TECHNICAL EVALUATION REPORT ON THE FIRST 10-YEAR INTERVAL INSERVICE INSPECTION PROGRAM PLAN: PUBLIC SERVICE OF NEW HAMPSHIRE, SEABROOK STATION, UNIT 1, DOCKET NUMBER 50-443

B. W. Brown
J. D. Mudlin

Published November 1989

Idaho National Engineering Laboratory
EG&G Idaho, Inc.
Idaho Falls, Idaho 83415

Prepared for:

U.S. Nuclear Regulatory Commission
Washington, D.C. 20555
under
DOE Contract No. DE-AC07-76ID01570
FIN No. D6022 (Project 5)

ABSTRACT

This report presents the results of the evaluation of the Seabrook Station, Unit 1, First 10-Year Interval Inservice Inspection (ISI) Program Plan, Revision 0, submitted April 14, 1987, including the requests for relief from the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code Section XI requirements which the Licensee has determined to be impractical. The Seabrook Station, Unit 1, First 10-Year Interval ISI Program Plan is evaluated in Section 2 of this report. The ISI Program Plan is evaluated for (a) compliance with the appropriate edition/addenda of Section XI, (b) acceptability of examination sample, (c) correctness of the application of system or component examination exclusion criteria, and (d) compliance with ISI-related commitments identified during the Nuclear Regulatory Commission (NRC) review before granting an Operating License. The requests for relief from the ASME Code requirements which the Licensee has determined to be impractical for the first 10-year inspection interval are evaluated in Section 3 of this report.

This work was funded under:

U.S. Nuclear Regulatory Commission
FIN No. D6022, Project 5
Operating Reactor Licensing Issues Program,
Review of ISI for ASME Code Class 1, 2, and 3 Components

SUMMARY

The Licensee, Public Service of New Hampshire, has prepared the Seabrook Station, Unit 1, First 10-Year Interval Inservice Inspection (ISI) Program Plan, Revision 0, to meet the requirements of the 1983 Edition, Summer 1983 Addenda (83S83) of the ASME Code Section XI except that the extent of examination of pressure retaining welds in Code Class 2 piping has been determined using the alternative rules of ASME Code Case N-408, " Alternative Rules for Examination of Class 2 Piping, Section XI, Division 1."

The information in the Seabrook Station, Unit 1, First 10-Year Interval ISI Program Plan, Revision 0, submitted April 14, 1987, was reviewed. Included in the review were the requests for relief from the ASME Code Section XI requirements which the Licensee has determined to be impractical. As a result of this review, a request for additional information (RAI) was prepared describing the information and/or clarification required from the Licensee in order to complete the review. The Licensee provided the requested information in the submittal dated June 3, 1988.

Based on the review of the Seabrook Station, Unit 1, First 10-Year Interval ISI Program Plan, Revision 0, the Licensee's response to the NRC's RAI, and the recommendations for granting relief from the ISI examination requirements that have been determined to be impractical, it is concluded that the Seabrook Station, Unit 1, First 10-Year Interval ISI Program Plan, Revision 0, is acceptable and in compliance with 10 CFR 50.55a(g)(4).

CONTENTS

ABSTRACT ii

SUMMARY iii

1. INTRODUCTION 1

2. EVALUATION OF INSERVICE INSPECTION PROGRAM PLAN 4

2.1 Documents Evaluated 4

2.2 Compliance with Code Requirements 4

2.2.1 Compliance with Applicable Code Editions 4

2.2.2 Acceptability of the Examination Sample 5

2.2.3 Exclusion Criteria 5

2.2.4 Augmented Examination Commitments 5

2.3 Conclusion 6

3. EVALUATION OF RELIEF REQUESTS 7

3.1 Class 1 Components 7

3.1.1 Reactor Pressure Vessel 7

3.1.1.1 Request for Relief IR-1 (Part 1 of 2), Examination Category B-A, Items B1.11, B1.12, B1.21, B1.22, B1.30, and B1.40, Reactor Pressure Vessel Welds 7

3.1.1.2 Request for Relief IR-1 (Part 2 of 2), Examination Category B-D, Item B3.90, Reactor Pressure Vessel Nozzle-to-Vessel Welds 9

3.1.2 Pressurizer 10

3.1.2.1 Request for Relief IR-2 (Part 1 of 4), Examination Category B-B, Item B2.11, Pressurizer Vessel Welds 10

3.1.2.2 Request for Relief IR-2 (Part 2 of 4), Examination Category B-D, Items B3.110 and B3.120, Pressurizer Nozzle-to-Vessel Welds and Nozzle Inside Radius Sections 11

3.1.3 Heat Exchangers and Steam Generators 12

3.1.3.1 Request for Relief IR-2 (Part 3 of 4), Examination Category B-B, Item B2.40, Steam Generator Tubesheet-to-Head Welds 12

3.1.3.2 Request for Relief IR-2 (Part 4 of 4), Examination Category B-D, Item B3.130, Steam Generator, Class 1, Nozzle-to-Vessel Welds 14

3.1.4 Piping Pressure Boundary 15

3.1.4.1 Request for Relief IR-3, Examination Category B-J, Items B9.11 and B9.31, Class 1, Pressure Retaining Welds in Piping, and Examination Category B-F, Items B5.10 and B5.70, Pressure Retaining Dissimilar Metal Welds 15

