA-2212.

(3) VT-3 examinations are conducted to determine general mechanical and structural conditions of components and their supports such as the presence of loose parts, debris, or abnormal corrosion products, wear, erosion, corrosion, and the loss of integrity at bolted or welded connections as defined in IWA-2213.

(4) VT-4 examinations are conducted to determine conditions related to operability of components or devices, such as mechanical and hydraulic snubbers, components, supports, pumps, valves, and spring-loaded and constant-weight hangers as defined in IWA-2214.

1.5.2 Surface Examination Method

A surface examination is performed to detect the presence of surface cracks or discontinuities. Techniques for surface examination include either magnetic particle (MT) or liquid penetrant (PT) techniques where the surface conditions, material, and accessibility permit. Surface examinations will be conducted as defined in IWA-2220.

1.5.3 Volumetric Examination Method

A volumetric examination is performed to detect discontinuities in the volume of a material. Such volumetric examinations include radiographic (RT), ultrasonic (UT), and eddy current (ET). Volumetric examinations will be conducted as defined in IWA-2230.

For volumetric examinations of piping and vessel components, use of the UT method is emphasized over RT for the following reasons:

(1) RT imposes restrictions that UT does not. For example, radiation levels associated with RT often necessitate evacuation of the examination area. This can extend outage time significantly.

(2) In many locations, background radiation levels would preclude RT examination.

(3) Preservice examinations (PSI) were conducted utilizing UT techniques. In order to correlate PSI data with ISI data, the same examination method should be used.

(4) UT examination provides more spacial information relative to determining flaw aspect ratios.

The UT examinations may be performed by utilizing either manual or mechanized UT (Mech UT) techniques.

1.6 Inspection Intervals

The examinations and system pressure tests required by IWA, IWB, IWC, and IWD shall be completed during each inspection interval for the service lifetime of CCNPP. In accordance

with IWA-2400, BG&E has elected to perform these examinations under Inspection Program B of IWA-2420. This inspection program is defined as follows:

1st Inspection Interval - 10 years following initial start of power unit commercial operation

2nd Inspection Interval - 10 years following the 1st inspection interval

3rd Inspection Interval - 10 years following the 2nd inspection interval

4th Inspection Interval - 10 years following the 3rd inspection interval

It should be noted that the first inspection interval for Unit 1 was extended to April 1, 1987. The purpose of the extension was to place the ISI programs of both units on the same year and addenda of Section XI.

Each inspection interval may be decreased or extended (but not cumulatively) by as much as one year. If CCNPP is out of service continuously for 6 months or more, the inspection interval during which the outage occurred may be extended for a period equivalent to the outage.

1.7 Classification of Components

The program plan components and piping have been classified by BG&E for purposes of inservice inspection based on definitions contained in 10CFR50.2 and Regulatory Guide 1.26, Rev. 3.

2. CLASS 1 PROGRAM

2.1 Basis for Preparation

Preparation of the Class 1 ISI program was based on the requirements of Articles IWB-1000 and IWB-2000 of Section XI. These articles provide rules and guidelines for exemptions, inspection schedules, and examination requirements for Class 1 pressure-retaining components and their integral attachments.

2.2 Components Subject to Examination

Based on the requirements of Section XI, the following Class 1 systems' nonexempt pressure-retaining components and their integral attachments will be subject to examination during the second inspection interval:

2.2.1 Vessels

Reactor Pressure Vessel
Pressurizer
Steam Generators (Primary Side)

2.2.2 Piping

Reactor Coolant System
Pressurizer Surge Line
Shutdown Cooling System
Safety Injection System
Pressurizer Spray System
Pressurizer Safety and Relief System
Charging Lines
Letdown Lines
Drain Lines

2.2.3 Pumps

Reactor Coolant Pumps

2.2.4 Valves

Safety Injection System
Pressurizer Spray System
Shutdown Cooling System
Pressurizer Safety and Relief System
Charging Lines
Letdown Lines

2.3 Exemption Criteria

In accordance with IWB-1220, certain Class 1 components are exempt from examination. The following criteria were applied to exempt components from surface and volumetric examinations in accordance with Section XI:

Exemption Criteria	Code Reference
Piping of 1 inch nominal pipe size (NPS) and smaller, except for steam generator tubing	IWB-1220(b)(1)
Components and their connections in piping of 1 inch NPS and smaller	IWB-1220(b)(2)

2.4 Selection and Examination of Class 1 Piping Category B-J

As permitted by 10CFR50.55a(b)(2)(ii), pressure retaining welds in Class 1 piping will be selected in accordance with the 1974 Edition of ASME Section XI with Addenda through Summer 1975. This provision provides facilities with construction permits docketed prior to July 1, 1978, the ability to retain continuity in ongoing inservice inspection programs to an extent considered practical and acceptable.

Welds selected to be examined will satisfy the extent required by the criteria in ASME Section XI 1974 through Summer 1975. Newly adopted criteria will be considered and may be utilized provided they are consistent with ASME Section XI 1974 through Summer 1975 and the Class 1 pressure boundary piping rules and regulations applied during construction and previous inspections of Calvert Cliffs.

This provision does not apply to other areas of Section XI such as exemption criteria, examination methods, or acceptance standards; these areas will be governed by ASME Section XI 1983 through Summer 1983 Addenda.

2.5 CCNPP Technical Specification Requirements

In accordance with Paragraph 4.4.10.1.1 of the CCNPP Technical Specifications, the Reactor Coolant Pump Flywheels shall be examined per the recommendations of Regulatory Position C.4.b of Regulatory Guide 1.14, Rev. 1. These examinations shall be scheduled in the Class 1 section of the ISI program.

2.6 Inservice Inspection Program Plan Tables

Provided in Table 1 are examination requirements for Class 1 components per the 1983 Edition of Section XI with Addenda through Summer 1983. These requirements shall be satisfied during the second inspection interval. Preceding Table 1 is an explanation of the table.

Table 1

SCHEME

CODE CLASS

Item No.	Examination Category	Components and Parts To Be Examined	Examination Method	Examination Requirements for Second Inspection Interval	Examination Technique/Examination Area Comments
The ASME Section XI Item No. and Category of the component are listed in these columns.		Each type of examination area is listed in this column.	The NDE method required to satisfy Code requirements is listed in this column.	This column provides information regarding the number and/or percent of examinations required to be performed for the inspection interval.	This column provides information specific to examination techniques and examination areas.

Table 1

INSERVICE INSPECTION PROGRAM

CLASS 1 COMPONENTS

Item No.	Examination Category	Components and Parts To Be Examined	Examination Method	Examination Requirements for Second Inspection Interval	Examination Technique/Examination Area Comments
REACTOR PRESSURE VESSEL					
B1.10 B1.11 B1.12	B-A	Circumferential and Longitudinal Shell Welds	Volumetric	100% of one circumferential and one longitudinal weld to be examined at structural discontinuity in the beltline region. Examinations may be performed at or near the end of the inspection interval.	Examination of longitudinal and circumferential shell welds will be performed with UT techniques.
B1.20 B1.21 B1.22	B-A	Circumferential and Meridional Head Welds	Volumetric	The accessible length of one meridional and one circumferential weld of each head to be examined. Examinations may be performed at or near the end of each inspection interval for the lower head.	Lower head and closure head welds will be examined utilizing UT techniques.
B1.30	B-A	Shell-to-Flange Weld	Volumetric	100% of the weld to be examined. At least 50% of the weld shall be examined from the flange face by the end of the first inspection period and the remainder by the end of the third inspection period.	The shell-to-flange weld will be examined from the vessel seal surface and from the vessel wall inside surface with UT.
B1.40	B-A	Head-to-Flange Weld	Volumetric and Surface	100% of the weld to be examined.	The head-to-flange weld will be examined with UT and surface examination techniques when the head is removed.
B1.50 B1.51	B-A	Repair Welds	N/A		No repair welds at Calvert Cliffs.
B3.90 B3.100	B-D B-D	Nozzle-to-Vessel Welds and Nozzle Inside Radius Section	Volumetric	100% of nozzles. At least 25% but not more than 50% of the nozzles shall be examined by the end of the first period and the remainder by the end of the interval.	The nozzle-to-vessel welds and nozzle inside radius sections will be examined with UT. First period requirements satisfied during the first interval 10-year examination.
B4.10 B4.11 B4.12 B4.13	B-E	Partial Penetration Welds: Vessel Nozzles Control Rod Drive Nozzles Instrumentation Nozzles	Visual (VT-2)	At least 25% of each group of welds of comparable size and function to be examined.	Examination will be performed during the system hydrostatic test. VT examinations will be performed in accordance with IWA-5240. There are no partial penetration vessel nozzle welds at Calvert Cliffs.
B5.10 B5.20 B5.30	B-F	Pressure-Retaining Dissimilar Metal Welds	N/A		No dissimilar metal welds on RPV at Calvert Cliffs.
B6.10	B-G-1	Closure Head Nuts >2 Inches in Diameter	Surface	100% of nuts to be examined. Examination may be performed at or near the end of the inspection interval.	Nuts will be examined with MT when removed for refueling.

Table 1

INSERVICE INSPECTION PROGRAM

CLASS 1 COMPONENTS (Cont'd)

Item No.	Examination Category	Components and Parts To Be Examined	Examination Method	Examination Requirements for Second Inspection Interval	Examination Technique/Examination Area Comments
REACTOR PRESSURE VESSEL (Cont'd)					
B6.20	B-G-1	Closure Head Studs, In Place, >2 Inches in Diameter	Volumetric	100% of studs to be examined. Examination may be performed at or near the end of the inspection interval.	Closure stud examinations may be performed "in place." Examinations should be scheduled when studs are removed to reduce radiation exposure and allow the most thorough examination. Code Case N-307-1 shall apply. See Section 6.
B6.30	B-G-1	Closure Head Studs, When Removed, >2 Inches in Diameter	Volumetric and Surface	100% of studs to be examined. Examination may be performed at or near the end of the inspection interval.	The studs will be examined with UT and MT. Code Case N-307-1 shall apply. See Section 6.
B6.40	B-G-1	Threads in Flange >2 Inches in Diameter	Volumetric	100% of threaded holes to be examined. Examination may be performed at or near the end of the inspection interval.	The threads in flange will be examined from the flange face with UT.
B6.50	B-G-1	Pressure-Retaining Closure Washers and Bushings >2 Inches in Diameter	Visual (VT-1)	All washers and bushings to be examined upon stud removal. Examination may be performed at or near the end of the inspection interval.	
B7.10	B-G-2	Pressure-Retaining Bolting ≤2 Inches in Diameter	Visual (VT-1)	All bolts, studs, and nuts to be examined.	The bolting may be examined in place under tension or when disassembled or removed.
B7.80	B-G-2	CRD Housings Bolts, Studs, and Nuts	N/A		No pressure-retaining CRD housing bolting at Calvert Cliffs.
B8.10	B-H	Integral Attachments for RPV	N/A		No integrally welded attachments on RPV at Calvert Cliffs that meet the requirements of Category B-H.
B13.10	B-N-1	Vessel Interior	Visual (VT-3)	Accessible areas to be examined during each inspection period.	
B13.50	B-N-2	Interior Attachments Within Beltline Region	Visual (VT-1)	Accessible attachment welds to be examined. Examinations may be completed at or near the end of the inspection interval.	
B13.60	B-N-2	Interior Attachments Beyond Beltline Region	Visual (VT-3)	Accessible attachment welds to be examined. Examinations may be completed at or near the end of the inspection interval.	

Table 1

INSERVICE INSPECTION PROGRAM

CLASS 1 COMPONENTS (Cont'd)

Item No.	Examination Category	Components and Parts To Be Examined	Examination Method	Examination Requirements for Second Inspection Interval	Examination Technique/Examination Area Comments
REACTOR PRESSURE VESSEL (Cont'd)					
B13.70	B-N-3	Core-Support Structure	Visual (VT-3)	With core-support structure removed, all accessible surfaces to be examined. Examinations may be completed at or near the end of the inspection interval.	
B14.10	B-O	Control Rod Drive Housing Welds	Volumetric or Surface	Welds in 10% of the peripheral CRD housings to be examined. Examinations may be performed at or near the end of the inspection interval.	The CRD housing welds will be examined with PT. See Relief Request No. 3 to perform equivalent length of weld.
B15.10	B-P	All Pressure-Retaining Boundaries for Vessel Components	Visual (VT-2)	All components to be examined during system leakage test. Examinations to be performed in accordance with IWB-5221 prior to plant startup after each refueling outage.	VT examinations will be performed in accordance with IWA-5240.
B15.11	B-P	All Pressure-Retaining Boundaries for Vessel Components	Visual (VT-2)	All components to be examined during system hydrostatic test. Examinations to be performed in accordance with IWB-5222 at or near the end of the inspection interval.	VT examinations will be performed in accordance with IWA-5240.

Table 1

INSERVICE INSPECTION PROGRAM

CLASS 1 COMPONENTS (Cont'd)

Item No.	Examination Category	Components and Parts To Be Examined	Examination Method	Examination Requirements for Second Inspection Interval	Examination Technique/Examination Area Comments
PRESSURIZER					
B2.10 B2.11 B2.12	B-B	Circumferential and Longitudinal Shell-to-Head Welds	Volumetric	The upper and lower head-to-shell welds to be examined. One foot of one longitudinal weld intersecting each head-to-shell weld to be examined.	Examination will be performed with UT techniques.
B2.20 B2.21 B2.22	B-B	Circumferential and Meridional Head Welds	Volumetric	One circumferential and one meridional weld on each head.	Examination will be performed with UT techniques.
B3.110 B3.120	B-D	Nozzle-to-Vessel Welds and Nozzle Inside Radius Sections	Volumetric	All nozzle-to-vessel welds and inside radius sections to be examined. At least 25% but not more than 50% of the nozzles shall be examined by the end of the first period and the remainder by the end of the inspection interval.	Examinations will be performed with UT techniques.
B4.20	B-E	Heater Penetration Welds	Visual (VT-2)	All pressurizer heater penetration welds shall be examined during system hydrostatic test in accordance with IWB-5222 at or near the end of the inspection interval.	VT examination will be performed in accordance with IWA-5240.
B5.40	B-F	Nozzle-to-Safe End Dissimilar Metal Welds $\geq$4 Inches NPS	Surface and Volumetric	All butt welds to be examined.	Examinations will be performed with PT and UT techniques.
B5.50	B-F	Nozzle-to-Safe End Dissimilar Metal Welds <4 Inches NPS	Surface	All butt welds to be examined.	Examinations will be performed with PT techniques.
B5.60	B-F	Nozzle-to-Safe End Socket Welds	N/A		No dissimilar metal socket welds on pressurizer at Calvert Cliffs.
B6.60 B6.70 B6.80	B-G-1	Pressure-Retaining Bolting >2 Inches in Diameter	N/A		No bolting on pressurizer >2 inches in diameter at Calvert Cliffs.
B7.20	B-G-2	Bolts,Studs, and Nuts $\leq$2 Inches in Diameter	Visual (VT-1)	All bolts, studs, and nuts to be examined.	Bolting examinations may be performed in place under tension or when disassembled or removed.
B8.20	B-H	Integrally Welded Attachments	Volumetric or Surface	Pressurizer support skirt to be examined.	Examination will be performed per Figure IWB-2500-14.

