



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

June 4, 2012

Mr. Paul Freeman  
Site Vice President  
c/o Michael O'Keefe  
Seabrook Station  
NextEra Energy Seabrook, LLC  
P.O. Box 300  
Seabrook, NH 03874

SUBJECT: SEABROOK STATION, UNIT 1 - SECOND 10-YEAR INTERVAL INSERVICE  
INSPECTION PROGRAM PLAN REQUEST FOR RELIEF NO. 2IR-17 (TAC NO.  
ME6904)

Dear Mr. Freeman:

By letter dated August 17, 2011, as supplemented March 13, 2012, NextEra Energy Seabrook, LLC (NextEra or licensee) submitted request for relief 2IR-17 for the second 10-year inservice inspection (ISI) interval program at the Seabrook Station, Unit 1 (Seabrook) from certain examination requirements of the American Society of Mechanical Engineers (ASME) *Boiler and Pressure Vessel Code* (Code). Specifically, the licensee requested relief from the ASME Code, Section XI requirements for examination Category C-A, Items C1.10 and C1.30, pressure retaining welds in pressure vessels. The request is for the risk-informed examination for the second 10-year ISI interval, which ended August 18, 2010.

The U.S. Nuclear Regulatory Commission (NRC) staff with technical assistance from its contractor, the Pacific Northwest National Laboratory (PNNL), has reviewed the subject request, and concludes that NexEra has adequately addressed all of the regulatory requirements set forth in 10 CFR 50.55a(g)(6)(i). Therefore, the NRC staff grants relief from the specified ASME Code, Section XI, examination coverage requirements of the subject welds contained in relief request 2IR-17 for the Seabrook second 10-year ISI interval.

All other ASME Code, Section XI requirements for which relief was not specifically requested and approved in the subject requests for relief remain applicable, including third-party review by the Authorized Nuclear Inservice Inspector.

The NRC staff's safety evaluation is enclosed. If you have any questions, please contact John G. Lamb at 301-415-3100 or via e-mail at [John.Lamb@nrc.gov](mailto:John.Lamb@nrc.gov).

Sincerely,

A handwritten signature in black ink, appearing to read "Meena Khanna".

Meena Khanna, Chief  
Plant Licensing Branch I-2  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Docket No. 50-443

Enclosure:  
Safety Evaluation

cc w/encl: Distribution via Listserv



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

SECOND 10-YEAR INTERVAL

REQUEST FOR RELIEF NO. 2IR-17

NEXTERA ENERGY SEABROOK, LLC.

SEABROOK STATION, UNIT 1

DOCKET NUMBER 50-443

1.0 INTRODUCTION

By letter dated August 17, 2011, as supplemented March 13, 2012,<sup>1</sup> NextEra Energy Seabrook, LLC (NextEra or licensee) submitted request for relief 2IR-17 for the second 10-year inservice inspection (ISI) interval program at the Seabrook Station, Unit 1 (Seabrook) from certain examination requirements of the American Society of Mechanical Engineers (ASME) *Boiler and Pressure Vessel Code* (Code). Specifically, the licensee requested relief from the ASME Code, Section XI requirements for examination Category C-A, Items C1.10 and C1.30, pressure retaining welds in pressure vessels. The request is for the risk-informed examination for the second 10-year ISI interval, which ended August 18, 2010.

2.0 REGULATORY EVALUATION

Pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) 50.55a(g)(4), American Society of Mechanical Engineers (ASME) Code Class 1, 2, and 3 components (including supports) shall meet the requirements, except the design and access provisions and the preservice examination requirements, set forth in the ASME Code, Section XI 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, which was 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.

10 CFR 50.55a(g)(5)(iii), states, in part, that licensees may determine that conformance with certain code requirements is impractical and that the licensee shall notify the Commission and submit information in support of the determination. Determination of impracticality in accordance with this section must be based on the demonstrated limitations experienced when attempting to comply with the code requirements during the inservice inspection interval for which the request is being submitted. Requests for relief made in accordance with this

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<sup>1</sup> Agencywide Documents Access and Management System Accession Numbers ML11234A185 and ML120790313, respectively.

section must be submitted to the NRC no later than 12 months after the expiration of the initial 120-month inspection interval or subsequent 120-month inspection interval for which relief is sought.

10 CFR 50.55a(g)(6)(i), states that the Commission will evaluate determinations under paragraph (g)(5) of this section that code requirements are impractical. The Commission may grant such relief and may impose such alternative requirements as it determines is authorized by law and will not endanger life or property or the common defense and security and is otherwise in the public interest giving due consideration to the burden upon the licensee that could result if the requirements were imposed on the facility.