3.1.5 Pump Pressure Boundary (No relief requests)

3.1.6 Valve Pressure Boundary (No relief requests)

3.1.7 General (No relief requests)

3.2 Class 2 Components 18

3.2.1 Pressure Vessels 18

3.2.1.1 Request for Relief IR-4 (Part 1 of 2), Examination Category C-A, Items C1.10, C1.20, and C1.30, Pressure Retaining Welds in Class 2 Pressure Vessels 18

3.2.1.2 Request for Relief IR-4 (Part 2 of 2), Examination Category C-B, Items C2.21 and C2.22, Steam Generator, Class 2, Nozzle-to-Vessel Welds and Nozzle Inside Radius Sections 19

3.2.2 Piping 21

3.2.2.1 Request for Relief IR-5, Examination Category C-F-1, Item C5.11, and Examination Category C-F-2, Items C5.52 and C5.81, Pressure Retaining Welds in Class 2 Piping 21

3.2.3 Pumps (No relief requests)

3.2.4 Valves (No relief requests)

3.2.5 General (No relief requests)

3.3 Class 3 Components (No relief requests)

3.4 Pressure Tests (No relief requests)

3.5 General (No relief requests)

4. CONCLUSION 25

5. REFERENCES 26

TECHNICAL EVALUATION REPORT ON THE
FIRST 10-YEAR INTERVAL INSERVICE INSPECTION PROGRAM PLAN:
PUBLIC SERVICE OF NEW HAMPSHIRE,
SEABROOK STATION, UNIT 1,
DOCKET NUMBER 50-443

1. INTRODUCTION

Throughout the service life of a water-cooled nuclear power facility, 10 CFR 50.55a(g)(4) (Reference 1) requires that components (including supports) which are classified as American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code Class 1, Class 2, and Class 3 meet the requirements, except the design and access provisions and the preservice examination requirements, set forth in the ASME Code Section XI, "Rules for Inservice Inspection of Nuclear Power Plant Components," (Reference 2) to the extent practical within the limitations of design, geometry, and materials of construction of the components. This section of the regulations also requires that inservice examinations of components and system pressure tests conducted during the initial 120-month inspection interval shall comply with the requirements in the latest edition and addenda of the Code incorporated by reference in 10 CFR 50.55a(b) on the date 12 months prior to the date of issuance of the operating license, subject to the limitations and modifications listed therein. The components (including supports) may meet requirements set forth in subsequent editions and addenda of this Code which are incorporated by reference in 10 CFR 50.55a(b) subject to the limitations and modifications listed therein. The Licensee, Public Service of New Hampshire, has prepared the Seabrook Station, Unit 1, First 10-Year Interval Inservice Inspection (ISI) Program Plan, Revision 0, to meet the requirements of the 1983 Edition, Summer 1983 Addenda of the ASME Code Section XI except that the extent of examination of pressure retaining welds in Code Class 2 piping has been determined by ASME Code Case N-408, "Alternative Rules for Examination of Class 2 Piping, Section XI, Division 1" (Reference 3).

As required by 10 CFR 50.55a(g)(5), if the licensee determines that certain Code examination requirements are impractical and requests relief from them,

the licensee shall submit information and justifications to the Nuclear Regulatory Commission (NRC) to support that determination.

Pursuant to 10 CFR 50.55a(g)(6), the NRC will evaluate the licensee's determinations under 10 CFR 50.55a(g)(5) that Code requirements are impractical. The NRC may grant relief and may impose alternative requirements that are determined to be authorized by law, will not endanger life or property or the common defense and security, and are otherwise in the public interest, giving due consideration to the burden upon the licensee that could result if the requirements were imposed on the facility.

The information in the Seabrook Station, Unit 1, First 10-Year Interval ISI Program Plan, Revision 0, submitted April 14, 1987 (Reference 4), was reviewed, including the requests for relief from the ASME Code Section XI requirements which the Licensee has determined to be impractical. The review of the ISI Program Plan was performed using the Standard Review Plans of NUREG-0800 (Reference 5), Section 5.2.4, "Reactor Coolant Boundary Inservice Inspections and Testing," and Section 6.6, "Inservice Inspection of Class 2 and 3 Components."

In a letter dated April 4, 1988 (Reference 6), the NRC requested additional information that was required in order to complete the review of the ISI Program Plan. The requested information was provided by the Licensee in the "Response to Request for Additional Information - ISI Program" dated June 3, 1988 (Reference 7).

The Seabrook Station, Unit 1, First 10-Year Interval ISI Program Plan is evaluated in Section 2 of this report. The ISI Program Plan is evaluated for (a) compliance with the appropriate edition/addenda of Section XI, (b) acceptability of examination sample, (c) correctness of the application of system or component examination exclusion criteria, and (d) compliance with ISI-related commitments identified during the NRC's review before granting an Operating License.

The requests for relief are evaluated in Section 3 of this report. Unless otherwise stated, references to the Code refer to the ASME Code, Section XI,

1983 Edition including Addenda through Summer 1983. Specific inservice test (IST) programs for pumps and valves are being evaluated in other reports.

2. EVALUATION OF INSERVICE INSPECTION PROGRAM PLAN

This evaluation consisted of a review of the applicable program documents to determine whether or not they are in compliance with the Code requirements and any license conditions pertinent to ISI activities. This section describes the submittals reviewed and the results of the review.

2.1 Documents Evaluated

Review has been completed on the following information:

(a) "Seabrook Station, Unit 1, First 10-Year Interval Inservice Inspection Program Plan," Revision 0, submitted April 14, 1987;

(b) Licensee's "Response to Request for Additional Information - ISI Program;" and

(c) NUREG-0896, Supplement No. 5, "Safety Evaluation Report related to the operation of Seabrook Station, Units 1 and 2," (Reference 8).