Table 1

INSERVICE INSPECTION PROGRAM

CLASS 1 COMPONENTS (Cont'd)

Item No.	Examination Category	Components and Parts To Be Examined	Examination Method	Examination Requirements for Second Inspection Interval	Examination Technique/Examination Area Comments
PRESSURIZER (Cont'd)					
B15.20	B-P	Pressure-Retaining Boundaries for Vessel Components	Visual (VT-2)	All pressurizer components to be examined during system leakage test. Examination to be performed in accordance with IWB-5221 prior to plant startup after each refueling outage.	VT examination will be performed in accordance with IWB-5240.
B15.21	B-P	Pressure-Retaining Boundaries for Vessel Components	Visual (VT-2)	All pressurizer components to be examined during system hydrostatic test. Examination to be performed in accordance with IWB-5222 at or near the end of the inspection interval.	VT examination will be performed in accordance with IWA-5240.

Table 1

INSERVICE INSPECTION PROGRAM

CLASS 1 COMPONENTS (Cont'd)

Item No.	Examination Category	Components and Parts To Be Examined	Examination Method	Examination Requirements for Second Inspection Interval	Examination Technique/Examination Area Comments
STEAM GENERATORS					
B2.30 B2.31 B2.32	B-B	Circumferential and Meridional Welds in the Lower Head	Volumetric	One circumferential and one meridional weld will be examined. The examinations will be limited to one of the two steam generators per unit.	Examinations will be performed with UT techniques.
B2.40	B-B	Tubesheet-to-Head Weld	Volumetric	The tubesheet-to-head weld will be examined. The examination will be limited to one of the two steam generators per unit.	Examination will be performed with UT techniques.
B3.130 B3.140	B-D	Nozzle-to-Vessel Welds and Nozzle Inside Radius Sections	Volumetric	All nozzle-to-shell welds and nozzle inside radius sections will be examined. At least 25% but not more than 50% of the nozzles shall be examined by the end of the first inspection period and the remainder by the end of the inspection interval.	Examinations will be performed with UT techniques.
B5.70 B5.80 B5.90	B-F	Nozzle-to-Safe End Dissimilar Metal Welds	N/A		No dissimilar metal nozzle welds on steam generators at Calvert Cliffs.
B6.90 B6.100 B6.110	B-G-1	Pressure-Retaining Bolting >2 Inches in Diameter	N/A		No bolting on steam generators >2 inches in diameter at Calvert Cliffs.
B7.30	B-G-2	Bolts, Studs, and Nuts $\leq$2 Inches in Diameter	Visual (VT-1)	All bolts, studs, and nuts will be examined.	Examinations may be performed in place under tension or when removed.
B8.30	B-H	Integrally Welded Attachments	Surface	The vessel support skirt will be examined. The examination will be limited to one steam generator.	Examinations will be performed per Figure IWB-2500-13.
B15.30	B-P	Pressure-Retaining Boundaries	Visual (VT-2)	All steam generator components to be examined during system leakage test. Examinations to be performed in accordance with IWB-5221 prior to plant startup after each refueling outage.	VT examinations will be performed in accordance with IWA-5240.
B15.31	B-P	Pressure-Retaining Boundaries	Visual (VT-2)	All steam generator components to be examined during system hydrostatic test. Examinations to be performed in accordance with IWB-5222 at or near the end of the inspection interval.	VT examinations will be performed in accordance with IWA-5240.
B16.20	B-Q	Steam Generator Tubing	Volumetric	The tubing in the hot leg side, U-bend portion, and optionally cold leg side will be examined.	Examination requirements, examination method, and the extent and frequency of examination shall be in accordance with plant Technical Specifications.

Table 1

INSERVICE INSPECTION PROGRAM

CLASS 1 COMPONENTS (Cont'd)

Item No.	Examination Category	Components and Parts To Be Examined	Examination Method	Examination Requirements for Second Inspection Interval	Examination Technique/Examination Area Comments
HEAT EXCHANGERS					
B2.50 B2.51 B2.52	B-B	Head Welds	N/A		No Class 1 heat exchangers at Calvert Cliffs. Steam generators scheduled separately.
B2.60	B-B	Tubesheet-to-Head Welds	N/A		No Class 1 heat exchangers at Calvert Cliffs.
B2.70	B-B	Longitudinal Welds	N/A		No Class 1 heat exchangers at Calvert Cliffs.
B2.80	B-B	Tubesheet-to-Shell Welds	N/A		No Class 1 heat exchangers at Calvert Cliffs.
B3.150	B-D	Nozzle-to-Vessel Welds	N/A		No Class 1 heat exchangers at Calvert Cliffs.
B3.160	B-D	Nozzle Inside Radius Section	N/A		No Class 1 heat exchangers at Calvert Cliffs.
B5.100 B5.110 B5.120	B-F	Pressure-Retaining Dissimilar Metal Welds	N/A		No Class 1 heat exchangers at Calvert Cliffs.
B6.120 B6.130 B6.140	B-G-1	Pressure-Retaining Bolting >2 Inches in Diameter	N/A		No Class 1 heat exchangers at Calvert Cliffs.
B7.40	B-G-2	Bolts, Studs, and Nuts $\leq$2 Inches in Diameter	N/A		No Class 1 heat exchangers at Calvert Cliffs.
B8.40	B-H	Integrally Welded Attachments	N/A		No Class 1 heat exchangers at Calvert Cliffs.
B15.40 B15.41	B-P	Pressure-Retaining Boundaries	N/A		No Class 1 heat exchangers at Calvert Cliffs.

Table 1

INSERVICE INSPECTION PROGRAM

CLASS 1 COMPONENTS (Cont'd)

Item No.	Examination Category	Components and Parts To Be Examined	Examination Method	Examination Requirements for Second Inspection Interval	Examination Technique/Examination Area Comments
PIPING					
B5.130	B-F	Dissimilar Metal Welds ≥4 Inches NPS	Volumetric and Surface	All butt welds to be examined.	The welds will be examined with UT and PT.
B5.140	B-F	Dissimilar Metal Welds <4 Inches NPS	Surface	All butt welds to be examined.	The welds will be examined with PT.
B5.150	B-F	Dissimilar Metal Socket Welds	N/A		No dissimilar metal socket welds at Calvert Cliffs.
B6.150 B6.160 B6.170	B-G-1	Pressure-Retaining Bolting >2 Inches in Diameter	N/A		No pressure-retaining bolting >2 inches in diameter at Calvert Cliffs.
B7.50	B-G-2	Pressure-Retaining Bolting ≤2 Inches in Diameter	Visual (VT-1)	All bolts, studs, and nuts to be examined.	The bolting may be examined in place under tension or when disassembled or removed.
B9.10 B9.11	B-J	Circumferential Pipe Welds ≥4 Inches NPS	Volumetric and Surface	25% of the required circumferential butt welds to be examined. See Note 1 at end of Table 1 for selection criteria.	The piping welds will be examined with UT and PT or MT as applicable. See Relief Request No. 1 for welds in reactor vessel annulus area.
B9.12	B-J	Longitudinal Pipe Welds ≥4 Inches NPS	Volumetric and Surface	Longitudinal welds that adjoin scheduled circumferential welds are to be examined. One pipe diameter not to exceed 12 inches of each longitudinal weld length required.	The piping welds will be examined with UT and PT or MT as applicable. See Relief Request No. 1 for welds in reactor vessel annulus area.
B9.20 B9.21	B-J	Circumferential Welds <4 Inches NPS	Surface	25% of the required circumferential butt welds to be examined. See Note 1 at end of Table 1 for selection criteria.	The piping welds will be examined with PT or MT as applicable.
B9.22	B-J	Longitudinal Pipe Welds <4 Inches NPS	Surface	Longitudinal welds that adjoin scheduled circumferential welds are to be examined. One pipe diameter of each longitudinal weld length required.	The piping welds will be examined with PT or MT as applicable.
B9.30 B9.31	B-J	Branch Pipe Connection Welds ≥4 Inches NPS	Volumetric and Surface	25% of the required branch connection joints to be examined. See Note 1 at end of Table 1 for selection criteria.	The branch connection welds will be examined with UT and PT or MT as applicable.
B9.32	B-J	Branch Pipe Connection Welds <4 Inches NPS	Surface	25% of the required branch connection joints to be examined. See Note 1 at end of Table 1 for selection criteria.	The branch connection welds will be examined with PT or MT as applicable.
B9.40	B-J	Socket Welds	Surface	25% of the required socket welds to be examined. See Note 1 at end of Table 1 for selection criteria.	The socket welds will be examined with PT or MT as applicable.

Table 1

INSERVICE INSPECTION PROGRAM

CLASS 1 COMPONENTS (Cont'd)

Item No.	Examination Category	Components and Parts To Be Examined	Examination Method	Examination Requirements for Second Inspection Interval	Examination Technique/Examination Area Comments
PIPING (Cont'd)					
B10.10	B-K-1	Integrally Welded Attachments	Volumetric or Surface	All required supports to be examined. See Note 2 at end of Table 1 for selection criteria.	The integrally welded attachments will be examined with PT, MT, or UT as applicable.
B15.50	B-P	All Pressure-Retaining Boundaries for Piping Components	Visual (VT-2)	All components to be examined during system leakage test. Examination to be performed in accordance with IWB-5221 prior to plant startup after each refueling outage.	VT examination will be performed in accordance with IWA-5240.
B15.51	B-P	All Pressure-Retaining Boundaries for Piping Components	Visual (VT-2)	All components to be examined during system hydrostatic test. Examination to be performed in accordance with IWB-5222 at or near the end of the inspection interval.	VT examination will be performed in accordance with IWA-5240.

Table 1

INSERVICE INSPECTION PROGRAM

CLASS 1 COMPONENTS (Cont'd)

Item No.	Examination Category	Components and Parts To Be Examined	Examination Method	Examination Requirements for Second Inspection Interval	Examination Technique/Examination Area Comments
PUMPS					
B6.180	B-G-1	Bolts and Studs, >2 Inches in Diameter	Volumetric	All bolts and studs to be examined.	The bolting will be examined with UT. Code Case N-307-1 shall apply. See Section 6. The bolting may be examined in place under tension or when disassembled or removed.
B6.190	B-G-1	Flange Surface for Bolting >2 Inches in Diameter When Connection Is Disassembled	Visual (VT-1)	Examination includes 1 inch annular surface of flange around each stud hole surface when disassembled.	
B6.200	B-G-1	Nuts, Bushings, and Washers >2 Inches in Diameter	Visual (VT-1)	All nuts, bushings, and washers to be examined when disassembled.	
B7.60	B-G-2	Pressure-Retaining Bolting ≤2 Inches in Diameter	Visual (VT-1)	All bolts, studs, and nuts to be examined.	The bolting may be examined in place under tension or when disassembled or removed.
B10.20	B-K-1	Integrally Welded Attachments	Volumetric or Surface	All required attachments to be examined. See Note 2 at end of Table 1 for selection criteria.	Welded attachments will be examined with PT, MT, or UT as applicable.
B12.10	B-L-1	Pump Casing Welds	Surface and Visual. See Relief Request No. 3.	Reactor coolant pump casing welds exempt from volumetric examination. See Relief Request No. 2. A supplemental visual and surface examination will be performed on one pump.	The supplemental examinations will be performed with VT and PT techniques. See Relief Request No. 2.
B12.20	B-L-2	Internal Surfaces of Pump Casings	Visual (VT-3)	One reactor coolant pump to be examined when disassembled. See Relief Request No. 2.	Pump casing internal surface will be examined with visual techniques when disassembled. A best possible inspection will be performed recognizing that the configuration obstructs visual inspection. See Relief Request No. 2.
B15.60	B-P	Pressure-Retaining Boundaries for Pump Components	Visual (VT-2)	All components to be examined during system leakage test. Examination to be performed in accordance with IWB-5221 prior to plant startup after each refueling outage.	VT examinations will be performed in accordance with IWA 5240.
B15.61	B-P	Pressure-Retaining Boundaries for Pump Components	Visual (VT-2)	All components to be examined during system hydrostatic test. Examination to be performed in accordance with IWB-5222 at or near the end of the inspection interval.	VT examinations will be performed in accordance with IWA-5240.

Table 1

INSERVICE INSPECTION PROGRAM

CLASS 1 COMPONENTS (Cont'd)

Item No.	Examination Category	Components and Parts To Be Examined	Examination Method	Examination Requirements for Second Inspection Interval	Examination Technique/Examination Area Comments
PUMPS (Cont'd)					
N/A	N/A	Pump Flywheels	Surface and Volumetric	Each reactor coolant pump flywheel to be examined per CCNPP Technical Specification (see 2.4 of Program Plan). High-stress areas to be examined each period with full examination at the end of interval.	Examinations will be performed with MT and UT techniques.

Table 1

INSERVICE INSPECTION PROGRAM

CLASS 1 COMPONENTS (Cont'd)

Item No.	Examination Category	Components and Parts To Be Examined	Examination Method	Examination Requirements for Second Inspection Interval	Examination Technique/Examination Area Comments
VALVES					
B6.210 B6.220 B6.230	B-G-1	Bolting >2 Inches in Diameter	N/A		No valve bolting >2 inches in diameter at Calvert Cliffs.
B7.70	B-G-2	Bolting ≤2 Inches in Diameter	Visual (VT-1)	All bolts, studs, and nuts to be examined.	The bolting may be examined in place under tension or when disassembled or removed.
B10.30	B-K-1	Integrally Welded Attachments	Volumetric or Surface	All required attachments to be examined. See Note 2 at end of Table 1 for selection criteria.	Welded attachments will be examined with PT, MT, or UT as applicable.
B12.30	B-M-1	Pressure-Retaining Welds in Valve Bodies <4 Inches NPS	Surface	One valve in each group of valves that is of the same construction and similar function to be examined.	Valve welds will be examined with PT or MT as applicable.
B12.40	B-M-1	Pressure-Retaining Welds in Valve Bodies ≥4 Inches NPS	N/A		No pressure-retaining welds in valve bodies ≥4 inches NPS at Calvert Cliffs.
B12.50	B-M-2	Internal Surfaces of Valve Bodies on Valves >4 Inches NPS	Visual (VT-3)	One valve in each group of valves that is of the same construction and similar function to be examined.	
B15.70	B-P	All Pressure-Retaining Boundaries for Valve Components	Visual (VT-2)	All components to be examined during system leakage test. Examination to be performed in accordance with IWB-5221 prior to plant startup after each refueling outage.	VT examinations will be performed in accordance with IWB-5240.
B15.71	B-P	All Pressure-Retaining Boundaries for Valve Components	Visual (VT-2)	All components to be examined during system hydrostatic test. Examination to be performed in accordance with IWB-5222 at or near the end of the inspection interval.	VT examinations will be performed in accordance with IWA-5240.

