

October 17, 2000

Mr. Ted C. Feigenbaum
Executive Vice President and
Chief Nuclear Officer
North Atlantic Energy Service Corporation
c/o Mr. James M. Peschel
P.O. Box 300
Seabrook, NH 03874

SUBJECT: SECOND 10-YEAR INTERVAL INSERVICE INSPECTION PROGRAM PLAN
REQUESTS FOR RELIEF 2AR-01 AND 2AR-02 FOR SEABROOK STATION,
UNIT NO. 1 (TAC NO. MA8991)

Dear Mr. Feigenbaum:

The Nuclear Regulatory Commission (NRC) staff, with technical assistance from its contractor, the Idaho National Engineering and Environmental Laboratory (INEEL) has reviewed and evaluated the information provided by North Atlantic Energy Service Corporation (licensee) in its letter dated May 19, 2000, which proposed its second 10-Year Interval Inservice Inspection Program Plan Requests for Relief 2AR-01 and 2AR-02 for Seabrook Station, Unit No. 1 from certain requirements of the American Society of Mechanical Engineers (ASME) Code (the Code). Additional information was provided by the licensee in its letter dated August 17, 2000. The NRC staff concludes that compliance with the Code requirements would result in a burden without a compensatory increase in the levels of quality and safety and that the proposed alternatives are acceptable. Therefore, the proposed alternatives are authorized under 10 CFR 50.53a(a)(3)(ii).

The staff's evaluation and conclusions are contained in the enclosed safety evaluation (SE). Enclosure 2 is the INEEL Technical Letter Report. If you have any questions, please contact Robert M. Pulsifer at (301) 415-3016. This task completes TAC No. MA8991.

Sincerely,
/RA/

James W. Clifford, Chief, Section 2
Project Directorate I
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-443

Enclosures: 1. Safety Evaluation
2. Technical Letter Report

cc w/encls: See next page

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** See previous concurrence.
*SE input provided on 9/21/00,
no major changes made.

ACCESSION NO. ML003753607

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
FOR SECOND 10-YEAR INTERVAL INSERVICE INSPECTION
REQUESTS FOR RELIEF 2AR-01 AND 2AR-02
FOR SEABROOK STATION, UNIT NO. 1
NORTH ATLANTIC ENERGY SERVICE CORPORATION
DOCKET NUMBER 50-443

1.0 INTRODUCTION

Inservice inspection of the American Society of Mechanical Engineers (ASME) Code Class 1, 2, and 3 components is performed in accordance with Section XI of the ASME Boiler and Pressure Vessel (B&PV) Code and applicable addenda as required by 10 CFR 50.55a(g), except where specific written relief has been granted by the Commission pursuant to 10 CFR 50.55a(g)(6)(i). Pursuant to 10 CFR 50.55a(a)(3), alternatives to the requirements of paragraph (g) may be used, when authorized by the Director of the Office of Nuclear Reactor Regulation of the Nuclear Regulatory Commission (NRC), if (i) the proposed alternatives would provide an acceptable level of quality and safety or (ii) compliance with the specified requirements would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

Pursuant to 10 CFR 50.55a(g)(4), ASME Code Class 1, 2, and 3 components (including supports) shall meet the requirements, except the design and access provisions and the pre-service examination requirements, set forth in the ASME Code, Section XI, "Rules for Inservice Inspection (ISI) of Nuclear Power Plant Components," to the extent practical within the limitations of design, geometry, and materials of construction of the components. The regulations require that inservice examination of components and system pressure tests conducted during the first 10-year interval and subsequent intervals comply with the requirements in the latest edition and addenda of Section XI of the ASME Code incorporated by reference in 10 CFR 50.55a(b) 12 months prior to the start of the 120-month interval, subject to the limitations and modifications listed therein. In its Safety Evaluation dated August 30, 2000, the NRC approved the use of the 1995 Edition through 1996 Addenda of the ASME B&PV Code for the Seabrook Station, second 10-year ISI interval.

2.0 EVALUATION

The staff, with technical assistance from Idaho National Engineering and Environmental Laboratory (INEEL), has reviewed the information concerning inservice inspection (ISI) program

Requests for Relief 2AR-01 and 2AR-02 submitted for the second 10-year interval for Seabrook Station in North Atlantic Energy Service Corporation's (the licensee) letter dated May 19, 2000. Additional information was provided in the licensee's letter dated August 17, 2000.