2.2 Compliance with Code Requirements

2.2.1 Compliance with Applicable Code Editions

The Inservice Inspection Program Plan shall be based on the Code editions defined in 10 CFR 50.55a(g)(4) and 10 CFR 50.55a(b). Based on the operating license date of October 1986, the Code applicable to the first interval ISI program is the 1983 Edition with Addenda through Summer 1983. As stated in Section 1 of this report, the Licensee has prepared the Seabrook Station, Unit 1, First 10-Year Interval ISI Program Plan, Revision 0, to meet the requirements of the 1983 Edition, Summer 1983 Addenda of the Code except that the extent of examination of pressure retaining welds in Code Class 2 piping has been determined by ASME Code Case N-408, "Alternative Rules for Examination of Class 2 Piping, Section XI, Division 1." This Code Case has been approved by the NRC as referenced in Regulatory Guide 1.147,

"Inservice Inspection Code Case Acceptability, ASME Section XI, Division 1" (Reference 9).

2.2.2 Acceptability of the Examination Sample

Inservice volumetric, surface, and visual examinations shall be performed on ASME Code Class 1, 2, and 3 components and their supports using sampling schedules described in Section XI of the ASME Code and 10 CFR 50.55a(b). Sample size and weld selection have been implemented in accordance with the Code and appear to be correct.

2.2.3 Exclusion Criteria

The criteria used to exclude components from examination shall be consistent with Paragraphs IWB-1220, IWC-1220, IWC-1230, IWD-1220, and 10 CFR 50.55a(b). The exclusion criteria have been applied by the Licensee in accordance with the Code as discussed in the ISI Program Plan, Section 6, "Exemptions," and appear to be correct. It is noted that the exemption criteria for Code Class 2 components have been revised to include portions of ASME Code Case N-408, "Alternative Rules for Examination of Class 2 Piping, Section XI, Division 1." Using the exemption criteria contained in ASME Code Case N-408, the Licensee has committed to volumetrically examine a minimum of 7.5% of the Class 2 piping welds in the engineered safety systems, including the Residual Heat Removal (RHR), Emergency Core Cooling (ECC), and Containment Heat Removal (CHR) systems.

2.2.4 Augmented Examination Commitments

The Licensee has stated in the ISI Program Plan that augmented examinations are being implemented during the first 10-year inspection interval per the following documents:

(a) Regulatory Guide 1.150, Revision 1, "Ultrasonic Testing of Reactor Vessel Welds During Preservice and Inservice Examination" (Reference 10).

(b) Regulatory Guide 1.14, Revision 1, "Reactor Coolant Pump Flywheel Integrity" (Reference 11).

(c) IE Bulletin 79-13, Revision 2, "Cracking in Feedwater System Piping" (Reference 12).

In addition, the Licensee's Final Safety Analysis Report (FSAR), Section 6.6.8, contains a commitment for an augmented inservice inspection program to protect against postulated pipe failures in certain high energy lines penetrating the containment building. The main steam and feedwater system piping between the first pipe whip restraint inside containment and the first pipe whip restraint outside containment, and the 3-inch letdown line between the containment penetration and the outermost containment isolation valve, are subject to augmented inservice inspection. The augmented inspection consists of examination of essentially 100% of the longitudinal and circumferential piping welds within the defined boundaries during each inspection interval.

2.3 Conclusion

Based on the review of the documents listed above, it is concluded that the Seabrook Station, Unit 1, First 10-Year Interval Inservice Inspection Program Plan, Revision 0, is acceptable and in compliance with 10 CFR 50.5a(g)(4).

3. EVALUATION OF RELIEF REQUESTS

The requests for relief from the ASME Code requirements which the Licensee has determined to be impractical for the Seabrook Station, Unit 1, first 10-year inspection interval are evaluated in the following sections.

3.1 Class 1 Components

3.1.1 Reactor Pressure Vessel

3.1.1.1 Request for Relief IR-1 (Part 1 of 2), Examination Category B-A, Items B1.11, B1.12, B1.21, B1.22, B1.30, and B1.40, Reactor Pressure Vessel Welds

Code Requirement: Section XI, Table IWB-2500-1, Examination Category B-A, Items B1.11, B1.12, B1.21, B1.22, B1.30, and B1.40 require a 100% volumetric examination of all the Reactor Pressure Vessel (RPV) shell, head, shell-to-flange, and head-to-flange welds.

Licensee's Code Relief Request: Relief is requested from examining 100% of the Code-required and/or Regulatory Guide 1.150-required volume of the following RPV welds:

Item Number	Component ID	Percent Examinable ASME Code	Percent Examinable RG 1.150
B1.11	RPV shell circumferential welds:		
	RC-RPV-103-121	93%	100%
	RC-RPV-104-141	68%	74%
B1.12	RPV shell longitudinal welds:		
	RC-RPV-101-122-42*	68%	73%
	RC-RPV-101-122-162*	82%	88%
	RC-RPV-101-122-282*	94%	85%
B1.21	RPV circumferential head welds:		
	RC-RPV-103-101	50%	50%
	RC-RPV-102-151	68%	N/R

Item Number	Component ID	Percent Examinable ASME Code	Percent Examinable RG 1.150
B1.22	RPV meridional head welds:		
	RC-RPV-101-154-0°	80%	80%
	RC-RPV-101-154-90°	89%	88%
	RC-RPV-101-154-180°	82%	83%
	RC-RPV-101-154-270°	93%	98%
B1.30	RPV shell-to-flange weld		
	RC-RPV-101-121	82%	56%
B1.40	RPV head-to-flange weld		
	RC-RPV-101-101	50%	50%

Licensee's Proposed Alternative Examination: None. The Code-required volumetric examination will be completed to the maximum extent practical.