The licensee has requested relief from ASME Code requirements pursuant to 10 CFR 50.55a(g)(6)(i). The ASME Code of Record for Seabrook second 10-year interval inservice inspection program, which ended on August 18, 2010, is the 1995 Edition through the 1996 Addenda of Section XI of the ASME *Boiler and Pressure Vessel Code*.

Based on the above, and subject to the following technical evaluation, the NRC staff finds that regulatory authority exists for the licensee to request and the Commission to grant the relief requested by the licensee.

### 3.0 TECHNICAL EVALUATION

The information provided by the licensee in support of the request for relief to ASME Code requirements has been evaluated and the bases for disposition are documented below.

#### 3.1 Request for Relief 2IR-17, ASME Code, Section XI, Examination Category C-A, Items C1.10 and C1.30, Pressure Retaining Welds in Pressure Vessels

##### ASME Code Requirement

ASME Code, Section XI, Examination Category C-A, Items C1.10 and C1.30, require essentially 100 percent volumetric examination, as defined by Figures IWC-2500-1 and -2, of the length of Class 2 pressure vessel circumferential shell and tubesheet-to-shell welds, respectively. "Essentially 100 percent," as clarified by ASME Code Case N-460, *Alternative Examination Coverage for Class 1 and Class 2 Welds*, is greater than 90 percent coverage of the examination volume, or surface area, as applicable. ASME Code Case N-460 has been approved for use by the NRC in Regulatory Guide 1.147, Revision 16, *Inservice Inspection Code Case Acceptability* (RG 1.147, Revision 16).

##### Licensee's ASME Code Relief Request

In accordance with 10 CFR 50.55a(g)(5)(iii), the licensee requested relief from the ASME Code-required volumetric examination of Residual Heat Removal (RHR) heat exchanger circumferential shell Weld RH E-9B 01B and Containment Building Spray (CBS) Heat Exchanger Tubesheet-To-Shell Weld CBS E-16B 01.

### Licensee's Basis for Relief Request (as stated)

#### Residual Heat Removal Heat Exchanger

The "B" Residual Heat Removal (RHR) heat exchanger shell circumferential weld was examined with a manual ultrasonic (UT) technique using most recent technology available to achieve maximum examination coverage practical. Due to original design of the heat exchanger, the lower shell circumferential weld is in close proximity to the flange joining the lower heat exchanger shell-to-the upper shell, thereby limiting [UT] examination coverage from the tubesheet side of the weld.

To increase examination coverage on the RHR heat exchanger lower shell circumferential weld, the heat exchanger would require replacement with a design that would allow for complete examination coverage of the subject weld. This option to meet the 100 percent examination requirement is considered impractical.

#### Containment Building Spray Heat Exchanger

The "B" Containment Building Spray (CBS) heat exchanger tubesheet-to-shell weld was examined with a manual [UT] technique using most recent technology available to achieve maximum examination coverage practical. Due to original design of the heat exchanger, the tubesheet-to-shell weld is in close proximity to the flange joining the heat exchanger shell side to the tubesheet side, thereby limiting [UT] examination coverage from the tubesheet side of the weld. Further examination limitations exist from support gusset plates welded on each side of the tubesheet shell.

To increase examination coverage on the CBS heat exchanger tubesheet-to-shell weld, removal of the permanently welded support gusset plates that are part of the original heat exchanger design or replacement of the heat exchanger with a design that would allow for complete examination coverage of the subject weld would be required. These options to meet the 100 percent examination coverage requirement are considered impractical.

### Licensee's Proposed Alternative Examination

The licensee did not propose any alternative examinations for the subject welds. However, the licensee's examinations were performed to the maximum extent practical.

### NRC Staff Evaluation

The ASME Code requires essentially 100 percent volumetric examination of circumferential shell and tubesheet-to-shell welds on selected ASME Code, Class 2 pressure vessels. However, for the subject welds on the Seabrook RHR and CBS heat exchangers, complete examinations are limited due to the design configuration of these components and adjacent appurtenances. In order to achieve greater volumetric coverage, the RHR and CBS heat exchangers and/or adjacent components would have to be redesigned and modified. This would place a burden on the licensee; therefore, the ASME Code examinations are considered impractical.