Table 1 - NOTES

(1) Examinations shall be distributed throughout the piping system to satisfy the extent required by ASME Section XI 1974 Edition with Addenda through Summer 1975 as permitted by 10CFR50.55a(b)(2)(ii). Examinations selected shall be distributed in such a manner to include:

(a) Terminal ends in each pipe or branch run connected to vessels.

(b) Terminal ends and joints in each pipe or branch run connected to other components.

(c) All areas where preservice examination revealed analytically acceptable flaw indications.

(d) All areas where inservice examination revealed additional analytically acceptable flaw indications.

(e) Additional piping welds so that the total number of circumferential butt welds (or branch connection or socket welds) selected for examination equals 25% of the circumferential butt welds (or branch connection or socket welds) in the reactor coolant piping system. This total does not include welds excluded by IWB-1220. These additional welds will be distributed between the loops.

(2) Examination is limited to those integrally welded attachments that meet the following conditions:

(a) the attachment is on the outside surface of the pressure-retaining component;

(b) the attachment provides component support as defined in NF-1110;

(c) the attachment base material design thickness is 5/8 inch or greater; and

(d) the attachment weld joins the attachment either directly to the surface of the component or to an integrally cast or forged attachment to the component.

Examinations include the welded attachments of piping required to be examined by Examination Category B-J and the welded attachments to associated pumps and valves integral to such piping.

3. CLASS 2 PROGRAM

3.1 Basis for Preparation

Preparation of the Class 2 ISI program was based on the requirements of Articles IWC-1000 and IWC-2000 of Section XI, Code Case N-408, and Plant Technical Specifications. These documents provide rules and guidelines for exemptions, inspection schedule, and examination requirements for Class 2 pressure-retaining components and their integral attachments.

3.2 Components Subject to Examination

Based on the requirements of Section XI, nonexempt pressure-retaining components and their integral attachments for the following Class 2 systems will be subject to volumetric and/or surface examination during the second inspection interval:

3.2.1 Vessels

Steam Generators (Secondary Side)
Shutdown Cooling Heat Exchanger
Regenerative Heat Exchanger

3.2.2 Piping

Safety Injection System
Containment Spray System
Shutdown Cooling System
Main Steam System
Feedwater System

3.3 Exemption Criteria

IWC-1220 of Section XI provides the exemption criteria for Class 2 components. Code Case N-408 will be implemented, which provides alternative exemptions for Class 2 components and replaces IWC-1220. The following criteria were used to exempt Class 2 components from surface and volumetric examinations in accordance with Code Case N-408.

3.3.1 The following components (or parts of components) of Residual Heat Removal (RHR), Emergency Core Cooling (ECC), and Containment Heat Removal (CHR), systems (or portions of systems) are exempt from the volumetric and surface examination requirements of IWC-2500:

(1) vessels, piping, pumps, valves, and other components 4 inches NPS and smaller in all systems except in high pressure safety injection systems of pressurized water reactor plants;

(2) vessels, piping, pumps, valves, and other components 1-1/2 inches NPS and smaller in high pressure safety injection systems of pressurized water reactor plants;

(3) component connections 4 inches NPS and smaller (including nozzles, socket fittings, and other connections) in vessels, piping, pumps, valves, and other

components of any size in all systems except in high pressure safety injection systems of pressurized water reactor plants;

(4) component connections 1-1/2 inches NPS and smaller (including nozzles, socket fittings, and other connections) in vessels, piping, pumps, valves, and other components of any size in high pressure safety injection systems of pressurized water reactor plants;

(5) vessels, piping, pumps, valves, other components, and component connections of any size in statically pressurized, passive (i.e., no pumps) safety injection systems of pressurized water reactor plants;

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

3.3.2 The following components (or parts of components) of systems (or portions of systems) other than RHR, ECC, and CHR systems are exempt from the volumetric and surface examination requirements of IWC-2500:

(1) vessels, piping, pumps, valves, and other components 4 inches NPS and smaller;

(2) component connections 4 inches NPS and smaller (including nozzles, socket fittings, and other connections) in vessels, piping, pumps, valves, and other components of any size;

(3) vessels, piping, pumps, valves, other components, and component connections of any size in systems or portions of systems that operate (when the system function is required) at a pressure equal to or less than 275 psig and at a temperature equal to or less than 200 F;

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

3.4 Selection and Examination of Class 2 Piping

Selection and examination of Class 2 piping will be in accordance with the requirements of Code Case N-408. These requirements are outlined as follows:

3.4.1 For welds in austenitic stainless steel or high alloy piping, the requirements of Table 1, Examination Category C-F-1, "Pressure Retaining Welds in Austenitic Stainless Steel or High Alloy Piping," shall be used as an alternative to the requirements of Table IWC-2500-1 Category C-F.

3.4.2 For welds in carbon or low alloy steel piping, the requirements of Table 2, Examination Category C-F-2, "Pressure Retaining Welds in Carbon or Low Alloy Steel Piping," shall be used as an alternative to the requirements of Table IWC-2500-1 Category C-F.

3.5 Augmented ISI Program for Main Steam and Main Feedwater Piping

In accordance with the Technical Specifications for CCNPP, an augmented ISI program will be implemented for Main Steam and Main Feedwater Piping. This program requires examination of the unencapsulated welds greater than 4 inches NPS located outside the containment and traversing safety areas.

The required welds will be examined in accordance with the rules of the 1983 Edition of Section XI with Addenda through Summer 1983, except that 100 percent of the welds will be scheduled for examination during each interval. If examinations reveal rejectable indications, an additional one-third of the welds shall be examined. If additional rejectable indications are revealed in the second sample, the remainder of the welds shall be examined. The inspection schedule for repaired welds shall revert to the original program. The examinations performed by this augmented program shall not be used to satisfy allocations of ASME Section XI required examinations on other portions of the system.

3.6 Inservice Inspection Program Plan Tables

Provided in Table 2 are examination requirements for Class 2 IWC components per the 1983 Edition of Section XI with Addenda through Summer 1983 and CCNPP Technical Specifications. These requirements shall be satisfied during the second inspection interval. Preceding Table 2 is an explanation of the table format.

Table 2

SCHEME

CODE CLASS

Item No.	Examination Category	Components and Parts To Be Examined	Examination Method	Examination Requirements for Second Inspection Interval	Examination Technique/Examination Area Comments
The ASME Section XI Item No. and Category of the component are listed in these columns.		Each type of examination area is listed in this column.	The NDE method required to satisfy Code requirements is listed in this column.	This column provides information regarding the number and/or percent of examinations required to be performed for the inspection interval.	This column provides information specific to examination techniques and examination areas.

Table 2

INSERVICE INSPECTION PROGRAM

CLASS 2 COMPONENTS

Item No.	Examination Category	Components and Parts To Be Examined	Examination Method	Examination Requirements for Second Inspection Interval	Examination Technique/Examination Area Comments
PRESSURE VESSELS					
C1.10	C-A	Shell Circumferential Welds	Volumetric	100% of each weld to be examined (applies only to welds at gross structural discontinuities). For multiple vessels of similar design size and service, examinations may be limited to one vessel.	The welds will be examined with UT.
C1.20	C-A	Head Circumferential Welds	Volumetric	100% of each head-to-shell weld to be examined. For multiple vessels of similar design size and service, examinations may be limited to one vessel.	The welds will be examined with UT.
C1.30	C-A	Tubesheet-to-Shell Weld	Volumetric	100% of each weld to be examined. For multiple vessels of similar design size and service, examinations may be limited to one vessel.	The welds will be examined with UT.
C2.10 C2.11	C-B	Nozzles in Vessels $\leq$1/2-Inch Nominal Thickness Nozzle-to-Shell (or Head) Weld	Surface	All nozzles at terminal ends of piping runs which are selected for examination under Categories C-F-1 and C-F-2. 100% of each weld to be examined. Manways and hand holes excluded. For multiple vessels of similar design, size, and service, examinations may be limited to one vessel.	The welds will be examined with MT or PT as applicable.
C2.20 C2.21	C-B	Nozzles Without Reinforcing Plate in Vessels >1/2-Inch Nominal Thickness Nozzle-to-Shell (or Head) Weld	Surface and Volumetric	All nozzles to be selected at terminal ends of piping runs selected for examination under Categories C-F-1 and C-F-2. 100% of each weld to be examined. Manways and hand holes excluded. For multiple vessels of similar design, size, and service, examinations may be limited to one vessel.	The welds will be examined with UT and MT or PT as applicable.
C2.22	C-B	Nozzle Inside Radius Section	Volumetric	100% of each area to be examined. Manways and hand holes are excluded. For multiple vessels of similar design, size, and service, examinations may be limited to one vessel.	The nozzle inside radius section will be examined with UT.
C2.30 C2.31 C2.32 C2.33	C-B	Nozzles with Reinforcing Plate in Vessels >1/2-Inch Nominal Thickness	N/A		There are no nozzles with reinforcing plate in vessels >1/2-Inch nominal thickness at Calvert Cliffs.

Table 2

INSERVICE INSPECTION PROGRAM

CLASS 2 COMPONENTS (Cont'd)

Item No.	Examination Category	Components and Parts To Be Examined	Examination Method	Examination Requirements for Second Inspection Interval	Examination Technique/Examination Area Comments
PRESSURE VESSELS (Cont'd)					
C3.10	C-C	Integrally Welded Attachments	Surface	100% of each weld to be examined. Attachments whose base material is 3/4 inch or greater to be selected. Where multiple vessels are provided with a number of similar attachments, the attachments may be distributed among the vessels. For multiple vessels of similar design and service, examinations may be limited to one vessel.	The welded attachments will be examined with MT or PT as applicable.
C4.10	C-D	Pressure-Retaining Bolting >2 Inches in Diameter	N/A		No pressure-retaining vessel bolting >2 inches in diameter at Calvert Cliffs.
C7.10	C-H	Pressure-Retaining Components	Visual (VT-2)	All pressure-retaining boundaries for vessels to be examined during system pressure test. Examinations to be performed in accordance with IWC-5221 for each inspection period.	VT examinations will be performed in accordance with IWA-5240.
C7.20	C-H	Pressure-Retaining Components	Visual (VT-2)	All pressure-retaining boundaries for vessels to be examined during system hydrostatic test. Examinations to be performed in accordance with IWC-5222 at or near the end of each inspection interval or during same inspection periods of each interval.	VT examinations will be performed in accordance with IWA-5240.

Table 2

INSERVICE INSPECTION PROGRAM

CLASS 2 COMPONENTS (Cont'd)

Item No.	Examination Category	Components and Parts To Be Examined	Examination Method	Examination Requirements for Second Inspection Interval	Examination Technique/Examination Area Comments
PIPING					
C3.20	C-C	Integrally Welded Attachments	Surface	100% of each weld to be examined. Attachments whose base material is 3/4 inch or greater to be selected. Selection limited to those components selected under Examination Categories C-F-1 and C-F-2.	The welds will be examined with MT or PT as applicable.
C4.20	C-D	Pressure-Retaining Bolting >2 Inches in Diameter	N/A		No pressure-retaining bolting >2 inches in diameter at Calvert Cliffs
C5.10 C5.11 C5.12	C-F-1	Piping Welds in Austenitic Stainless Steel or High-Alloy Piping $\geq$3/8-Inch Nominal Wall Thickness for Piping >4 NPS, Circumferential and Longitudinal	Surface and Volumetric	100% of each circumferential and 2.5t of each longitudinal weld requiring examination. See Note 1 at end of Table 2 for selection criteria.	The welds will be examined with UT and PT. Selection and examination will be in accordance with Code Case N-408. See Section 6.
C5.20 C5.21 C5.22	C-F-1	Piping Welds in Austenitic Stainless Steel or High-Alloy Piping $\geq$1/5-Inch Nominal Wall Thickness for Piping $\geq$2 NPS and $\leq$4 NPS, Circumferential and Longitudinal	Surface and Volumetric	100% of each circumferential and 2.5t of each longitudinal weld requiring examination. See Note 1 at end of Table 2 for selection criteria.	The welds will be examined with UT and PT. Selection and examination will be in accordance with Code Case N-408. See Section 6.
C5.30	C-F-1	Socket Welds in Austenitic Stainless Steel or High-Alloy Piping	Surface	100% of each weld requiring examination. See Note 1 at end of Table 2 for selection criteria.	The welds will be examined with PT. Selection and examination will be in accordance with Code Case N-408. See Section 6.
C5.40 C5.41 C5.42	C-F-1	Pipe Branch Connections in Austenitic Stainless Steel or High-Alloy Piping $\geq$2 NPS, Circumferential and Longitudinal	Surface	100% of each circumferential and 2.5t of each longitudinal weld requiring examination. See Note 1 at end of Table 2 for selection criteria.	The welds will be examined with PT. Selection and examination will be in accordance with Code Case N-408. See Section 6.
C5.50 C5.51 C5.52	C-F-2	Piping Welds in Carbon or Low-Alloy Steel $\geq$3/8-Inch Nominal Wall Thickness for Piping >4 NPS, Circumferential and Longitudinal	Surface and Volumetric	100% of each circumferential and 2.5t of each longitudinal weld requiring examination. See Note 2 at end of Table 2 for selection criteria. In addition, 100% of the main steam and main feedwater welds located outside containment and traversing safety areas shall be examined per CCNPP Technical Specifications (see 2.4 of Program Plan).	The welds will be examined with UT and MT. Selection and examination will be in accordance with Code Case N-408. See Section 6.