Licensee's Basis for Requesting Relief: Geometric configuration and permanent obstructions prohibit 100% volumetric examination of the Code-required volume of the subject welds.

Evaluation: The volumetric examination of the subject welds is impractical to perform to the extent required by the Code due to the obstructions described in the Licensee's submittal (i.e., weld geometry, control rod drive interference, obstructions presented by instrumentation nozzles, nozzle knuckles, lifting lug, and core support lug). A significant percentage of the Code-required and/or Regulatory Guide 1.150-required volumetric examination will be completed; this percentage is consistent with plants of similar design.

Conclusions: Based on the above evaluation, it is concluded that the Code requirement is impractical for the subject welds and that the limited Section XI volumetric examination, along with the Code-required pressure test, provides reasonable assurance of the continued inservice structural integrity. Therefore, it is recommended that relief be granted as requested.

3.1.1.2 Request for Relief IR-1 (Part 2 of 2), Examination Category B-D, Item B3.90, Reactor Pressure Vessel Nozzle-to-Vessel Welds

Code Requirement: Section XI, Table IWB-2500-1, Examination Category B-D, Item B3.90 requires a 100% volumetric examination of the RPV nozzle-to-vessel welds as defined by Figure IWB-2500-7.

Licensee's Code Relief Request: Relief is requested from examining 100% of the Code-required and/or Regulatory Guide 1.150-required volume of the following RPV nozzle-to-vessel welds:

Nozzle ID	Required Volume Coverage	
	ASME Code	RG 1.150
RC-RPV-107-121-A	84%	74%
RC-RPV-107-121-D	84%	74%
RC-RPV-107-121-E	84%	67%
RC-RPV-107-121-H	85%	80%
RC-RPV-107-121-B	100%	96%
RC-RPV-107-121-C	100%	99%
RC-RPV-107-121-F	100%	99%
RC-RPV-107-121-G	100%	98%

Licensee's Proposed Alternative Examination: None. The Code-required volumetric examination will be completed to the maximum extent practical.

Licensee's Basis for Requesting Relief: The geometric configuration of the nozzle knuckles prohibits 100% volumetric examination of the Code-required volume of the subject RPV nozzle-to-vessel welds.

Evaluation: The volumetric examination of the subject welds is impractical to perform to the extent required by the Code due to the obstructions described in the Licensee's submittal (i.e., outlet nozzle knuckle obstructing examination of the inlet nozzle-to-vessel weld). A significant percentage of the Code-required and/or Regulatory Guide 1.150-required volumetric

examination will be completed; this percentage is consistent with plants of similar design.

Conclusions: Based on the above evaluation, it is concluded that the Code requirement is impractical for the subject welds and that the limited Section XI volumetric examination, along with the Code-required pressure test, provides reasonable assurance of the continued inservice structural integrity. Therefore, it is recommended that relief be granted as requested.

3.1.2 Pressurizer

3.1.2.1 Request for Relief IR-2 (Part 1 of 4), Examination Category B-B, Item B2.11, Pressurizer Vessel Welds

Code Requirement: Section XI, Table IWB-2500-1, Examination Category B-B, Item B2.11 requires a 100% volumetric examination of Pressurizer circumferential shell-to-head welds as defined by Figure IWB-2500-1.

Licensee's Code Relief Request: Relief is requested from examining 100% of the Code-required volume (CRV) of the following Pressurizer circumferential welds:

Weld ID	CRV Examinable
1-RC-E-10-4	96%
1-RC-E-10-9	95%
1-RC-E-10-1	80%

Licensee's Proposed Alternative Examination: None. The Code-required volumetric examination will be completed to the maximum extent practical.

Licensee's Basis for Requesting Relief: The Licensee reports that geometric configuration and permanent obstructions prohibit performance of a 100% volumetric examination of each of the subject welds.

Evaluation: The volumetric examination of the circumferential shell-to-head welds is impractical to perform to the extent required by the Code because of OD interferences. A significant percentage (80 to 96%) of the Code-required volumetric examination will be completed on each of the subject welds.

Conclusions: Based on the above evaluation, it is concluded that the Code requirement is impractical for the subject welds and that the limited Section XI volumetric examination, along with the Code-required pressure test, provides reasonable assurance of the continued inservice structural integrity. Therefore, it is recommended that relief be granted as requested.

3.1.2.2 Request for Relief IR-2 (Part 2 of 4), Examination Category B-D, Items B3.110 and B3.120, Pressurizer Nozzle-to-Vessel Welds and Nozzle Inside Radius Sections

Code Requirement: Section XI, Table IWB-2500-1, Examination Category B-D, Items B3.110 and B3.120 require a 100% volumetric examination of the Pressurizer nozzle-to-vessel welds and nozzle inside radius sections, respectively, as defined by Figure IWB-2500-7.

Licensee's Code Relief Request: Relief is requested from examining 100% of the Code-required volume (CRV) of the following Pressurizer nozzle-to-vessel welds and nozzle inside radius sections:

Nozzle ID	CRV Examinable
RC-E-10-A-NZ	75%
RC-E-10-B-NZ	75%
RC-E-10-C-NZ	75%
RC-E-10-D-NZ	75%
RC-E-10-SP-NZ	75%
RC-E-10-S-NZ	74%
RC-E-10-S-IR	74%

Licensee's Proposed Alternative Examination: None. The Code-required volumetric examination will be completed to the maximum extent practical.