The staff adopts the evaluations and recommendations for authorizing alternatives contained in the Technical Letter Report (TLR), included as Enclosure 2, prepared by INEEL. Attachment 1 to this SE lists each relief request and the status of approval.

For Seabrook Station the alternatives are authorized where compliance would result in a hardship or unusual difficulty without a compensating increase in quality or safety. Furthermore, the licensee's proposed alternatives are authorized, because the licensee's proposed alternatives provide reasonable assurance of structural integrity of the subject components in the licensee's requests for relief.

3.0 CONCLUSION

The staff has reviewed the Seabrook Station requests for alternatives to the Code requirements with the assistance of its contractor, INEEL. The enclosed TLR provides INEEL's evaluation of these alternatives. The staff has reviewed the TLR and adopts the evaluations and recommendations for authorizing the licensee's alternatives.

For the alternatives contained in Requests for Relief 2AR-01 and 2AR-02, the imposition of the Code requirements would result in a significant hardship without a compensating increase in the level of quality and safety. The staff concludes that Requests for Relief 2AR-01 and 2AR-02 alternatives provide reasonable assurance of structural integrity of the subject components in the licensee's requests for relief.

The alternative contained in Request for Relief 2AR-01 to use Code Case N-533 for Class 1 systems is authorized pursuant to 10 CFR 50.55a(a)(3)(ii) for the second 10-year inservice inspection interval or until such time as Code Case N-533 is referenced in a future revision of 10 CFR 50.55a. Upon incorporation in 10 CFR 50.55a, the licensee will follow all provisions in Code Case N-533, including any exceptions or limitations discussed in 10 CFR 50.55a.

The alternative contained in Request for Relief 2AR-02 is authorized pursuant to 10 CFR 50.55a(a)(3)(ii) for the second 10-year inservice inspection interval.

Principal Contributor: T. McLellan

Date: October 17, 2000

SUMMARY OF RELIEF REQUESTS

Relief Request Number	INEEL TLR Sec.	System or Component	Exam Category	Item No.	Volume or Area to be Examined	Required Method	Licensee Proposed Alternative	Relief Request Disposition
2AR-01	2.1	Class 1 Bolted Connections	IWA-5242(a)	N/A	Insulated Bolted Connections	Visual (VT-2)	Code Case N-533, <i>Alternative Requirements for VT-2 Visual Examination of Class 1 Insulated Pressure-Retaining Bolted Connections</i>	Authorized 10 CFR 50.55a(a)(3)(ii)
2AR-02	2.2	Class 2 Bolted Connections	IWA-5242(a)	N/A	Insulated Bolted Connections	Visual (VT-2)	Perform system leakage test and VT-2 on insulated bolted connection, and subsequent VT-2 on bolted connection with insulation removed and system not under pressure	Authorized 10 CFR 50.55a(a)(3)(ii)

TECHNICAL LETTER REPORT
SECOND 10-YEAR INTERVAL INSERVICE INSPECTION
REQUESTS FOR RELIEF 2AR-01 AND 2AR-02
FOR
NORTH ATLANTIC ENERGY SERVICE CORPORATION
SEABROOK NUCLEAR POWER STATION, UNIT 1
DOCKET NUMBER: 50-443

1. INTRODUCTION

By letter dated May 19, 2000, the licensee, North Atlantic Energy Service Corporation, submitted Requests for Relief 2AR-01 and 2AR-02 from certain requirements of the ASME Code, Section XI, for the Seabrook Nuclear Power Station, Unit 1 second 10-year inservice inspection (ISI) interval. The licensee provided additional information in response to an NRC request in a letter dated August 17, 2000. The Idaho National Engineering and Environmental Laboratory (INEEL) staff's evaluation of the subject requests for relief is in the following section.

2. EVALUATION

The information provided by North Atlantic Energy Service Corporation in support of the requests for relief from Code requirements has been evaluated and the bases for disposition are documented below. The Code of record for the Seabrook Nuclear Power Station, Unit 1, second 10-year ISI interval, which began August 2000, is the 1995 Edition through 1996 Addenda of Section XI of the ASME Boiler and Pressure Vessel Code. The use of the 1995 Edition through 1996 Addenda was approved in an NRC Safety Evaluation dated August 30, 2000.