Table 2

INSERVICE INSPECTION PROGRAM

CLASS 2 COMPONENTS (Cont'd)

Item No.	Examination Category	Components and Parts To Be Examined	Examination Method	Examination Requirements for Second Inspection Interval	Examination Technique/Examination Area Comments
PIPING (Cont'd)					
C5.60 C5.61 C5.62	C-F-2	Piping Welds in Carbon or Low-Alloy Steel >1/5-Inch Nominal Wall Thickness for Piping ≥2 NPS and ≤4 NPS, Circumferential and Longitudinal	N/A		Selection and examination will be in accordance with Code Case N-408. See Section 6. No carbon or low-alloy steel nonexempt welds in this category at Calvert Cliffs.
C5.70	C-F-2	Socket Welds in Carbon or Low-Alloy Steel	N/A		Selection and examination will be in accordance with Code Case N-408. See Section 6. No carbon or low-alloy steel nonexempt welds in this category at Calvert Cliffs.
C5.80 C5.81 C5.82	C-F-2	Pipe Branch Connections in Carbon or Low-Alloy Steel ≥2 NPS, Circumferential and Longitudinal	Surface	100% of each circumferential and 2.5t of each longitudinal weld requiring examination. See Note 2 at end of Table 2 for selection criteria.	The welds will be examined with MT. Selection and examination will be in accordance with Code Case N-408. See Section 6.
C7.30	C-H	Pressure-Retaining Components	Visual (VT-2)	All pressure-retaining boundaries for piping to be examined during system pressure test. Examination to be performed in accordance with IWC-5221 for each inspection period.	VT examinations will be performed in accordance with IWA-5240.
C7.40	C-H	Pressure-Retaining Components	Visual (VT-2)	All pressure-retaining boundaries for piping to be examined during system hydrostatic test. Examination to be performed in accordance with IWC-5222 at or near the end of each inspection interval or during same inspection periods of each interval.	VT examinations will be performed in accordance with IWA-5240. Reference Relief Request No. 4. See Section 6.

Table 2

INSERVICE INSPECTION PROGRAM

CLASS 2 COMPONENTS (Cont'd)

Item No.	Examination Category	Components and Parts To Be Examined	Examination Method	Examination Requirements for Second Inspection Interval	Examination Technique/Examination Area Comments
PUMPS					
C3.30	C-C	Integrally Welded Attachments	N/A		100% of each weld to be examined. Attachments whose base material is 3/4 inch or greater to be selected. Selection limited to those components selected under Examination Category C-G. No pumps meet this criteria at Calvert Cliffs.
C4.30	C-D	Pressure-Retaining Bolting >2 Inches in Diameter	N/A		No pressure-retaining pump bolting >2 inches in diameter at Calvert Cliffs.
C6.10	C-G	Pressure-Retaining Welds in Pump Casings	N/A		No pressure-retaining pump welds at Calvert Cliffs.
C7.50	C-H	Pressure-Retaining Components	Visual (VT-2)	All pressure-retaining boundaries for pumps to be examined during pressure test. Examination to be performed in accordance with IWC-5221 for each inspection period.	VT examinations will be performed in accordance with IWA-5240.
C7.60	C-H	Pressure-Retaining Components	Visual (VT-2)	All pressure-retaining boundaries for pumps to be examined during system hydrostatic test. Examination to be performed in accordance with IWC-5222 at or near the end of each inspection interval or during same inspection periods of each interval.	VT examinations will be performed in accordance with IWA-5240.

Table 2

INSERVICE INSPECTION PROGRAM

CLASS 2 COMPONENTS (Cont'd)

Item No.	Examination Category	Components and Parts To Be Examined	Examination Method	Examination Requirements for Second Inspection Interval	Examination Technique/Examination Area Comments
VALVES					
C3.40	C-C	Integrally Welded Attachments	Surface	100% of each weld to be examined. Attachments whose base material is 3/4 inch or greater to be selected. Selection limited to those components selected under Examination Category C-G.	The welds will be examined with MT or PT as applicable.
C4.40	C-D	Pressure-Retaining Bolting >2 Inches in Diameter	N/A		No pressure-retaining bolting >2 inches in diameter at Calvert Cliffs.
C6.20	C-G	Pressure-Retaining Welds in Valve Bodies	Surface	100% of welds in components in each piping run examined under Examination Categories C-F-1 and C-F-2. In case of multiple valves of similar design, size, function, and service in a system, the examination of only one valve is required.	The welds will be examined with MT or PT as applicable.
C7.70	C-H	Pressure-Retaining Components	Visual (VT-2)	All pressure-retaining boundaries for valves to be examined during system pressure test. Examination to be performed in accordance with IWC-5221 for each inspection period.	VT examinations will be performed in accordance with IWA-5240.
C7.80	C-H	Pressure-Retaining Components	Visual (VT-2)	All pressure-retaining boundaries for valves to be examined during system hydrostatic test. Examination to be performed in accordance with IWC-5222 at or near the end of each inspection interval or during same inspection periods of each interval.	VT examinations will be performed in accordance with IWA-5240.

Table 2 - NOTES

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

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

(b) within a system, the examinations shall be distributed among terminal ends [see Note (3)] and structural discontinuities [see Note (4)] prorated, to the degree practicable, on the number of nonexempt terminal ends and structural discontinuities in that system; and

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

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

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

(b) within a system, the examinations shall be distributed among terminal ends [see Note (3)] and structural discontinuities [see Note (4)] prorated, to the degree practicable, on the number of nonexempt terminal ends and structural discontinuities in that system; and

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

(d) Only those welds showing reportable preservice transverse indications need to be examined for transverse reflectors.

(3) Terminal ends are the extremities of piping runs that connect to structures, components (such as vessels, pumps, valves), or pipe anchors, each of which acts as a rigid restraint or provides at least two degrees of transitional restraint to piping thermal expansion.

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

4. CLASS 3 PROGRAM

4.1 Basis for Preparation

Preparation of the Class 3 ISI program was based on the requirements of Articles IWD-1000 and IWD-2000 of Section XI. These articles provide rules and guidelines for exemptions, inspection schedules, and examination requirements for Class 3 pressure-retaining components and their integral attachments.

4.2 Components Subject to Examination

Based on the requirements of Section XI, pressure-retaining components and their integral attachments for the following Class 3 systems will be subject to examination during the second inspection interval:

Auxiliary Feedwater System
Shutdown Cooling System
Component Cooling System
Service Water Cooling System
Salt Water System
Spent Fuel Pool Cooling System

4.3 Exemption Criteria

In accordance with IWD-1220, certain Class 3 components are exempt from examination. The following exemption criteria were applied to Class 3 systems as specified in IWD-1220:

Exemption Criteria	Section XI Reference
Integral attachments of supports and restraints to components that are 4 inches NPS and smaller within the system boundaries of Examination Categories D-A, D-B, and D-C shall be exempt from the VT-3 examination, except for Auxiliary Feedwater.	IWD-1220.1
Integral attachments of supports and restraints to components exceeding 4 inches nominal pipe size may be exempted from the visual examination VT-3 of Table IWD-2500-1 provided: (a) the components are located in systems (or portions of systems) whose function is not required in support of reactor residual heat removal, containment heat removal, and emergency core cooling; and (b) the components operate at a pressure of 275 psig or less and at a temperature of 200 degrees F or less.	IWD-1220.2

4.5 Inservice Inspection Program Plan Tables

Provided in Table 3 are examination requirements for Class 3 IWD components per the 1983 Edition of Section XI with Addenda through Summer 1983. These requirements shall be satisfied during the second inspection interval. Preceding Table 3 is an explanation of the table format.

Table 3

SCHEME

CODE CLASS

Item No.	Examination Category	Components and Parts To Be Examined	Examination Method	Examination Requirements for Second Inspection Interval	Examination Technique/Examination Area Comments
The ASME Section XI Item No. and Category of the component are listed in these columns.		Each type of examination area is listed in this column.	The NDE method required to satisfy Code requirements is listed in this column.	This column provides information regarding the number and/or percent of examinations required to be performed for the inspection interval.	This column provides information specific to examination techniques and examination areas.

Table 3

INSERVICE INSPECTION PROGRAM

CLASS 3 COMPONENTS

Item No.	Examination Category	Components and Parts To Be Examined	Examination Method	Examination Requirements for Second Inspection Interval	Examination Technique/Examination Area Comments
D1.10 D2.10 D3.10	D-A D-B D-C	Pressure-Retaining Components	Visual (VT-2)	All components to be examined during system pressure or system hydrostatic test. Examination to be performed in accordance with IWD-5221 for each inspection period and performed once each interval in accordance with IWD-5223.	VT examinations will be performed in accordance with IWA-5240. See Relief Request No. 5 for modified system inservice pressure test in lieu of system hydrostatic test for some systems.
D1.20 through D1.60 D2.20 through D2.60 D3.20 through D3.60	D-A D-B D-C	Integral Attachments of Supports and Restraints, Hydraulic Snubbers, Spring, Constant Load, and Shock Absorbers	Visual (VT-3)	All required attachments to be examined during each inspection interval. For multiple components in a system of similar design, function, and service, the integral attachment of only one of the multiple components shall be examined. The integral attachments selected shall correspond to those support components selected for examination in accordance with IWF-2510(b).	The integral attachments will be examined.

5. CLASS 1, CLASS 2, AND CLASS 3 COMPONENT SUPPORTS

5.1 Basis for Preparation

Preparation of the component support ISI program was based on the requirements of Articles IWF-1000 and IWF-2000 of Section XI. These articles provide rules and guidelines for exemptions, inspection schedules, and examination requirements for Class 1, Class 2, and Class 3 component supports. Inservice test requirements for snubbers shall be conducted in accordance with Technical Specifications which shall supersede the requirements of Article IWF-5000. The snubber inservice test program is excluded from this Program Plan; it is addressed in other surveillance test programs.

5.2 Components Subject to Examination

Based on the requirements of Section XI, no exempt component supports for the Class 1, Class 2, and Class 3 systems identified in Sections 2.2, 3.2, and 4.2 of this plan will be subject to examination during the second inspection interval. The component supports requiring examination shall be classified as follows:

5.2.1 Plate and Shell Type Supports

Supports which are fabricated from plate and shell elements, such as vessel skirts and saddles, and are normally subjected to a biaxial stress.

5.2.2 Linear-Type Supports

Supports acting under essentially a single component of direct stress. Such elements may also be subjected to shear stress. Examples of such structural elements are: tension and compression struts; beams and columns subjected to bending; trusses; frames; arches; rings; and cables.

5.2.3 Component Standard Supports

A support assembly consisting of one or more generally mass-produced units usually referred to as catalog items. Examples of such items are shown in Figure IWF-1210-1 of Section XI.

5.3 Exemptions

ASME Section XI, 1983 Edition with Addenda through Summer 1983, does not contain defined exemption criteria for component supports.

5.4 Inservice Inspection Program Plan Tables

Provided in Table 4 are examination requirements for Class 1, Class 2, and Class 3 component supports per the 1983 Edition of Section XI with Addenda through Summer 1983. These requirements shall be satisfied during the second inspection interval. Preceding Table 4 is an explanation of the table format.

Table 4

SCHEME

CODE CLASS

Item No.	Examination Category	Components and Parts To Be Examined	Examination Method	Examination Requirements for Second Inspection Interval	Examination Technique/Examination Area Comments
The ASME Section XI Item No. and Category of the component are listed in these columns.		Each type of examination area is listed in this column.	The NDE method required to satisfy Code requirements is listed in this column.	This column provides information regarding the number and/or percent of examinations required to be performed for the inspection interval.	This column provides information specific to examination techniques and examination areas.

Table 4

INSERVICE INSPECTION PROGRAM

CLASS 1, CLASS 2, AND CLASS 3 COMPONENT SUPPORTS

Item No.	Examination Category	Components and Parts To Be Examined	Examination Method	Examination Requirements for Second Inspection Interval	Examination Technique/Examination Area Comments
PLATE AND SHELL TYPE SUPPORTS, LINEAR TYPE SUPPORTS, AND COMPONENT STANDARD SUPPORTS					
F1.10 through F1.40	F-A	Mechanical Connections to Pressure-Retaining Components and Building Structure; Weld Connections to Building Structure; Weld and Mechanical Connections at Intermediate Joints in Multi-connected Integral and Non-integral Supports; and Component Displacement Settings of Guides and Stops, Misalignment of Supports, Assembly of Support Items; Spring Type Supports; Constant Load Type Supports; Shock Absorbers; Hydraulic Type Snubbers	Visual (VT-3) and for spring, constant load, shock and snubber type Visual (VT-4)	Component supports to be selected for examination are the supports of the nonexempt Class 1, 2, and 3 components scheduled to be examined. Examination boundaries established in accordance with IWF-1300. Examinations may be performed during normal system operation or plant outages.	Functional testing of snubber type support components shall be performed in accordance with Technical Specifications under a separate surveillance program.
F2.10 through F2.40	F-B				
F3.10 through F3.50	F-C				

6. RELIEF REQUESTS AND CODE CASES

6.1 Relief Requests

In accordance with 10CFR50.55a(g)(5)(iv), BG&E has requested relief from those ASME Section XI requirements that have been determined impractical for certain areas. This section summarizes each Relief Request submitted to the NRC for consideration. Each request provides information on the component for which relief is requested, ASME requirements, proposed alternate method, and other pertinent information, as needed. Additional Relief Requests will be submitted to the NRC as appropriate.

Table 5 presents a summary of the enclosed Relief Requests.

6.2 ASME Code Cases

In accordance with 10CFR50.55a, footnote 6, ASME Section XI Code Cases referenced in Regulatory Guide 1.147, "Inservice Inspection Code Case Acceptability-ASME Section XI, Division 1," may be incorporated into the Calvert Cliffs ISI Program. Those Code Cases included in Regulatory Guide 1.147 that will be implemented at Calvert Cliffs are identified in this section. Each Code Case is preceded by information on the applicable component/area, ASME requirements, and how the Code Case will be implemented. Additional Code Cases will be included as appropriate.

Table 6 presents a summary of Regulatory Guide 1.147 Code Cases that will be used.

Table 5

SUMMARY OF RELIEF REQUESTS

Relief Request Number	Section XI Reference	Component	ASME Requirement for Which Relief Is Requested	Reason for Relief Request	Proposed Alternate Examination
1	IWB-2500-1 Cat. B-J	42" and 30" Reactor Coolant Pipe Welds in Reactor Vessel Annulus	Surface	Difficult access from the outside surface and prohibitive radiation environment.	Surface examination using UT technique from inside surface.
2	IWB-2500-1 Cat. B-L-1, B-L-2	Reactor Coolant Pump Case Welds and Internals	Volumetric of case welds and visual of internals	Pump configuration and material.	Hydrostatic test, surface, and visual examinations of outside surface of one pump.
3	IWB-2500-1 Cat. B-O	Welds in CRD Housings	10% (three) peripheral CRD housings (surface)	Portions of all CRD housing welds are inaccessible due to closure head configuration.	Surface examination on five CRD housing welds to compensate for inaccessible portions.
4	IWA-5000, IWC-5000	Portions of Class 2 HPSI, Aux HPSI, and LPSI	Class 2 Hydrostatic Pressure Test every 10 years	Some Class 2 portions cannot be isolated from Class 1 due to check valve isolations.	Perform hydrostatic pressure tests to Class 1 hydrostatic pressure requirements.
5	IWA-5200, IWD-5200	Class 3 Portions of Component Cooling, Service Water, and Salt Water Cooling	Hydrostatic Test every 10 years	These systems cannot be practically isolated.	Perform system inservice pressure testing annually in lieu of hydrostatic test.