Licensee's Basis for Requesting Relief: The Licensee reports that geometric configuration and/or I.D. cladding prohibit performance of a 100% volumetric examination on each of the subject welds.

Evaluation: The volumetric examination of the Pressurizer nozzle-to-vessel welds and nozzle inside radius sections listed above is impractical to perform to the extent required by the Code due to the geometric configuration, I.D. cladding, and heater penetrations. A significant percentage (at least 74%) of the Code-required volume can and will be examined.

Conclusions: Based on the above evaluation, it is concluded that the Code requirement is impractical for the subject nozzles and that the limited Section XI volumetric examination, along with the Code-required pressure test, provides reasonable assurance of the continued inservice structural integrity. Therefore, it is recommended that relief be granted as requested.

3.1.3 Heat Exchangers and Steam Generators

3.1.3.1 Request for Relief IR-2 (Part 3 of 4), Examination Category B-B, Item B2.40, Steam Generator Tubesheet-to-Head Welds

Code Requirement: Section XI, Table IWB-2500-1, Examination Category B-B Item B2.40 requires a 100% volumetric examination of Steam Generator tubesheet-to-head welds as defined by Figure IWB-2500-6.

Licensee's Code Relief Request: Relief is requested from examining 100% of the Code-required volume (CRV) of the following Steam Generator tubesheet-to-head welds:

Weld ID	CRV Examinable
1-RC-E-11A Seam 1	78%
1-RC-E-11B Seam 1	78%
1-RC-E-11C Seam 1	78%
1-RC-E-11D Seam 1	78%

Licensee's Proposed Alternative Examination: None. The Code-required volumetric examination will be completed to the maximum extent practical.

Licensee's Basis for Requesting Relief: The Licensee reports that the Steam Generator supports prohibit performance of a 100% volumetric examination of each of the subject welds. In addition, the surface contour further restricts examination of Weld 1-RC-E-11A, Seam 1, during the 60° scan.

Evaluation: The volumetric examination of the Steam Generator tubesheet-to-head welds listed above is impractical to perform to the extent required by the Code due to support obstructions. A significant percentage (78%) of the Code-required volumetric examination will be completed on each of the subject welds.

Conclusions: Based on the above evaluation, it is concluded that the Code requirement is impractical for the subject welds and that the limited Section XI volumetric examination, along with the Code-required pressure test, provides reasonable assurance of the continued inservice structural integrity. Therefore, it is recommended that relief be granted as requested.

3.1.3.2 Request for Relief IR-2 (Part 4 of 4), Examination Category B-D, Item B3.130, Steam Generator, Class 1, Nozzle-to-Vessel Welds

Code Requirement: Section XI, Table IWB-2500-1, Examination Category B-C, Item B3.130 requires a 100% volumetric examination of Steam Generator, Class 1, nozzle-to-vessel welds as defined by Figure IWB-2500-7.

Licensee's Code Relief Request: Relief is requested from examining 100% of the Code-required volume (CRV) of the following Steam Generator, Class 1, nozzle-to-vessel welds:

Nozzle ID	CRV Examinable
1-RC-E-11A-2A-NZ	75%
1-RC-E-11A-2B-NZ	75%
1-RC-E-11B-2A-NZ	75%
1-RC-E-11B-2B-NZ	75%
1-RC-E-11C-2A-NZ	75%
1-RC-E-11C-2B-NZ	75%
1-RC-E-11D-2A-NZ	75%
1-RC-E-11D-2B-NZ	75%

Licensee's Proposed Alternative Examination: None. The Code-required volumetric examination will be completed to the maximum extent practical.

Licensee's Basis for Requesting Relief: The Licensee reports that geometric configuration and/or I.D. cladding prohibit performance of a 100% volumetric examination on each of the subject welds.

Evaluation: The volumetric examination of the Steam Generator nozzle-to-vessel welds listed above is impractical to perform to the extent required by the Code due to the geometric configuration and/or I.D. cladding. A significant percentage (75%) of the Code-required volume can and will be examined.

Conclusions: Based on the above evaluation, it is concluded that the Code requirement is impractical for the subject welds

and that the limited Section XI volumetric examination, along with the Code-required pressure test, provides reasonable assurance of the continued inservice structural integrity. Therefore, it is recommended that relief be granted as requested.

3.1.4 Piping Pressure Boundary

3.1.4.1 Request for Relief IR-3, Examination Category B-J, Items B9.11 and B9.31, Class 1 Pressure Retaining Welds in Piping, and Examination Category B-F, Items B5.10 and B5.70, Pressure Retaining Dissimilar Metal Welds

Code Requirement: Section XI, Table IWB-2500-1, Examination Category B-J, Items B9.11 and B9.31, and Examination Category B-F, Items B5.10 and B5.70 all require both 100% surface and volumetric examinations as defined by Figure IWB-2500-8.