As shown in the sketches and technical descriptions included in the licensee's submittals, examinations of the "B" RHR Heat Exchanger Shell Circumferential Weld RH E-9B 01B and "B" CBS Heat Exchanger Tubesheet-to-Shell Weld CBS E-16B 01 have been performed to the extent practical, with the licensee obtaining approximately 50.0 and 19.0 percent of the required ASME Code examination volumes, respectively. The RHR and CBS heat exchanger shells are fabricated of Type 304 austenitic stainless steel. Due to their geometrical design and close proximity to bolted flanges, UT scan access is limited to the shell side only for these welds. Additionally, welded support attachments limit access on the shell side of the CBS heat exchanger tubesheet-to-shell weld.

The licensee examined these welds from one accessible side using 45-degree shear and 60-degree longitudinal (L-waves) waves to achieve the maximum possible coverage along the weld length. L-wave techniques have been shown to provide enhanced detection on the far-side of austenitic stainless steel welds.<sup>2,3,4</sup> Thus, while the licensee has only taken credit for obtaining volumetric coverage of the near-side of the subject welds, the techniques employed would have provided some coverage on the far-side of the welds. No inservice related flaws were detected.

The licensee has shown that it is impractical to meet the ASME Code-required volumetric examination coverage for the subject weld due to the design geometry of the weld, materials, and proximity of welded supports. However, based on the volumetric coverage obtained, and the UT techniques employed, it is reasonable to conclude that, if significant service-induced degradation had occurred in the subject welds, evidence of it would have been detected by the examinations performed. Furthermore, the NRC staff determined that the examinations performed to the extent practical on the subject welds provide reasonable assurance of structural integrity of the subject welds.

#### 4.0 CONCLUSIONS

As set forth above, the NRC staff has determined that granting relief pursuant to 10 CFR 50.55a(g)(6)(i) is authorized by law and will not endanger life or property, or the common defense and security, and is otherwise in the public interest given due consideration to the burden upon the licensee that could result if the requirements were imposed on the facility. Accordingly, the NRC staff concludes that the licensee has adequately addressed all of the regulatory requirements set forth in 10 CFR 50.55a(g)(6)(i). Therefore, the NRC staff grants relief from the specified ASME Code, Section XI, examination coverage requirements of the subject welds contained in relief request 2IR-17 for the Seabrook second 10-year ISI interval.

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- 2 F.V. Ammirato, X. Edelmann, and S.M. Walker, *Examination of Dissimilar Metal Welds in BWR Nozzle-to-Safe End Joints*, 8<sup>th</sup> International Conference on NDE in the Nuclear Industry, ASM International, 1987.
  - 3 P. Lemaitre, T.D. Koble, and S.R. Doctor, *PISC III Capability Study on Wrought-to-Wrought Austenitic Steel Welds: Evaluation at the Level of Procedures and Techniques*, Effectiveness of Nondestructive Examination Systems and Performance Demonstration, PVP-Volume 317, NDE-Volume 14, ASME, 1995.
  - 4 M. T. Anderson, A.A. Diaz, A.D. Cinson, S.L. Crawford, S.E. Cumblidge, S.R. Doctor, K.M. Denslow, and S. Ahmed, 2011. *An Assessment of Ultrasonic Techniques for Far-Side Examinations of Austenitic Stainless Steel Piping Welds*, NUREG/CR-7113, PNNL-19353, U. S. Nuclear Regulatory Commission, Washington, DC.

All other ASME Code, Section XI requirements for which relief was not specifically requested and approved in the subject requests for relief remain applicable, including third-party review by the Authorized Nuclear Inservice Inspector.

Principal Contributors: Tom McLellan and Steve Cumblidge

Date: June 4, 2012

SEABROOK STATION, UNIT 1  
Second 10-Year ISI Interval

TABLE 1  
SUMMARY OF RELIEF REQUEST

Relief Request Number	TLR RR Sec.	System or Component	ASME Code Exam. Category	ASME Code, Item No.	Volume or Area to be Examined	Required Method	Licensee Proposed Alternative	Relief Request Disposition
2IR-17	3.1	Pressure Retaining Welds in Pressure Vessels	C-A	C1.10 C1.30	100% of ASME Code, Class 2 circumferential shell and tubesheet-to-shell weld	Volumetric	Use volumetric coverage achieved	Granted 10 CFR 50.55a(g)(6)(i)

June 4, 2012

Mr. Paul Freeman  
Site Vice President  
c/o Michael O'Keefe  
Seabrook Station  
NextEra Energy Seabrook, LLC  
P.O. Box 300  
Seabrook, NH 03874

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Sincerely,  
*/ra/*  
Meena Khanna, Chief  
Plant Licensing Branch I-2  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Docket No. 50-443

Enclosure:  
Safety Evaluation

cc w/encl: Distribution via Listserv

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