ISI RELIEF REQUEST 1

RELIEF FROM SURFACE EXAMINATION ON SPECIFIED B-J PIPING WELDS
LOCATED IN REACTOR VESSEL ANNULUS

I. Components for Which Relief Is Requested

The components for which relief is requested consist of the 42" and 30" Reactor Coolant System piping welds that are scheduled to be examined using mechanized UT and are located in the reactor vessel cavity annulus. These pipe welds are identified below:

UNIT 1

Line	Weld	Type
42-RC-11	1	Nozzle-to-Transition Piece
42-RC-11	2	Transition Piece-to-Pipe
42-RC-11	2 LD-1	Longitudinal Seam
	2 LD-1	Longitudinal Seam
42-RC-12	1	Nozzle-to-Transition Piece
42-RC-12	2	Transition Piece-to-Pipe
42-RC-12	2 LD-1	Longitudinal Seam
42-RC-12	2 LD-2	Longitudinal Seam
30-RC-11A	12 LU-1	Longitudinal Seam
	12 LU-2	Longitudinal Seam
	12	Elbow-to-Transition Piece
	13	Transition Piece-to-Nozzle
30-RC-11B	12 LU-1	Longitudinal Seam
	12 LU-2	Longitudinal Seam
	12	Elbow-to-Transition Piece
	13	Transition Piece-to-Nozzle
30-RC-12A	12 LU-1	Longitudinal Seam
	12 LU-2	Longitudinal Seam
	12	Elbow-to-Transition Piece
	13	Transition Piece-to-Nozzle
30-RC-12B	12 LU-1	Longitudinal Seam
	12 LU-2	Longitudinal Seam
	12	Elbow-to-Transition Piece
	13	Transition Piece-to-Nozzle

UNIT 2

Line	Weld	Type
42-RC-21	1	Nozzle-to-Transition Piece
42-RC-21	2	Transition Piece-to-Pipe
42-RC-21	2 LD-1	Longitudinal Seam
42-RC-21	2 LD-2	Longitudinal Seam
42-RC-22	1	Nozzle-to-Transition Piece
42-RC-22	2	Transition Piece-to-Pipe
42-RC-22	2 LD-1	Longitudinal Seam
42-RC-22	2 LD-2	Longitudinal Seam
30-RC-21A	12 LU-1	Longitudinal Seam
	12 LU-2	Longitudinal Seam
	12	Elbow-to-Transition Piece
	13	Transition Piece-to-Nozzle
30-RC-21B	12 LU-1	Longitudinal Seam
	12 LU-2	Longitudinal Seam
	12	Elbow-to-Transition Piece
	13	Transition Piece-to-Nozzle
30-RC-22A	12 LU-1	Longitudinal Seam
	12 LU-2	Longitudinal Seam
	12	Elbow-to-Transition Piece
	13	Transition Piece-to-Nozzle
30-RC-22B	12 LU-1	Longitudinal Seam
	12 LU-2	Longitudinal Seam
	12	Elbow-to-Transition Piece
	13	Transition Piece-to-Nozzle

These welds are to be examined in accordance with the 1983 Edition of Section XI with Addenda through Summer 1983.

II. ASME Requirement from Which Relief Is Requested

The welds identified are classified as Item B9.11 (Circumferential) and B9.12 (Longitudinal), Category B-J. In accordance with Table IWB-2500-1, these welds require both a surface and volumetric examination of the areas shown in Figure IWB-2500-8. To perform the required surface examination on the weld crown and heat-affected zone, the examiners must gain access to the reactor vessel annulus area housing these reactor coolant piping welds. These areas are extremely difficult to enter, provide marginal room for mobility, and are very high radiation areas. It has been determined that a surface method examination of these welds, such as magnetic particle (MT), is not practical and that an alternate method should be used.

III. Proposed Alternate Method

As an alternate to performing a surface examination (MT), BG&E proposes to perform a 45-degree shear-wave UT examination of the outside surface by utilizing mechanized ultrasonic

techniques from the inside of the pipe or component. This examination has been qualified for detection of unacceptable outside surface flaws that would otherwise be detected using MT. This will allow examination of the entire circumference of the outside surface of the weld while saving a significant amount of radiation exposure.

In order to qualify this technique for Calvert Cliffs, Southwest Research Institute (SwRI) developed a mock-up of the nozzle and pipe welds and induced cracks at specific locations on the inside and outside surfaces. The lengths and depths of these cracks were tightly controlled in order to allow the cracks to be used for qualification purposes. Crack depths ranged from 1/2 the maximum allowable Code flaw depth for the pipe thickness to the maximum allowable Code flaw depth. All flaws were less than the largest acceptable surface flaw in length. The cracks were then investigated with UT techniques (performed by SwRI) to the satisfaction of BG&E personnel to demonstrate that the largest acceptable surface flaw could be detected with this technique.

ISI RELIEF REQUEST 2

RELIEF FROM VOLUMETRIC AND VISUAL EXAMINATION
OF REACTOR COOLANT PUMPS

(Granted during First Interval)
(Ref: NRC approval letter dated November 6, 1985,
from Mr. E. J. Butcher of the NRC
to Mr. A. E. Lundvall of BG&E)

I. Component for Which Relief Is Requested

A. Name and Number

Calvert Cliffs Unit 1 reactor coolant pumps #11A, #11B, #12A, and #12B and Calvert Cliffs Unit 2 reactor coolant pumps #21A, #21B, #22A, and #22B. All pumps are identical in design and function and are Byron-Jackson Type DFSS Reactor Coolant Pumps, Serial Numbers 681-N-0437 through 44, Size 35 X 35 X 43.

B. Function

Each Calvert Cliffs unit has four reactor coolant pumps which are welded to the 30" recirculation loop. These pumps function during normal reactor operation to provide forced recirculation through the core.

C. Code Class

Current ISI Class:	Class 1
Original Design:	ASME Code Section III, 1965 Edition with Addenda through Winter 1967, Class 1

II. Code Requirement from Which Relief Is Requested

ASME Code Section XI 1983 Edition with Addenda through Summer 1983 examination categories B-L-1 and B-L-2 require volumetric examination of casing welds and visual examination of internal pressure boundary surfaces of one pump casing in each of the pump groups performing similar system functions each inspection interval. These examinations are impractical for the reactor coolant pumps at Calvert Cliffs Units 1 and 2 and relief is, therefore, requested.

A. Supporting Information

1. The design configuration of the pump corresponds to a Type E pump illustrated in Figure NB-3442.5-1 (1977 Edition, ASME Code Section III). No practical technique currently exists to perform inservice inspection radiographic examination (RT) or ultrasonic examination (UT) of this pump type.

2. The presence of the diffuser vanes precludes conventional RT. The vanes prevent placement of the RT film cassettes inside the pump (as does the radiation field in terms of radiographic film and personnel radiation exposure). Placement of the film on the outside of the pump is feasible, but there is no radiographic source suitable for placement inside the pump. Standard isotopic radiation

ISI RELIEF REQUEST 2

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(Granted during First Interval)
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to Mr. A. E. Lundvall of BG&E)

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A. Name and Number

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B. Function

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ISI RELIEF REQUEST 2

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(Granted during First Interval)
(Ref: NRC approval letter dated November 6, 1985,
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to Mr. A. E. Lundvall of BG&E)

I. Component for Which Relief Is Requested

A. Name and Number

Calvert Cliffs Unit 1 reactor coolant pumps #11A, #11B, #12A, and #12B and Calvert Cliffs Unit 2 reactor coolant pumps #21A, #21B, #22A, and #22B. All pumps are identical in design and function and are Byron-Jackson Type DFSS Reactor Coolant Pumps, Serial Numbers 681-N-0437 through 44, Size 35 X 35 X 43.

B. Function

Each Calvert Cliffs unit has four reactor coolant pumps which are welded to the 30" recirculation loop. These pumps function during normal reactor operation to provide forced recirculation through the core.

C. Code Class

Current ISI Class:	Class 1
Original Design:	ASME Code Section III, 1965 Edition with Addenda through Winter 1967, Class 1

II. Code Requirement from Which Relief Is Requested

ASME Code Section XI 1983 Edition with Addenda through Summer 1983 examination categories B-L-1 and B-L-2 require volumetric examination of casing welds and visual examination of internal pressure boundary surfaces of one pump casing in each of the pump groups performing similar system functions each inspection interval. These examinations are impractical for the reactor coolant pumps at Calvert Cliffs Units 1 and 2 and relief is, therefore, requested.

A. Supporting Information

1. The design configuration of the pump corresponds to a Type E pump illustrated in Figure NB-3442.5-1 (1977 Edition, ASME Code Section III). No practical technique currently exists to perform inservice inspection radiographic examination (RT) or ultrasonic examination (UT) of this pump type.

2. The presence of the diffuser vanes precludes conventional RT. The vanes prevent placement of the RT film cassettes inside the pump (as does the radiation field in terms of radiographic film and personnel radiation exposure). Placement of the film on the outside of the pump is feasible, but there is no radiographic source suitable for placement inside the pump. Standard isotopic radiation

sources are too weak to penetrate the thick casting, and background radiation from the inside surface of the pump would diminish sensitivity. Special strong isotopic sources would be impractical to handle and position inside the pump due to personnel radiological exposure from the radiographic source itself. The recently developed Miniature Linear Accelerator (MINAC) was considered, but the Type E pump design precludes positioning of the accelerator inside the pump. Double-wall radiography utilizing the MINAC has also been considered with some hope of attaining meaningful radiographs of a portion of the casing welds. This technique has not been qualified to date and appears to be some time off, if at all possible.

3. The coarse grain structure inherent in thick stainless steel castings precludes the use of conventional UT. Future developments in ultrasonic techniques may provide a method to examine thick stainless steel casting, and, if developed, this would be preferred over the difficulties and dangers of thick-wall radiography. We are hopeful that the Ultrasonic Data Recording and Processing system (UDRPS) technology may provide some breakthrough to stainless steel casting UT.

4. The pump casing is fabricated from cast stainless steel (ASTM A351, Grade CF8M). The material is essentially a cast-type 316 stainless steel. This material is widely used in the nuclear industry, and no industry failures of this type material in reactor coolant pumps have been noted. The presence of delta ferrite (typically 15% or more) imparts increased resistance to intergranular stress corrosion cracking (IGSCC). The delta ferrite also improves resistance to pitting corrosion.

5. Report Number ERP-06-102, Revision 0, August 1983, prepared for the Electric Power Research Institute by NUTECH Engineers, Incorporated, concludes that:

   a. Based on the generic pump casing analysis, there is justification for the extension of the pump-casing examination up to 15 years.

   b. Plant-unique analysis will show greater margins of safety.

   c. The tearing modulus analysis shows that large, final flaw sizes can be tolerated in the pump casing before fracture is predicted.

   d. The recent 10-year inservice inspection of several pump casings (Type F) indicates no detectable flaw growth from baseline inspections, which corroborates the above analytical conclusion.

6. Pump disassembly for the sole purpose of conducting a very limited visual examination of the interior pressure boundary surfaces of a reactor coolant pump which, for the most part, has an as-cast surface texture is fruitless, particularly in light of the man-hours and radiation exposure that would be expended.

7. Over 700 man-hours and over 20 person-rem is estimated to disassemble, visually inspect, and reassemble one reactor coolant pump. The man-hour estimate is based only on onsite outage work performed by maintenance, operations, and nondestructive testing personnel. The estimate does not include engineering time or preoutage job planning. Additionally, man-hours and person-rem will be expended by radiation protection personnel providing direct coverage. The time

required to perform the disassembly and inspection would be approximately 2 weeks of critical path time. Most of the work would be performed under full face mask conditions.

III. Proposed Alternate Method

As an alternative to the examinations required by Section XI, BG&E proposes to implement the following inspection program:

A. The pump interior will be inspected to the extent practical (in recognition of the vanes therein) should the pump be disassembled for any other reason.

B. The reactor coolant pumps shall be hydrostatically tested per the requirements of ASME Code Section XI.

C. A surface examination of one RCP in each unit shall be performed on the exterior casing weld surface areas by the liquid penetrant method once per interval.

D. A visual examination of one RCP in each unit shall be performed on the exterior pump case surfaces once per interval.

ISI RELIEF REQUEST 3

ALTERNATIVE EXAMINATION FOR SURFACE EXAMINATION
ON CONTROL ROD DRIVE HOUSING WELDS

(Granted during First Interval)
(Ref: NRC approval letter dated May 11, 1987, from
Mr. Robert A. Capra of the NRC to Mr. J. A. Tiernan of BG&E)

I. Components for Which Relief Is Requested

The components for which relief is requested are the Control Rod Drive Housing Welds located in the RPV Closure Heads.

II. ASME Requirement from Which Relief Is Requested

Table IWB-2500-1, Examination Category B-O, requires that 10% of the peripheral CRD Housing welds be examined by either surface or volumetric methods (due to design geometry and limited accessibility, BG&E has elected surface examination).

There are 28 peripheral housings on each RPV at Calvert Cliffs; therefore, three housings are required to be examined. However, only a portion of each of these three welds is accessible due to the configuration of the Closure Head. These welds are partially obstructed because they extend into the Closure Head (reference CE drawing E233-415, attached). For this reason, relief is requested from the requirement to examine 100% of three housings.

III. Proposed Alternate Method

In order to meet the intent of the ASME requirements, BG&E proposes to examine additional CRD Housing welds to satisfy the equivalent of 100% of three welds. This will be done by examining 75% of three welds and 50% of two welds.