Licensee's Code Relief Request: Relief is requested from examining 100% of the Code-required volume (CRV) of the following welds:

Item Number	Weld Identification	CRV Examinable
B9.11	Reactor Coolant Main Loop 1 piping welds:	
	1-RC-1-1-1	75%
	1-RC-2-1-2	95%
	1-RC-2-1-5	95%
	1-RC-2-1-6	99%
	1-RC-3-1-3	<1%
B9.11	Reactor Coolant Main Loop 4 piping welds:	
	1-RC-10-1-1	75%
	1-RC-12-1-3	<1%
B9.11	Reactor Coolant Main Loop 2 piping welds:	
	1-RC-4-1-1	75%
	1-RC-5-1-2	93%
	1-RC-5-1-5	95%
	1-RC-6-1-3	<1%

Item Number	Weld Identification	CRV Examinable
B9.11	Reactor Coolant Main Loop 3 piping welds:	
	1-RC-7-1-1	75%
	1-RC-8-1-2	95%
	1-RC-9-1-3	<1%
B9.31	Branch connection piping welds:	
	1-RC-1-1-5B	33%
	1-RC-3-1-5B	50%
	1-RC-4-1-5B	50%
	1-RC-6-1-3B	50%
	1-RC-7-1-5B	50%
	1-RC-7-1-6B	50%
	1-RC-9-1-4B	50%
	1-RC-10-1-5B	50%
	1-RC-12-1-4B	50%
B9.11	Branch piping welds:	
	1-SI-203-2-2	84%
	1-RH-158-5-19	75%
	1-RH-158-5-20	78%
	1-RH-160-17-2	50%
	1-RC-48-2-2	50%
B5.10	Reactor Vessel safe end weld	
	RC-RPV-SE-301-121-D	97%
B5.70	Steam Generator safe end welds:	
	1-RC-1-1-3	25%
	1-RC-2-1-1	25%
	1-RC-4-1-3	25%
	1-RC-5-1-1	25%
	1-RC-7-1-3	25%
	1-RC-8-1-1	25%
	1-RC-10-1-3	25%
	1-RC-11-1-1	25%

Licensee's Proposed Alternative Examination: None. The Code-required volumetric examination will be completed to the maximum extent practical. These welds will receive the Code-required surface examination.

Licensee's Basis for Requesting Relief: The Licensee reports that geometric configurations (i.e., elbow-to-pump, elbow-to-safe end), permanent obstructions, and/or metallurgy restrictions prohibit 100% of the Code-required volumetric examination on the subject welds.

Evaluation: The volumetric examinations of the welds listed above are impractical to perform to the extent required by the Code due to the geometric configurations, permanent obstructions, and/or metallurgy restrictions.

With regard to the metallurgical properties of the cast stainless steel fittings and based on discussions and demonstrations performed by the Licensee during a meeting at the plant site in May 1986, it is determined that the volumetric examinations of the cast stainless steel fittings in the primary coolant system at Seabrook meet the methodology requirements of Section XI of the ASME Code and that the detection of significant defects, if present, would be possible with the equipment and procedures being used.

It is also reported that complete examinations which meet the requirements of ASME Section XI will be completed on welds of similar configuration using the same inspection techniques, equipment, and procedures as the partially inspected or uninspected welds. Since the partially inspected or uninspected welds will see the same operating and environmental conditions as the inspected welds, reasonable assurance of the structural integrity of the welds for which relief is requested will be attained.

Conclusions: Based on the above evaluation, it is concluded that the Code requirement is impractical for the subject welds and that the limited Section XI volumetric examination, along with the Code-required surface examination and pressure test, provides reasonable assurance of the continued inservice structural integrity. Therefore, it is recommended that relief be granted as requested.

3.1.5 Pump Pressure Boundary (No relief requests)

3.1.6 Valve Pressure Boundary (No relief requests)

3.1.7 General (No relief requests)

3.2 Class 2 Components

3.2.1 Pressure Vessels

3.2.1.1 Request for Relief IR-4 (Part 1 of 2), Examination Category C-A, Items C1.10, C1.20, and C1.30, Pressure Retaining Welds in Class 2 Pressure Vessels

Code Requirement: Section XI, Table IWC-2500-1, Examination Category C-A, Items C1.10, C1.20, and C1.30 require a 100% volumetric examination of Class 2 Pressure Vessel pressure retaining shell circumferential welds, head circumferential welds, and tubesheet-to-shell welds, respectively, as defined by Figures IWC-2500-1 and IWC-2500-2.

Licensee's Code Relief Request: Relief is requested from examining 100% of the Code-required volume (CRV) of the following welds:

Number	Weld Identification	CRV Examinable
C1.10	Steam Generator shell circumferential welds:	
	1-RC-E-11A Seam 6	96%
	1-RC-E-11A Seam 5	80%
	1-RC-E-11A Seam 3	99%
	1-RC-E-11B Seam 6	95%
	1-RC-E-11B Seam 5	79%
	1-RC-E-11B Seam 3	80%
	1-RC-E-11C Seam 6	95%
	1-RC-E-11C Seam 5	78%
	1-RC-E-11D Seam 6	92%
	1-RC-E-11D Seam 5	83%
C1.20	Steam Generator head circumferential weld	
	1-RC-E-11A Seam 8	98%
C1.30	Steam Generator tubesheet -to-shell weld	
	1-RC-E-11A Seam 2	86%

Number	Weld Identification	CRV Examinable
C1.10	Regenerative Heat Exchanger shell circumferential welds:	
	1-CS-F-2-REG-4A	70.4%
	1-CS-E-2-REG-4B	70.4%
C1.20	Excess Letdown Heat Exchanger head circumferential weld	
	1-CS-E-3C	46.4%

Licensee's Proposed Alternative Examination: None. The Code-required volumetric examination will be completed to the maximum extent practical.