2.1 Request for Relief 2AR-01, Use of Code Case N-533, Alternative Requirements for VT-2 Visual Examination of Class 1 Insulated Pressure-Retaining Bolted Connections

Code Requirement: IWA-5242(a) requires removal of insulation from bolted connections for visual examination, VT-2, when the systems are borted for the purpose of controlling reactivity.

Licensee's Proposed Alternative: Pursuant to 10CFR50.55a(3)(ii), authorization is sought to use Code Case N-533, *Alternative Requirements for VT-2 Visual Examination of Class 1 Insulated Pressure-Retaining Bolted Connections*, as an alternative to the requirements of the ASME Boiler and Pressure Vessel Code specified in 10CFR50.55a(g)(4). The licensee stated:

"North Atlantic will implement ASME Code Case N-533 as an alternative to the requirements of IWA-5242(a). The requirements of Code Case N-533 include the following:

1. A system pressure (leakage) test and VT-2 examination (without the removal of insulation) will be performed at operating pressure prior to plant startup following each refueling outage.
2. A VT-2 examination of pressure retaining bolted connections will be performed each refueling outage with the insulation removed. The connections are not required to be pressurized. Any evidence of leakage will be evaluated in accordance with IWA-5250."

In response to the Staff's request, the licensee stated:

"...North Atlantic has determined that a 4-hour hold time would provide a more meaningful examination as suggested by the NRC.

"Accordingly, North Atlantic hereby commits to perform a 4-hour hold time for VT-2 examinations performed in accordance with Alternative Requests 2AR-01 and 2AR-02."

Licensee's Basis for Proposed Alternative (as stated):

"North Atlantic requests to implement ASME Code Case N-533 'Alternative Requirements for VT-2 Visual Examination of Class 1 Insulated Pressure-Retaining Bolted Connections' as an alternative to the requirements of IWA-5242(a) for the visual examination of Class 1 insulated pressure-retaining bolted connections. The utilization of ASME Code Case N-533 is requested on the basis that compliance with the requirements of IWA-5242(a) for Class 1 insulated pressure-retaining bolted connections would result in a hardship without a compensating increase in the level of quality and safety.

"As prescribed in Table IWB-2500-1, Examination Category B-P, a system leakage test is required to be performed on Class 1 components at the completion of each refueling outage (typically in the Hot Standby mode of operation) at nominal operating pressure and elevated temperature conditions. During this test, VT-2 visual examinations are performed to detect evidence of leakage.

"IWA-5242(a) requires that, for systems bolated for the purpose of controlling reactivity, insulation shall be removed from pressure-retaining bolted connections for VT-2 visual examination. The requirements of IWA-5242(a) place a hardship on the plant for the following reasons:

1. Personnel would be required to enter the primary containment to erect scaffolding, remove thermal insulation, re-install the removed insulation and remove the associated scaffolding. This is expected to be a time consuming activity that could significantly impact the re-start of the plant.
2. Entries into the primary containment in order to erect scaffolding, remove thermal insulation, re-install the removed insulation and remove the associated scaffolding with the plant at the nominal operating pressure and elevated temperature would unnecessarily subject personnel to adverse heat stress conditions and increase their radiation exposure.
3. When bolted connections are examined with the insulation removed in the Hot Standby condition, inspection personnel will be exposed to extreme heat and potentially hazardous conditions."

"The purpose of removing insulation from pressure retaining bolting for visual examination is to inspect for evidence of bolated water leakage that could cause corrosion of the bolting. Due to the residue of boron crystals that remain where

borated water leakage occurs, it is not necessary to visually see actual fluid leakage.

“The use of Code Case N-533 provides a two-phased approach for ensuring the leak tight integrity of Class 1 bolted connections. Any significant leakage will be detected during the Code required system leakage test with the insulation in place. Minor leakage will be detected during the VT-2 examination performed during each outage.

“Based upon the frequency of the examinations proposed, the integrity of Class 1 pressure retaining bolted connections will be verified at the same frequency required by the Code. Additionally, no changes will be made to the areas that are inspected, the inspection criteria, or the qualifications of VT-2 inspection personnel.

“Therefore, the removal of insulation at nominal operating pressure and elevated temperature conditions to perform a VT-2 examination will result in a hardship without a compensating increase in the level of quality and safety.”