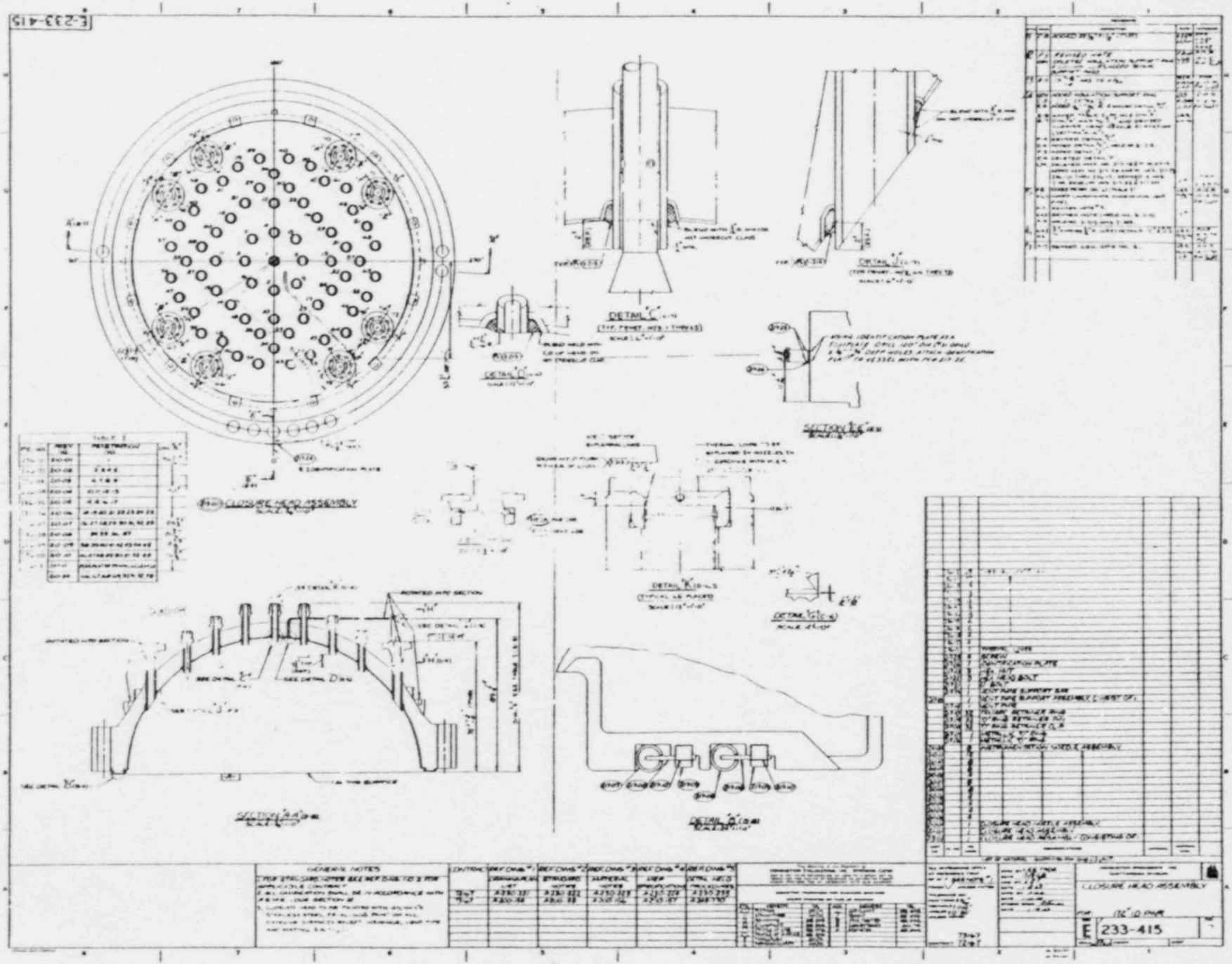


Fig. 8 Closure Head Assembly 7-17/7-18

ISI RELIEF REQUEST 4

RELIEF FROM HYDROSTATIC TESTING ON SPECIFIED CLASS 2 LINES

(Granted during First Interval)
(Ref: NRC approval letter dated November 14, 1985, from
Mr. Harold R. Denton of the NRC to Mr. A. E. Lundvall of BG&E)

I. Components for Which Relief Is Requested

The components for which relief is requested are the following portions of Class 2 piping from the High Pressure Safety Injection (HPSI), Auxiliary HPSI, and Low Pressure Safety Injection (LPSI) Loop Isolation MOVs to the Reactor Coolant System (RCS). (Reference Sketches #1 and #2.)

UNIT 1			UNIT 2		
From	To	Line Nos.	From	To	Line Nos.
1-SI-118	1-SI-615-MOV	6" CC-13-1001	2-SI-118	2-SI-615-MOV	6" CC-13-2001
	1-SI-616-MOV	2" CC-13-1019		2-SI-616-MOV	2" CC-13-2019
	1-SI-617-MOV	3" CC-13-1014		2-SI-617-MOV	3" CC-13-2014
		2" CC-13-1005			2" CC-13-2005
		2" CC-6-1002			2" CC-6-2002
1-SI-128	1-SI-625-MOV	6" CC-13-1002	2-SI-128	2-SI-625-MOV	6" CC-13-2002
	1-SI-626-MOV	2" CC-13-1018		2-SI-626-MOV	2" CC-13-2018
	1-SI-627-MOV	3" CC-13-1015		2-SI-627-MOV	3" CC-13-2015
		2" CC-13-1006			2" CC-13-2006
		2" CC-6-1004			2" CC-6-2004
I-SI-138	1-SI-635-MOV	6" CC-13-1003	2-SI-138	2-SI-635-MOV	6" CC-13-2003
	1-SI-636-MOV	2" CC-13-1016		2-SI-636-MOV	2" CC-13-2016
	1-SI-637-MOV	3" CC-13-1021		2-SI-637-MOV	3" CC-13-2021
		2" CC-13-1007			2" CC-13-2007
		2" CC-6-1005			2" CC-6-2005
1-SI-148	1-SI-645-MOV	6" CC-13-1004	2-SI-148	2-SI-645-MOV	6" CC-13-2004
	1-SI-646-MOV	2" CC-13-1017		2-SI-646-MOV	2" CC-13-2017
	1-SI-647-MOV	3" CC-13-1020		2-SI-647-MOV	3" CC-13-2020
		2" CC-13-1008			2" CC-13-2008
		2" CC-6-1006			2" CC-6-2006

II. ASME Requirement from Which Relief Is Requested

IWA-5000 and IWC-5000 of Section XI require a hydrostatic pressure test of all Class 2 pressure-retaining components. The test pressure requirement for Class 2 is 1.25 times the Design Pressure, P_D, for systems with design temperature above 200°F. This test pressure exceeds the hydrostatic pressure test requirements of the Class 1 system (1.02 times the Operating Pressure, P_O) downstream of the check valve. A breakdown of the pressure

requirements is provided below.

	Class 1 Portion	Class 2 Portion
Design Temperature	650	650
Operating Temperature	550	294
Design Pressure	2485	2485
Operating Pressure	2235	2235
Class 1 Hydro Pressure (1.02 P_O)	2280	N/A
Class 2 Hydro Pressure (1.25 P_D)	N/A	3106

Thus, the hydrostatic test pressure for the Class 2 side (3106 psi) exceeds the hydrostatic test pressure for the Class 1 side (2280 psi) by 826 psi. Because the Class 1 side of this piping cannot be isolated from the Class 2 side, the higher pressure requirements of Class 2 cannot be accomplished. In addition, the following portions of this piping cannot be pressurized due to the inability to align the charging pumps and the operating requirements of these portions when the RCS is pressurized.

UNIT 1			UNIT 2		
From	To	Line Nos.	From	To	Line Nos.
1-SI-114	1-SI-615-MOV	6" CC-13-1001	2-SI-114	2-SI-615-MOV	6" CC-13-2001
1-SI-124	1-SI-625-MOV	6" CC-13-1002	2-SI-124	2-SI-625-MOV	6" CC-13-2002
1-SI-134	1-SI-635-MOV	6" CC-13-1003	2-SI-134	2-SI-635-MOV	6" CC-13-2003
1-SI-144	1-SI-645-MOV	6" CC-13-1004	2-SI-144	2-SI-645-MOV	6" CC-13-2004

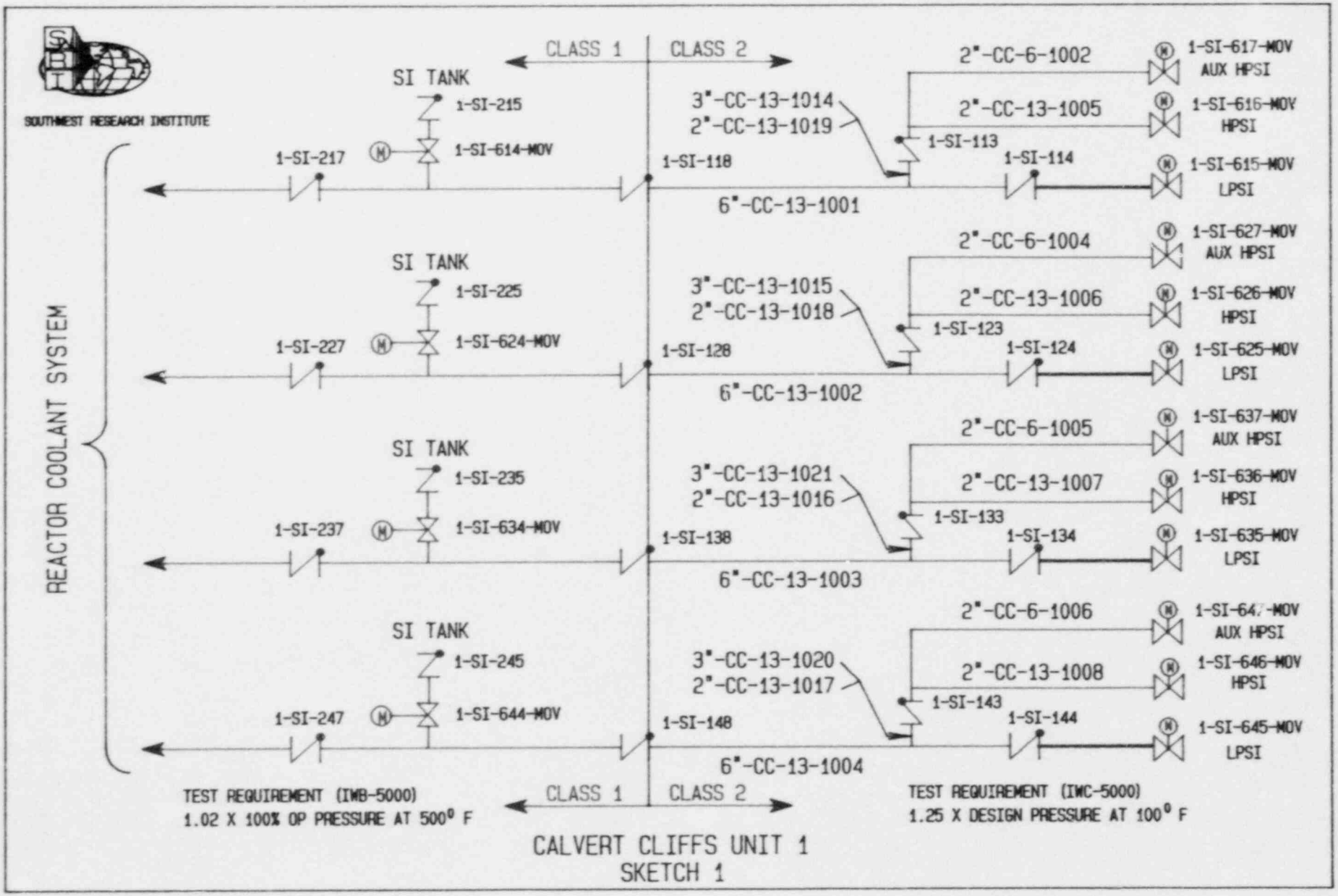
BG&E therefore requests relief from the Class 2 hydrostatic pressure test requirements for the portions of Class 2 systems identified in I. above.

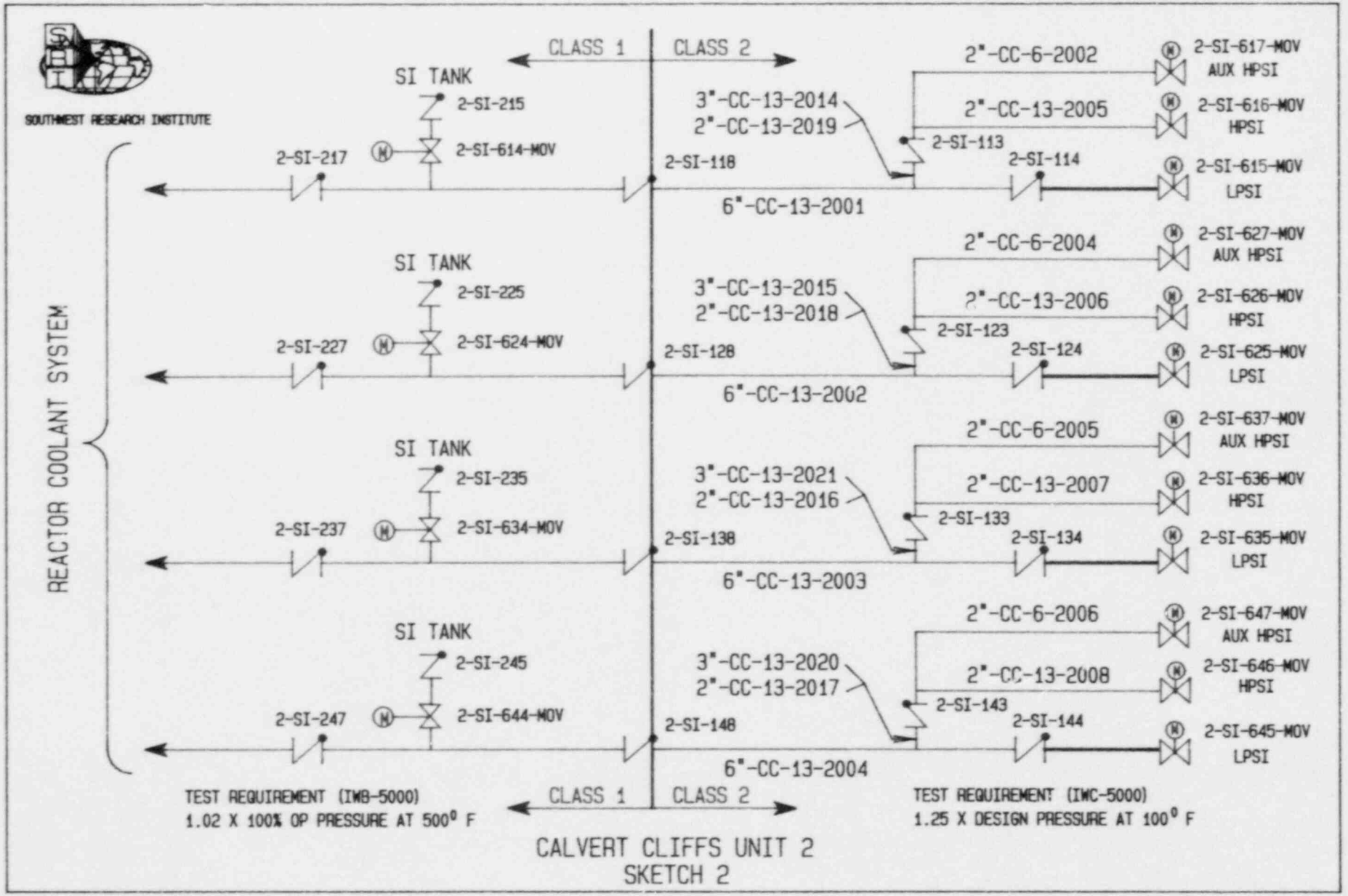
III. Proposed Alternate Method

As an alternative, BG&E proposes to implement the following program for pressure testing:

A. Perform a hydrostatic pressure test of the piping listed in Section I (excluding the piping listed in Section II) to the pressure test requirements of IWB-5000 for Class 1 piping. This piping can be pressurized via alignment of the charging system to the Auxiliary HPSI header to obtain the required test pressure of IWB-5000.