Licensee's Basis for Requesting Relief: The Licensee reports that geometric configuration and permanent obstructions prohibit the performance of a 100% volumetric examination of each of the subject welds.

Evaluation: The volumetric examination of the subject welds is impractical to perform to the extent required by the Code due to the geometric configuration and permanent obstructions (i.e., surface/weld contour, plates, instrumentation lines, surface gouge). A significant percentage of the Code-required volume will be volumetrically examined.

Conclusions: Based on the above evaluation, it is concluded that the Code requirement is impractical for the subject welds and that the limited Section XI volumetric examination will provide reasonable assurance of the continued inservice structural integrity. Therefore, it is recommended that relief be granted as requested.

3.2.1.2 Request for Relief IR-4 (Part 2 of 2), Examination Category C-B, Items C2.21 and C2.22, Steam Generator, Class 2, Nozzle-to-Vessel Welds and Nozzle Inside Radius Sections

Code Requirement: Section XI, Table IWC-2500-1, Examination Category C-B, Items C2.21 and C2.22 require a 100% volumetric

examination of the Steam Generator Class 2 nozzle-to-vessel welds and nozzle inside radius sections as defined by Figure IWC-2500-4.

Licensee's Code Relief Request: Relief is requested from examining 100% of the Code-required volume (CRV) of the following Steam Generator, Class 2, nozzle-to-vessel welds and nozzle inside radius sections:

Nozzle ID	CRV Examinable	
1-RC-E-11B-11NZ	89%	
1-RC-E-11D-16NZ	57%	
1-RC-E-11A-16IR	0%	- due to I.D. geometry
1-RC-E-11B-16IR	0%	- due to I.D. geometry
1-RC-E-11C-16IR	0%	- due to I.D. geometry
1-RC-E-11D-16IR	0%	- due to I.D. geometry
1-RC-E-11C-11IR	0%	- due to surface contour

Licensee's Proposed Alternative Examination: None. The Code-required volumetric examination on the Steam Generator nozzle-to-vessel welds will be completed to the maximum extent practical.

Licensee's Basis for Requesting Relief: The Licensee states that the volumetric examinations of the Steam Generator nozzle-to-vessel welds and the nozzle inner radius on 1-RC-E-11C-11IR are limited by surface roughness and that the volumetric examinations of the nozzle inner radius sections on the steam outlet nozzles (16IR) are prohibited due to the nozzle configuration.

Evaluation: The volumetric examination of the Steam Generator nozzle-to-vessel welds is impractical to perform to the extent required by the Code due to nozzle and surface contours. A significant percentage (57 and 89%) of the Code-required volume will be examined.

The Licensee provided a drawing of a portion of the Steam Generator vessel, in the submittal dated June 3, 1988, showing the steam outlet nozzle. The drawing shows that the steam

outlet nozzle was designed with an internal multiple venturi type flow restrictor. This design does not utilize a radiused nozzle as described in Figure IWC-2500-4, but instead has several individual inner radii, corresponding to each venturi. Therefore, the Code-required volumetric examination of these nozzle inner radius sections is impractical to perform.

Conclusions: Based on the above evaluation, it is concluded that the Code requirement is impractical for the subject nozzles and that the limited Section XI volumetric examination of the nozzle-to-vessel welds provides reasonable assurance of the continued inservice structural integrity. Therefore, it is recommended that relief be granted as requested.

3.2.2 Piping

3.2.2.1 Request for Relief IR-5, Examination Category C-F-1, Item C5.11, and Examination Category C-F-2, Items C5.52 and C5.81, Pressure Retaining Welds in Class 2 Piping

Code Requirement: For Seabrook Unit 1, these examinations will be performed in accordance with ASME Code Case N-408. ASME Code Case N-408, Examination Category C-F-1, Item C5.11 requires both 100% surface and volumetric examinations of Class 2 pressure retaining circumferential piping welds with equal to or greater than 3/8 inch nominal wall thicknesses for piping greater than 4 inch nominal pipe size as defined by Figure IWC-2500-7. Examination Category C-F-2, Item C5.52 requires both surface and volumetric examinations of Class 2 pressure retaining longitudinal piping welds with equal to or greater than 3/8 inch nominal wall thicknesses for piping greater than 4 inch nominal pipe size as defined by Figure IWC-2500-7. The length of the longitudinal weld examined shall be at least 2.5 times the wall thickness at the intersecting circumferential weld. Item C5.81 requires a 100% surface examination of the Class 2 branch connection welds

greater than 2 inch nominal pipe size as defined by Figures IWC-2500-9, -10, -11, -12, and -13.

In addition, in the Seabrook FSAR, the Licensee committed to perform 100% volumetric examination of the seven branch connection welds listed below.

Licensee's Code Relief Request: Relief is requested from examining 100% of the Code-required volume (CRV) of the following pressure retaining welds in Class 2 piping:

Weld Identification	CRV Examinable
Circumferential piping weld 1-RH-158-4-2	50%
Longitudinal piping weld 1-MS-4002-36-LU-7	99.6%

Relief is also requested from examining 100% of the required volume (FSAR augmented volumetric examination commitment) of the following Class 2 pipe branch connection welds:

Weld ID	Required Volume Examinable
MS-4000-41-4B	70%
MS-4000-41-13B	59%
MS-4001-41-4B	70%
MS-4003-37-3B	95%
MS-4001-41-3B	65%
MS-4002-37-3B	95%
MS-4001-41-13B	70%

Licensee's Proposed Alternative Examination: None. The Code-required and FSAR-required volumetric examinations will be completed to the maximum extent practical. These welds will receive the full Code-required surface examination.