Evaluation: Paragraph IWA-5242(a) requires the removal of all insulation from pressure-retaining bolted connections in systems borated for the purpose of controlling reactivity when performing VT-2 visual examinations during system pressure tests. However, requiring the licensee to remove insulation during the Class 1 system pressure test would create a safety hazard due to elevated system temperatures that are present during this test, and would also result in excess radiation exposure to plant personnel. Therefore, the requirements of IWA-5242(a) would create a hardship on the licensee. The licensee has proposed to implement the requirements of Code Case N-533, *Alternative Requirements for VT-2 Visual Examination of Class 1 Insulated Pressure-Retaining Bolted Connections*, for Class 1 bolted connections in borated systems. This Code Case allows the VT-2 visual examination to be performed, typically in conjunction with startup activities, with the insulation in place. In addition, the licensee has committed to perform this VT-2 visual examination using a minimum four hour hold time prior to examination performance. A subsequent VT-2 visual examination is then performed each refueling outage during cold shutdown with the insulation removed.

The licensee’s proposed alternative provides a reasonable approach of ensuring the leak-tight integrity of systems borated for the purpose of controlling reactivity. First, the 4-hour hold time during a system pressure test at normal operating pressure ensures detection by allowing any significant leakage to penetrate the insulation. Second, by removing the insulation each refueling outage, the licensee will be able to detect minor leakage indicated by the presence of boron crystals or residue. This two-phase approach provides reasonable assurance of the continued leakage integrity of Class 1 bolted connections in borated systems.

Requiring the licensee to remove insulation at normal operating pressure (and elevated temperatures) would present a significant safety hazard for plant personnel. Furthermore, the licensee’s proposed alternative provides reasonable assurance of continued leakage integrity for Class 1 bolted connections. Based on these considerations, it is concluded that compliance with the Code requirements for Class 1 systems would result in a hardship without a compensating increase in the level of quality and safety. Therefore, it is recommended that the licensee’s proposed alternative be authorized, pursuant to 10 CFR 50.55a(a)(3)(ii), for Class 1 systems. Use

of this Code Case should be authorized until such time as the Code Case is referenced in a future revision of 10 CFR 50.55a. At that time, if the licensee intends to continue to implement this Code Case, the licensee is to follow all provisions in Code Case N-533 with limitations issued in the regulations, if any.

2.2 Request for Relief No. 2AR-02, Examination Category C-H, Visual Examination of Class 2 Pressure Retaining Components

Code Requirement: IWA-5242(a) requires removal of insulation from bolted connections for visual examination, VT-2, when the systems are borated for the purpose of controlling reactivity.

Licensee's Proposed Alternative: In accordance with 10 CFR 50.55a(a)(3)(ii), the licensee proposed the following, as stated:

"North Atlantic will implement the following as an alternative to the requirements of IWA-5242(a):

1. A system leakage test and VT-2 examination at operating pressure will be performed (without the removal of insulation) during each inspection period at the conditions specified in IWC-5221.
2. A VT-2 examination of pressure retaining bolted connections will be performed during each inspection period with the insulation removed. The connections are not required to be pressurized. Any evidence of leakage will be evaluated in accordance with IWA-5250."

In response to the Staff's request, the licensee stated:

"...North Atlantic has determined that a 4-hour hold time would provide a more meaningful examination as suggested by the NRC.

"Accordingly, North Atlantic hereby commits to perform a 4-hour hold time for VT-2 examinations performed in accordance with Alternative Requests 2AR-01 and 2AR-02."

Licensee's Basis for Proposed Alternative (as stated):

"North Atlantic requests to implement an alternative to the requirements of IWA-5242(a) for the visual examination of Class 2 insulated pressure-retaining bolted connections. The use of the proposed alternative is requested on the basis that compliance with the requirements of IWA-5242(a) for Class 2 insulated pressure-retaining bolted connections would result in a hardship without a compensating increase in the level of quality and safety.

"As prescribed in Table IWC-2500-1, Examination Category CH, a system leakage test is required to be performed for Class 2 components each inspection period. As outlined in Note (1) of the subject table, a VT-2 examination is required to be performed in accordance with IWA-5242(a). During this test, VT-2 visual examinations are performed to detect evidence of leakage.