B. During each refueling cycle, a leakage test of the piping listed in Section II will be performed in accordance with Technical Specification 6.14. In this test, the piping listed in Section II will be pressurized to LPSI pump discharge pressure, and a visual examination for leakage will be conducted.


SOUTHWEST RESEARCH INSTITUTE
CLASS 1
CLASS 2
REACTOR COOLANT SYSTEM
SI TANK
1-SI-215
1-SI-614-MOV
1-SI-217
1-SI-118
3"-CC-13-1014
2"-CC-13-1019
2"-CC-6-1002
2"-CC-13-1005
1-SI-113
1-SI-114
1-SI-617-MOV
AUX HPSI
1-SI-616-MOV
HPSI
1-SI-615-MOV
LPSI
6"-CC-13-1001
SI TANK
1-SI-225
1-SI-624-MOV
1-SI-227
1-SI-128
3"-CC-13-1015
2"-CC-13-1018
2"-CC-6-1004
2"-CC-13-1006
1-SI-123
1-SI-124
1-SI-627-MOV
AUX HPSI
1-SI-626-MOV
HPSI
1-SI-625-MOV
LPSI
6"-CC-13-1002
SI TANK
1-SI-235
1-SI-634-MOV
1-SI-237
1-SI-138
3"-CC-13-1021
2"-CC-13-1016
2"-CC-6-1005
2"-CC-13-1007
1-SI-133
1-SI-134
1-SI-637-MOV
AUX HPSI
1-SI-636-MOV
HPSI
1-SI-635-MOV
LPSI
6"-CC-13-1003
SI TANK
1-SI-245
1-SI-644-MOV
1-SI-247
1-SI-148
3"-CC-13-1020
2"-CC-13-1017
2"-CC-6-1006
2"-CC-13-1008
1-SI-143
1-SI-144
1-SI-647-MOV
AUX HPSI
1-SI-646-MOV
HPSI
1-SI-645-MOV
LPSI
6"-CC-13-1004
TEST REQUIREMENT (IWB-5000)
1.02 X 100% OP PRESSURE AT 500° F
CLASS 1
CLASS 2
TEST REQUIREMENT (IWC-5000)
1.25 X DESIGN PRESSURE AT 100° F
CALVERT CLIFFS UNIT 1
SKETCH 1


SOUTHWEST RESEARCH INSTITUTE
CLASS 1
CLASS 2
REACTOR COOLANT SYSTEM
SI TANK
2-SI-215
2-SI-614-MOV
2-SI-217
2-SI-118
3"-CC-13-2014
2"-CC-13-2019
2-SI-113
2-SI-114
2"-CC-6-2002
2"-CC-13-2005
2-SI-617-MOV AUX HPSI
2-SI-616-MOV HPSI
2-SI-615-MOV LPSI
6"-CC-13-2001
SI TANK
2-SI-225
2-SI-624-MOV
2-SI-227
2-SI-128
3"-CC-13-2015
2"-CC-13-2018
2-SI-123
2-SI-124
2"-CC-6-2004
2"-CC-13-2006
2-SI-627-MOV AUX HPSI
2-SI-626-MOV HPSI
2-SI-625-MOV LPSI
6"-CC-13-2002
SI TANK
2-SI-235
2-SI-634-MOV
2-SI-237
2-SI-138
3"-CC-13-2021
2"-CC-13-2016
2-SI-133
2-SI-134
2"-CC-6-2005
2"-CC-13-2007
2-SI-637-MOV AUX HPSI
2-SI-636-MOV HPSI
2-SI-635-MOV LPSI
6"-CC-13-2003
SI TANK
2-SI-245
2-SI-644-MOV
2-SI-247
2-SI-148
3"-CC-13-2020
2"-CC-13-2017
2-SI-143
2-SI-144
2"-CC-6-2006
2"-CC-13-2008
2-SI-647-MOV AUX HPSI
2-SI-646-MOV HPSI
2-SI-645-MOV LPSI
6"-CC-13-2004
TEST REQUIREMENT (IWB-5000)
1.02 X 100% OP PRESSURE AT 500° F
CLASS 1
CLASS 2
TEST REQUIREMENT (IWC-5000)
1.25 X DESIGN PRESSURE AT 100° F
CALVERT CLIFFS UNIT 2
SKETCH 2

ISI RELIEF REQUEST 5

RELIEF FROM HYDROSTATIC TESTS ON SPECIFIED CLASS 3 SYSTEMS

(Granted during First Interval)
(Ref: NRC approval letter dated January 24, 1983, from Mr. Robert A. Clark of the NRC to Mr. A. E. Lundvall, Jr. of BG&E for Component Cooling and NRC approval letter dated December 13, 1982, from Mr. Robert A. Clark of the NRC to to Mr. A. E. Lundvall, Jr. of BG&E for Saltwater and Service Water)

I. Components for Which Relief Is Requested

The components for which relief is requested include the Class 3 portions of Component Cooling, Service Water, and Saltwater Cooling Systems.

II. ASME Requirement from Which Relief Is Requested

Subarticles IWA-5200 and IWD-5200 require that Class 3 systems receive a system hydrostatic test. Paragraph IWD-5223(a) specifies that the hydrostatic test pressure shall be at least 1.10 times the system pressure for systems with design temperatures of 200 degrees F or less.

On the main headers of the listed systems, where butterfly valves are installed, sufficient seal to maintain hydrostatic pressure on isolated portions cannot be achieved. For this reason, the elevated pressure hydrostatic test cannot be completed.

III. Proposed Alternate Method

As an alternative, BG&E proposes to perform a system inservice pressure test on an annual basis for portions of these systems outside containment and on a refueling outage basis for systems located inside containment to verify system integrity.

Table 6

SUMMARY OF REGULATORY GUIDE 1.147 CODE CASES

Code Case Number	Section XI Reference	Component/Area	Section XI Requirement	Reason for Implementing Code Case	Code Case Implementation
N-307-1	IWB-2500-1 Cat. B-G-1	Studs and Bolts with Heater Holes	100% Volumetric	More critical examination of the postulated flaw regions is achieved utilizing Code Case N-307-1.	Volumetric examination utilizing Code Case N-307-1.
N-408	IWC-2500-1 Cat. C-F	Class 2 Piping	Surface and/or Volumetric per IWC-2500-1 requirements	Code Case N-408 provides supplemental requirements adopted by later editions of ASME Section XI.	Surface and/or volumetric in accordance with Code Case N-408.
N-416	IWA-4400	Any repaired or replaced Class 2 piping component that cannot be isolated by valves or requires securing safety/relief valves	System Hydrostatic Test in accordance with IWA-5000 following weld repair or replacement	In the event a Class 2 system is repaired or replaced and cannot be isolated for a hydrostatic test, BG&E may elect to defer the test until the next scheduled hydrostatic test.	Deferral of system hydrostatic testing in accordance with Code Case N-416.
N-424	IWA-2300 (3)(c)	Qualification of Visual Examination Personnel	ANSI N45.2.6-1973	BG&E's Calvert Cliffs Instructions for qualifying visual examination personnel are written to ANSI N45.2.6-1978.	Visual examination personnel shall be qualified in accordance with ANSI N45.2.6-1978.

CODE CASE N-307-1 FOR EXAMINATION
OF CLASS 1 BOLTING WITH HEATER HOLES

I. Applicable Components

The components for which this Code Case shall be used are the Reactor Vessel Closure Head studs and Reactor Coolant Pump studs, which can be ultrasonically examined from the heater hole.

II. ASME Requirement

Table IWB-2500-1, Examination Category B-G-1, requires that the examination of studs and bolts include 100% of the volume. Since cracking in studs and bolts is most likely to occur in the areas of high stress, it is more practical to concentrate the examination on the thread root area and surface of the heater hole. For this reason, Code Case N-307-1 will be implemented.

III. Code Case Implementation

Code Case N-307-1, "Ultrasonic Examination Volume for Class 1 Bolting," limits the UT examination of studs and bolts to 1/4 inch beyond the thread root and requires a supplemental examination of the heater hole surface. Since this Code Case allows what is considered a more sensitive examination to the areas of interest, BG&E will use this Code Case in lieu of the Section XI requirements. A copy of this Code Case is attached.

Approval Date: December 5, 1984

See Numeric Index for expiration and any reaffirmation dates.

Case N-307-1
Revised Ultrasonic Examination Volume for Class 1 Bolting, Table IWB-2500-1, Examination Category B-G-1, When the Examinations Are Conducted From the Center-Drilled Hole
Section XI, Division 1

Inquiry: When ultrasonic examinations are conducted from the center-drilled hole of Class 1 bolts or studs to satisfy the examination requirements of Section XI, Division 1, Table IWB-2500-1, Examination Category B-G-1, may the examination volume be limited to the cylindrical region defined by A-B-C-D-E-F-A in Fig. 1?

Reply: It is the opinion of the Committee that, when conducting ultrasonic examinations from the center-drilled hole of Class 1 bolts or studs to satisfy the examination requirements of Section XI, Division 1, Table IWB-2500-1, Examination Category B-G-1, the examination volume may be limited to the cylindrical region defined by A-B-C-D-E-F-A in Fig. 1 if the center bore hole surface is examined with a qualified supplemental ultrasonic, surface, or eddy current procedure. The examination procedure shall be qualified to cover the entire inner bore surface. If eddy current examination is used, the following requirements shall apply.

(*a*) The procedure qualification shall demonstrate the ability to detect and measure the length of the maximum allowable flaws of IWB-3515-1. Qualification of the procedure shall include detection of at least one crack in each material type (ferromagnetic or nonferromagnetic) to be examined. The length of the crack open to the surface shall not exceed the maximum allowable length of IWB-3515-1 for nonaxial flaws. The crack shall be located in a bore hole surface and oriented circumferentially. Alternatively, the crack may be located in a block with different geometry if the qualification demonstrates cracks can be detected in bore holes. Demonstration may be performed by showing equivalent response in both geometries (bore hole and block) using calibration discontinuities specified by the qualified procedure.

(*1*) The procedure qualification shall be documented in a Certification Report. Procedure qualification records shall be retain·d for the service life of the bolt or stud examined. The Certification Report shall include at least the following items:

(*a*) identification of procedure qualified;

(*b*) personnel performing and witnessing the qualification tests;

(*c*) description and drawings of the qualification specimens and the calibration blocks, as applicable;

(*d*) calibration and sensitivity details;

(*e*) methods of identifying flaw indications and discriminating between flaw indications and nonrelevant indications such as indications from probe lift-off, plating thickness changes, or permeability changes in ferromagnetic material;

(*f*) procedure for interpretation of results;

(*g*) qualification results; and

(*h*) signature of the Authorized Nuclear Inservice Inspector (ANII).

(*2*) Eddy current examinations shall be performed in accordance with a written procedure. Each procedure shall include at least the following information:

(*a*) bolt or stud configuration to be examined, including, as applicable, lengths, diameters, thread sizes, plating and base materials, and product forms (e.g., forging, bar, bolt or stud, rolled or cut threads);

(*b*) surface condition requirements and any applicable preparation methods;

(*c*) sizes and types of probes, including description and part or drawing numbers, and lengths of probe cable;

(*d*) manufacturers and models of eddy current equipment qualified;

(*e*) data recording equipment and methods;

(*f*) examination frequencies;

(*g*) maximum scanning speed permitted and demonstrated by procedure qualification;

(*h*) calibration procedure and calibration standards;

(*i*) examination technique (e.g., scanning instructions, hand probe, and mechanized probe device);

(*j*) reporting instructions;

(*k*) personnel qualification requirements;

(*l*) reference to the Certification Report.

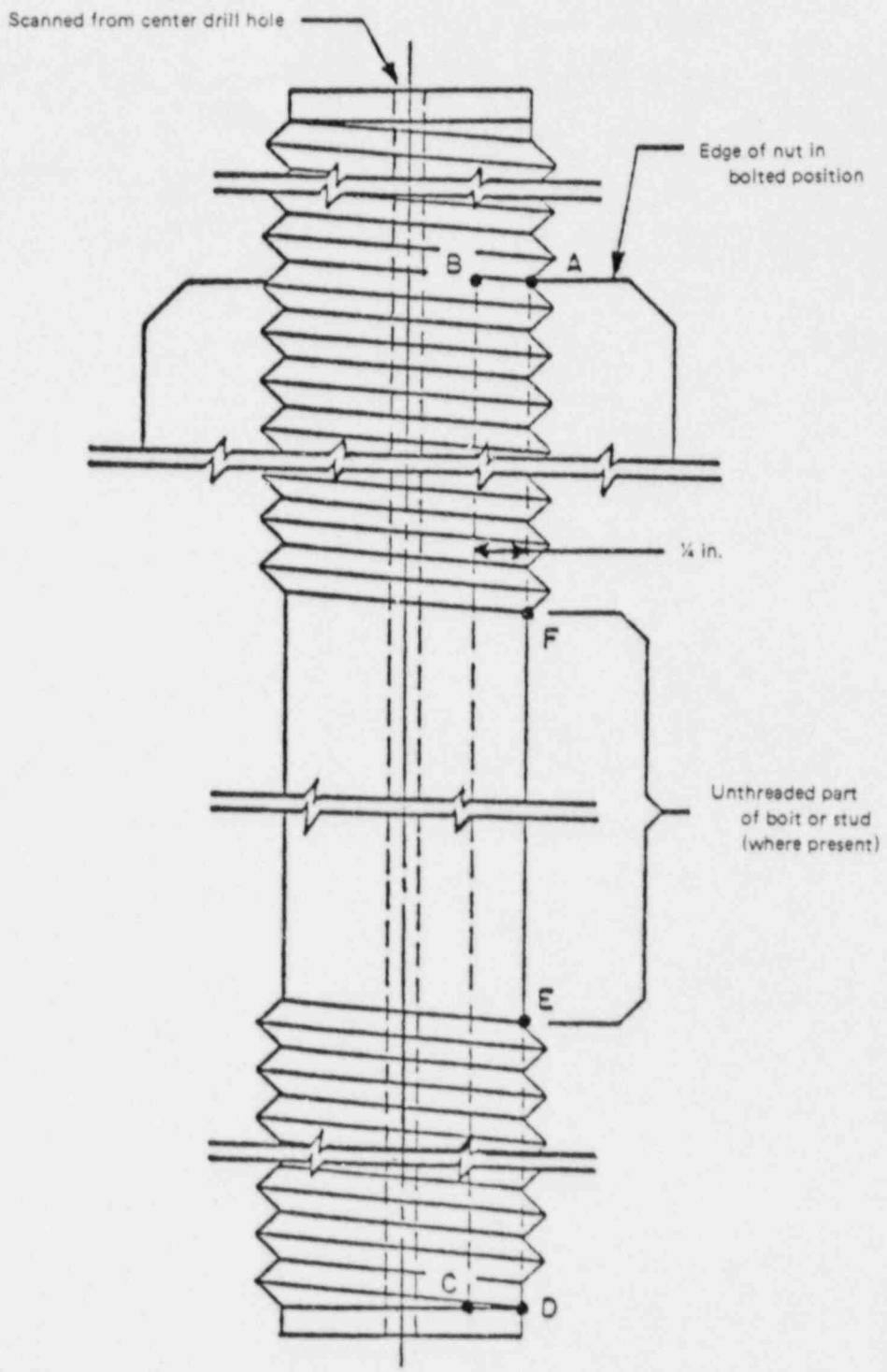


FIG. 1 REVISED EXAMINATION VOLUME FOR CLASS 1 BOLTING WHEN SCANNED FROM THE CENTER-DRILLED HOLE

CODE CASE N-408 FOR SELECTION
AND EXAMINATION OF CLASS 2 PIPING

I. Applicable Components

The components for which this Code Case shall be used include all Class 2 piping components required to be examined in accordance with Table IWC-2500-1, Category C-F, of ASME Section XI.