Licensee's Basis for Requesting Relief: The Licensee reports that geometric configurations and/or permanent obstructions

prohibit 100% of the Code-required volumetric examination on the subject welds.

Evaluation: The volumetric examinations of welds 1-RH-158-4-2 and 1-MS-4002-36-LU-7 are impractical to perform to the extent required by the Code because of surface geometry.

With regard to the branch connection welds, volumetric examination is not required for branch connections of this size under the 83S83, Examination Category C-F, Item C5.30 or the alternative rules of ASME Code Case N-408, Examination Category C-F-2, Item C5.81. However, the Seabrook FSAR commits to augmented ISI of main steam and feedwater piping which consists of 100% examination of the longitudinal and circumferential welds. These connections on the main steam header are not the normal 6-inch tee fitting but rather a sweep-o-let. Since these fittings represent a large weld area on the main header, a conservative judgement was made during PSI to include these welds under Examination Category C-F-2, Item C5.81 of ASME Code Case N-408.

This request for relief is requesting variance due to geometric configuration, permanent obstructions, and/or structural interferences on 100% examination for these welds which are being examined under C5.81. Based on these limitations, the volumetric examination of the pipe branch connection welds is impractical to perform to the extent required by Item C5.81 of ASME Code Case N-408.

In addition to all of the welds receiving the full Code-required surface examination, a significant percentage of the Code-required or FSAR-required volumetric examination will be performed.

Conclusions: Based on the above, it is concluded that the Code requirement and the FSAR augmented examination requirement are impractical for the subject welds and that the limited inservice volumetric examinations, along with the Code-required surface examinations, provide reasonable assurance of the continued inservice structural integrity. Therefore, it is recommended that relief be granted as requested.

3.2.3 Pumps (No relief requests)

3.2.4 Valves (No relief requests)

3.2.5 General (No relief requests)

3.3 Class 3 Components (No relief requests)

3.4 Pressure Tests (No relief requests)

3.5 General (No relief requests)

4. CONCLUSION

Pursuant to 10 CFR 50.55a(g)(6), it has been determined that certain Section XI required inservice examinations are impractical to perform. In all cases, the Licensee has demonstrated that specific Section XI requirements are impractical.

This technical evaluation has not identified any practical method by which the Licensee can meet all the specific inservice inspection requirements of Section XI of the ASME Code for the existing Seabrook Station, Unit 1, facility. Requiring compliance with all the exact Section XI required inspections would entail redesign of a significant number of plant systems, sufficient replacement components to be obtained, installation of the new components, and a baseline examination of these components. Even after the redesign efforts, complete compliance with the Section XI examination requirements probably could not be achieved. Therefore, it is concluded that the public interest is not served by imposing certain provisions of Section XI of the ASME Code that have been determined to be impractical. Pursuant to 10 CFR 50.55a(g)(6), relief is allowed from these requirements which are impractical to implement if granting the relief will not endanger life or property or the common defense and security and is otherwise in the public interest giving due consideration to the burden upon the licensee that could result if the requirements were imposed on the facility.

The development of new or improved examination techniques should continue to be monitored. As improvements in these areas are achieved, the Licensee should incorporate these techniques in the ISI program plan examination requirements.

Based on the review of the Seabrook Station, Unit 1, First 10-Year Interval Inservice Inspection Program Plan, Revision 0, the Licensee's response to the NRC's request for additional information, and the recommendations for granting relief from the ISI examination requirements that have been determined to be impractical, it is concluded that the Seabrook Station, Unit 1, First 10-Year Interval Inservice Inspection Program Plan, Revision 0, is acceptable and in compliance with 10 CFR 50.55a(g)(4).

5. REFERENCES

1. Code of Federal Regulations, Volume 10, Part 50.

2. American Society of Mechanical Engineers Boiler and Pressure Vessel Code, Section XI, Division 1: 1983 Edition through Summer 1983 Addenda.

3. American Society of Mechanical Engineers Boiler and Pressure Vessel Code, Code Cases - Nuclear Components, 1986 Edition.

4. Seabrook Station, Unit 1, First 10-Year Interval Inservice Inspection Program Plan, Revision 0, submitted April 14, 1987.

5. NUREG-0800, Standard Review Plans, Section 5.2.4, "Reactor Coolant Boundary Inservice Inspection and Testing," and Section 6.6, "Inservice Inspection of Class 2 and 3 Components," July 1981.

6. Letter, dated April 4, 1988, V. Nerses (NRC) to R. J. Harrison [Public Service of New Hampshire (PSNH)], Request for Additional Information on First Ten-Year Interval ISI Program - Seabrook Station, Unit 1.

7. Letter, dated June 3, 1988, G. S. Thomas (PSNH) to Document Control Desk (NRC), Response to Request for Additional Information - ISI Program.

8. NUREG-0896, Supplement No. 5, "Safety Evaluation Report related to the operation of Seabrook Station, Units 1 and 2," July 1986.

9. Regulatory Guide 1.147, "Inservice Inspection Code Case Acceptability, ASME Section XI, Division 1," Revision 5, August 1986.

10. Regulatory Guide 1.150, "Ultrasonic Testing of Reactor Vessel Welds During Preservice and Inservice Examinations," Revision 1, February 1983.

11. Regulatory Guide 1.14, "Reactor Coolant Pump Flywheel Integrity," Revision 1, August 1975.

12. IE Bulletin 79-13, "Cracking in Feedwater System Piping," Revision 2, October 17, 1979.