"IWA-5242(a) requires that, for systems borated for the purpose of controlling reactivity, insulation shall be removed from pressure-retaining bolted connections

for VT-2 visual examination. The requirements of IWA-5242(a) place a hardship on the plant for the following reasons:

1. Personnel may be required to enter the primary containment to erect scaffolding, remove thermal insulation, re-install the removed insulation and remove the associated scaffolding. This is expected to be a time consuming activity that could significantly impact the re-start of the plant.
2. Entries into the primary containment in order to erect scaffolding, remove thermal insulation, re-install the removed insulation and remove the associated scaffolding with the systems at nominal operating pressure and elevated temperature would unnecessarily expose personnel to adverse heat stress conditions and increase their radiation exposure.
3. When bolted connections are examined with the insulation removed, inspection personnel may be exposed to extreme heat and potentially hazardous conditions.”

“The purpose of removing insulation from pressure retaining bolting for visual examination is to inspect for evidence of borated water leakage that could cause corrosion of the bolting. Due to the residue of boron crystals that remain where borated water leakage occurs, it is not necessary to visually see actual fluid leakage.

“Additionally, the proposed alternative is consistent with the alternative examination requirements approved by the ASME Code committee to ensure the leak-tight integrity of Class 1 bolted connections in Code Case N-533 ‘Alternative Requirements for VT-2 Visual Examination of Class 1 Insulated Pressure-Retaining Bolted Connections, Section XI, Division 1.’ The proposed alternative examination provides a two-phased approach for ensuring the integrity of Class 2 bolted connections. Any significant leakage will be detected during the Code required system leakage test with the insulation in place. Minor leakage will be detected during the VT-2 examination performed during each outage.

“Based upon the frequency of the proposed examinations, the integrity of Class 2 pressure retaining bolted connections will be verified at the same frequency required by the Code. Additionally, no changes will be made to the areas that are inspected, the inspection criteria, or the qualifications of VT-2 examination personnel.

“Therefore, the removal of insulation at nominal operating pressure and elevated temperature conditions to perform a VT-2 examination will result in a hardship without a compensating increase in the level of quality and safety.”

Evaluation: The Code requires the removal of all insulation from pressure-retaining bolted connections in systems borated for the purpose of controlling reactivity when performing VT-2 visual examinations during system pressure tests. However, requiring the licensee to remove insulation during the Class 2 system pressure test would create a safety hazard due to elevated temperatures associated with normal system operating pressure, and would also result in excess radiation exposure to plant personnel. Therefore, the requirements of IWA-5242(a) would create a hardship on the licensee.

As an alternative, the licensee has proposed to perform a system pressure test and associated VT-2 visual examination, without removal of insulation from bolted connections, on Class 2 systems. The system pressure test will be augmented with a minimum 4-hour hold time prior to the VT-2 visual examination. The frequency of examinations will be in accordance with the requirements in Table IWC-2500-1 for Class 2 systems (each period). In addition, with the systems depressurized, insulation will be removed from the bolted connections for direct visual examination each period.

The licensee's proposed alternative is essentially equivalent to Code Case N-533, *Alternative Requirements for VT-2 Visual Examination of Class 1 Insulated Pressure-Retaining Bolted Connections, Section XI, Division 1*, except the proposed alternative was extended to address Code Class 2 bolted connections.

The licensee's proposed alternative provides a thorough approach to ensuring the leak-tight integrity of systems bolted for the purpose of controlling reactivity. First, the 4-hour hold time will allow potential leakage to penetrate the insulation, thus providing a means of detecting significant leakage with the insulation in place. Further, by subsequently removing the insulation each period for Class 2 bolted connections, the licensee will be able to detect minor leakage indicated by the presence of boric acid residue. Therefore, it is concluded that this two-phased approach will provide reasonable assurance of continued leakage integrity of Class 2 systems.

Requiring the licensee to remove insulation at normal operating pressure (and elevated temperatures) would present a significant safety hazard for plant personnel. Furthermore, the licensee's proposed alternative provides reasonable assurance of continued leakage integrity for Class 1 bolted connections. Based on these considerations, it is concluded that compliance with the Code requirements for Class 2 systems would result in a hardship without a compensating increase in the level of quality and safety. Therefore, pursuant to 10 CFR 50.55a(a)(3)(ii), it is recommended that the licensee's proposed alternative be authorized for the subject Class 2 systems.

3. CONCLUSION

The INEEL staff has reviewed the licensee's submittal and concludes that for Requests for Relief 2AR-01 and 2AR-02, the licensee has demonstrated that the Code examination requirements would result in a hardship without a compensating increase in the level of quality and safety. Therefore, it is recommended that the licensee's proposed alternatives be authorized pursuant to 10 CFR 50.55a(a)(3)(ii) for the second ISI interval.