II. ASME Requirement

Table IWC-2500-1, Examination Category C-F, for pressure-retaining welds in piping.

III. Code Class Implementation

Class 2 pressure-retaining piping welds will be examined in accordance with Code Case N-408, "Alternative Rules for Examination of Class 2 Piping." This Code Case provides supplemental exemption and examination requirements for Class 2 piping. A copy of Code Case N-408 is attached.

Approval Date: July 12, 1984

See Numerical Index for expiration and any reaffirmation dates.

Case N-408
Alternative Rules for Examination of Class 2 Piping Section XI, Division 1

Inquiry: When determining the components subject to examination and establishing examination requirements for Class 2 piping under Section XI, Division 1, what alternative exemptions to those stated in IWC-1220 and what alternative examination requirements to those stated in IWC-2500, Category C-F, may be used?

Reply: It is the opinion of the Committee that the following alternative rules may be used for determining components subject to examination and for establishing examination requirements for Class 2 piping under Section XI, Division 1.

(*a*) The following components (or parts of components) of RHR, ECC, and CHR systems (or portions of systems)[1] are exempt from the volumetric and surface examination requirements of IWC-2500:

(*1*) vessels, piping, pumps, valves, and other components NPS 4 and smaller in all systems except in high pressure safety injection systems of pressurized water reactor plants;

(*2*) vessels, piping, pumps, valves, and other components NPS 1½ and smaller in high pressure safety injection systems of pressurized water reactor plants;

(*3*) component connections NPS 4 and smaller (including nozzles, socket fittings, and other connections) in vessels, piping, pumps, valves, and other components of any size in all systems except in high pressure safety injection systems of pressurized water reactor plants;

(*4*) component connections NPS 1½ and smaller (including nozzles, socket fittings, and other connections) in vessels, piping, pumps, valves, and other components of any size in high pressure safety injection systems of pressurized water reactor plants;

(*5*) vessels, piping, pumps, valves, other components, and component connections of any size in statically pressurized, passive (i.e., no pumps) safety injection systems[2] of pressurized water reactor plants;

(*6*) piping and other components of any size beyond the last shutoff valve in open ended portions of systems that do not contain water during normal plant operating conditions.[3]

(*b*) The following components (or parts of components) of systems (or portions of systems) other than RHR, ECC, and CHR systems are exempt from the volumetric and surface examination requirements of IWC-2500:

(*1*) vessels, piping, pumps, valves, and other components NPS 4 and smaller;

(*2*) component connections NPS 4 and smaller (including nozzles, socket fittings, and other connections) in vessels, piping, pumps, valves, and other components of any size;

(*3*) vessels, piping, pumps, valves, other components, and component connections of any size in systems or portions of systems that operate (when the system function is required) at a pressure equal to or less than 275 psig and at a temperature equal to or less than 200°F;

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

(*c*) For welds in austenitic stainless steel or high alloy piping, the requirements of Table 1, Examination Category C-F-1, Pressure Retaining Welds in Austenitic Stainless Steel or High Alloy Piping, shall be used as an alternative to the requirements of Table IWC-2500-1.

(*d*) For welds in carbon or low alloy steel piping, the requirements of Table 2, Examination Category C-F-2, Pressure Retaining Welds in Carbon or Low Alloy Steel Piping, shall be used as an alternative to the requirements of Table IWC-2500-1.

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[1] RHR, ECC, and CHR systems are Residual Heat Removal, Emergency Core Cooling, and Containment Heat Removal systems, respectively.

[2] Statically pressurized, passive safety injection systems of pressurized water reactor plants are typically called by such names as accumulator tank and associated system, safety injection tank and associated system, and core flooding tank and associated system.

[3] Normal plant operating conditions include reactor startup, operation at power, hot standby, and reactor cooldown to cold shutdown conditions, but do not include test conditions.

TABLE 1 EXAMINATION CATEGORY C-F-1, PRESSURE RETAINING WELDS IN AUSTENITIC STAINLESS STEEL OR HIGH ALLOY PIPING

Item No.	Parts Examined[1]	Examination Requirements/ Fig. No.[6]	Examination Method	Acceptance Standard[6]	Extent of Examination[2]	Examination[5]
C5.10	Piping welds $\geq$ 3/8 in. nominal wall thickness for piping > NPS 4					
C5.11	Circumferential weld	IWC-2500-7	Surface and volumetric	IWC-3514	100% of each weld requiring examination	Each inspection interval
C5.12	Longitudinal weld	IWC-2500-7	Surface and volumetric	IWC-3514	2.5t – at the intersecting circumferential weld	Each inspection interval
C5.20	Piping welds > 3/8 in. nominal wall thickness for piping $\geq$ NPS 2 and $\leq$ NPS 4					
C5.21	Circumferential weld	IWC-2500-7	Surface and volumetric	IWC-3514	100% of each weld requiring examination	Each inspection interval
C5.22	Longitudinal weld	IWC-2500-7	Surface and volumetric	IWC-3514	2.5t – at the intersecting circumferential weld	Each inspection interval
C5.30	Socket welds	IWC-2500-7	Surface	IWC-3514	100% of each weld requiring examination	Each inspection interval
C5.40	Pipe branch connections of branch piping $\geq$ NPS 2					
C5.41	Circumferential weld	IWC-2500-9 to -13, inclusive	Surface	IWC-3514	100% of each weld requiring examination	Each inspection interval
C5.42	Longitudinal weld	WC-2500-12 and -13	Surface	IWC-3514	2.5t – at the intersecting circumferential weld	Each inspection interval

NOTES:

(1) Requirements for examination of welds in piping $\leq$ NPS 4 apply to PWR high pressure safety injection systems in accordance with the exemption criteria of this Case.

(2) The welds selected for examination shall include 7.5%, but not less than 25 welds, of all austenitic stainless steel or high alloy welds not exempted by this Case. (Some welds not exempted by this Case are not required to be nondestructively examined per Examination Category C-F-1. These welds, however, shall be included in the total weld count to which the 7.5% sampling rate is applied.) The examinations shall be distributed as follows:

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

(*b*) within a system, the examinations shall be distributed among terminal ends [see Note (3)] and structural discontinuities [see Note (4)] prorated, to the degree practicable, on the number of nonexempt terminal ends and structural discontinuities in that system; and

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

(3) Terminal ends are the extremities of piping runs that connect to structures, components (such as vessels, pumps, valves), or pipe anchors, each of which acts as a rigid restraint or provides at least two degrees of translational restraint to piping thermal expansion.

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

(5) The welds selected for examination shall be reexamined during subsequent inspection intervals over the service lifetime of the piping component.

(6) Figure numbers and acceptance standards refer to those in Section XI, Winter 1983 Addenda.

TABLE 2 EXAMINATION CATEGORY C-F-2, PRESSURE RETAINING WELDS IN CARBON OR LOW ALLOY STEEL PIPING

Item No.	Parts Examined[1]	Examination Requirements/ Fig. No.[7]	Examination Method	Acceptance Standard[7]	Extent of Examination[2,4]	Frequency of Examination[5]
C5.50	Piping welds $\geq$ $^3/_8$ in. nominal wall thickness for piping $>$ NPS 4					
C5.51	Circumferential weld	IWC-2500-7	Surface and volumetric	IWC-3514	100% of each weld requiring examination	Each inspection interval
C5.52	Longitudinal weld	IWC-2500-7	Surface and volumetric	IWC-3514	2.5t – at the intersecting circumferential weld	Each inspection interval
C5.60	Piping welds $>$ $^1/_8$ in. nominal wall thickness for piping $\geq$ NPS 2 and $<$ NPS 4					
C5.61	Circumferential weld	IWC-2500-7	Surface and volumetric	IWC-3514	100% of each weld requiring examination	Each inspection interval
C5.62	Longitudinal weld	IWC-2500-7	Surface and volumetric	IWC-3514	2.5t – at the intersecting circumferential weld	Each inspection interval
C5.70	Socket welds	IWC-2500-7	Surface	IWC-3514	100% of each weld requiring examination	Each inspection interval
C5.80	Pipe branch connections of branch piping $\geq$ NPS 2					
C5.81	Circumferential weld	IWC-2500-9 to -13, inclusive	Surface	IWC-3514	100% of each weld requiring examination	Each inspection interval
C5.82	Longitudinal weld	IWC-2500-12 and -13	Surface	IWC-3514	2.5t – at the intersecting circumferential weld	Each inspection interval

NOTES:

(1) Requirements for examination of welds in piping $\leq$ NPS 4 apply to PWR high pressure safety injection systems in accordance with the exemption criteria of this Case.

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

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

(*b*) within a system, the examinations shall be distributed among terminal ends [see Note (3)] and structural discontinuities [see Note (4)] prorated, to the degree practicable, on the number of nonexempt terminal ends and structural discontinuities in that system; and

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

(3) Terminal ends are the extremities of piping runs that connect to structures, components (such as vessels, pumps, valves), or pipe anchors, each of which acts as a rigid restraint or provides at least two degrees of translational restraint to piping thermal expansion.

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

(5) The welds selected for examination shall be reexamined during subsequent inspection intervals over the service lifetime of the piping component.

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

(7) Figure numbers and acceptance standards refer to those in Section XI, Winter 1983 Addenda.

CODE CASE N-416 FOR HYDROSTATIC TESTING OF CLASS 2 REPAIR OR REPLACEMENT WELDS

I. Application

Code Case N-416 will be used, at BG&E discretion, to defer the IWA-4000 hydrostatic testing of Class 2 piping that has been repaired or replaced and cannot be isolated by existing valves or that requires securing safety or relief valves.

II. ASME Requirement

IWA-4400 and IWA-4600 of Section XI state that a system hydrostatic test shall be performed in accordance with IWA-5000 following repairs or replacements by welding on a pressure-retaining boundary. However, in some Class 2 systems, it may not be practical to isolate a system for testing by existing valves or by taking safety or relief valves out of service. Code Case N-416 allows hydrostatic testing in this instance to be deferred until the next regularly scheduled test.

III. Code Case Implementation

In the event a Class 2 system is repaired or replaced at Calvert Cliffs, BG&E may elect to exercise Code Case N-416 to defer the system hydrostatic test until the next regularly scheduled test for that system. BG&E may defer this test provided the following conditions are met:

(a) A VT-2 for leakage shall be performed during the system functional or inservice test. This test shall be performed prior to or immediately upon return to service.

(b) The repair or replacement welds shall be examined with volumetric techniques for full penetration welds or surface techniques for partial penetration welds.

A copy of Code Case N-416 is attached.

Approval Date: December 5, 1984

See Numeric Index for expiration and any reaffirmation dates.

Case N-416
Alternative Rules for Hydrostatic Testing of Repair or Replacement of Class 2 Piping
Section XI, Division 1

Inquiry: For Section XI, Division 1, repair or replacement of Class 2 piping that cannot be isolated by existing valves or that requires securing safety or relief valves for isolation, may the system hydrostatic test required by IWA-4400 (IWA-4210 in earlier Code editions) be deferred until the next regularly scheduled system hydrostatic test (IWC-5000) for that system?

Reply: It is the opinion of the Committee that the system hydrostatic test required by IWA-4400 (IWA-4210 in earlier Code editions) for repair or replacement of Class 2 piping that cannot be isolated by existing valves or that requires securing safety or relief valves for isolation may be deferred until the next regularly scheduled system hydrostatic tests (IWC-5000), provided both of the following conditions are met.

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

(*b*) The repair or replacement welds shall be examined in accordance with IWA-4000 and IWA-7000 using volumetric examination methods (IWA-2230) for full penetration welds or surface examination methods (IWA-2220) for partial penetration welds.

CODE CASE N-424 FOR QUALIFICATION OF VISUAL EXAMINATION PERSONNEL

I. Application

Code Case N-424 shall be used for qualifying BG&E personnel performing VT-2, VT-3, and VT-4 visual examinations.

II. ASME Requirement

IWA-2300(3)(c) of Section XI states that personnel performing VT-2, VT-3, and VT-4 examinations shall be qualified in accordance with ANSI N45.2.6-1973. However, BG&E's Calvert Cliffs Instructions for qualifying visual examination personnel are written in accordance with the 1978 edition of this ANSI document (ANSI N45.2.6-1978).

Code Case N-424 permits BG&E to qualify visual examination personnel to the requirements of ANSI N45.2.6-1978.

III. Code Case Implementation

BG&E personnel performing VT-2, VT-3, and VT-4 examinations during the Second Interval will be qualified in accordance with ANSI N45.2.6-1978, as permitted by Code Case N-424. A copy of this Code Case is attached.

Approval Date: July 18, 1985

See Numeric Index for expiration and any reaffirmation dates.

Case N-424
Qualification of Visual Examination Personnel
Section XI, Division 1

Inquiry: When qualifying personnel to perform visual examinations VT-2, VT-3, and VT-4 in accordance with IWA-2300 of Section XI, Division 1, may ANSI/ASME N45.2.6-1978 be used instead of ANSI N45.2.6-1973?

Reply: It is the opinion of the Committee that ANSI/ASME N45.2.6-1978 may be used instead of ANSI N45.2.6-1973 when qualifying examination personnel to perform VT-2, VT-3, and VT-4 visual examinations for Section XI, Division 1.