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

September 4, 2012

Mr. Kevin Walsh
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 NO. 1 – REQUEST FOR ADDITIONAL INFORMATION REGARDING RELIEF REQUEST FOR SERVICE WATER PIPING (TAC NO. ME9187)

Dear Mr. Walsh:

By letter dated August 1, 2012 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML12219A129), NextEra Energy Seabrook, LLC (NextEra) submitted a relief request to use an alternative to the requirements of the American Society of Mechanical Engineers *Boiler and Pressure Vessel Code* (ASME Code), Section XI at Seabrook Station, Unit 1 (Seabrook). NextEra plans to excavate and examine Class 3 Nuclear Service Water System (SW) buried piping in accordance with the requirements of the Seabrook Buried Piping Integrity Program. Should areas requiring repair be detected during these inspections, NextEra requests relief from ASME Code, Section XI, IWA 4400 requirements that defective portions of components be removed prior to performing a repair/replacement activity by welding.

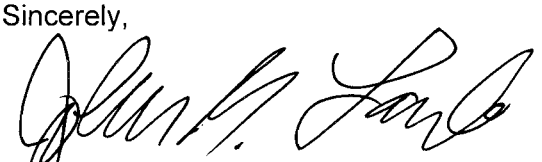
NextEra requested that the U.S. Nuclear Regulatory Commission (NRC) complete its review by September 25, 2012, to support schedules for inspecting portions of the Seabrook SW system during the fall 2012 refueling outage.

The NRC staff has determined that additional information is required to complete its review. The NRC staff's request for additional information (RAI) is contained in the Enclosure. A draft of these questions was previously sent to Mr. Paul Willoughby of your staff with an opportunity to have a teleconference to ensure that NextEra understood the questions and their regulatory basis, as well as to verify that the information was not previously docketed.

A teleconference was held on August 16, 2012, and Mr. O'Keefe agreed that NextEra would respond to the RAI by September 7, 2012. Please note that if you do not respond to the RAI by September 7, 2012, the NRC may reject your request for relief under the provisions of Title 10 of the *Code of Federal Regulations*, Section 2.108, "Denial of application for failure to supply information."

If you have any questions, please contact me at (301) 415-3100.

Sincerely,



John G. Lamb, Senior Project Manager
Plant Licensing Branch I-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-443

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REQUEST FOR ADDITIONAL INFORMATION

REGARDING RELIEF REQUEST FOR SERVICE WATER PIPING

NEXTERA ENERGY SEABROOK, LLC

SEABROOK STATION, UNIT 1

DOCKET NUMBER 50-443

1.0 SCOPE

By letter dated August 1, 2012 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML12219A129), NextEra Energy Seabrook, LLC (NextEra) submitted a relief request to use an alternative to the requirements of the American Society of Mechanical Engineers *Boiler and Pressure Vessel Code* (ASME Code), Section XI at Seabrook Station, Unit 1 (Seabrook). NextEra plans to excavate and examine Class 3 Nuclear Service Water (SW) System buried piping in accordance with the requirements of the Seabrook Buried Piping Integrity Program. Should areas requiring repair be detected during these inspections, NextEra requests relief from ASME Code, Section XI, IWA 4400 requirements that defective portions of components be removed prior to performing a repair/replacement activity by welding.

NextEra requested that the U.S. Nuclear Regulatory Commission (NRC) complete its review by September 25, 2012, to support schedules for inspecting portions of the Seabrook SW system during the fall 2012 refueling outage.

The NRC staff has determined that additional information is required to complete its review.

2.0 Request for Additional Information

Pre-Repair Inspections

1. Sections 4 and 5.c of the relief request briefly describe the pre-repair inspection. It is not clear to the NRC staff the details of the inspection, such as, the sequence of the inspection and the acceptance criteria for the location that needs repair. Please provide a step-by-step description of how the examination of the subject SW pipe will be performed prior to the repair.

2. Section 5.c of the relief request states that an initial [inside] surface cleanup will be performed. (a) Clarify whether the inside surface of the entire subject SW system pipe will be cleaned or only the location where the cement liner is damaged. (b) If only a portion of the pipe will be cleaned, explain which segment of the pipe will be cleaned. (c) If the cement liner is damaged (e.g., wall loss) but the inside surface of the metal pipe wall is not exposed to air/water, discuss whether the damaged liner location will be repaired as part of the pre-repair inspection effort. If not, please provide supporting justification.

3. Section 5.c of the relief request describes a contour gauge that will be used to determine the extent of wall loss. (a) Confirm that the aforementioned "wall loss" is related to the metal pipe wall loss, not the cement liner wall loss. (b) Explain why a contour gauge is used initially in lieu of ultrasonic testing (UT) to determine the pipe wall loss. (c) Section 5.c of the relief request states that UT examination will be used to establish the existing surrounding area, consisting of good wall (sufficient wall thickness to support welding of the repair). Provide the value for the "sufficient wall thickness" to support welding of the repair. (d) Discuss why UT is not used to measure the thickness of both the cement liner and pipe wall. (e) Discuss how the degradation from the outside surface of the pipe will be determined and dispositioned. (f) It appears that UT will be used only at the location where the cement liner is damaged and the inside surface of the metal pipe is exposed to air/water. It appears that if the cement liner is not damaged at a location, then UT will not be used at that location. Therefore, for those pipe locations where the cement liner is not damaged, how would the degradation from the outside surface of the metal pipe be determined?

4. (a) Discuss the minimum wall thickness (pipe and cement liner) that the repair is required to be performed. (b) Provide the technical basis of the minimum wall thickness. (c) Provide the approximate length of line numbers 1801-3 and 1818-3 that are covered in the relief request. (d) Section 4 of the relief request states that the subject pipe has a 24-inch nominal diameter, standard schedule and 0.375-inch liner. Confirm that the pipe wall thickness is 0.375 inches and the cement liner wall thickness is also 0.375 inches.

The Encapsulation Design

5. (a) Explain the statement in Figure A of the relief request that reads: "...Center weld root standoff hub is optional and may be deleted..." (b) Explain why the center weld root standoff hub is optional and not a requirement. (c) Discuss the situation in which the center weld root standoff hub will be and will not be applied. (d) Discuss the purpose of the center weld root standoff hub.

6. Section 5 (second paragraph on page 2) of the relief request states that "...The encapsulation cap ID [inside diameter] will be such that the inside diameter is greater than the maximum diameter of the defective area plus a minimum of twice the nominal thickness of the pipe..." (a) Explain how twice the nominal thickness of the pipe (plus the maximum diameter of the defective area) is sufficient to cover the potential corrosion growth in the lateral direction of the pipe within the design life of the encapsulation. (b) Section 5 further states that the encapsulation ID cap has a 6-inch diameter. Does this imply that the encapsulation application is limited to repair a defective area with a diameter of less than 6 inches? (c) Discuss whether the encapsulation needs to be bent to fit the contour of the pipe (i.e., would cold work be done on the encapsulation?).

7. Section 5.e of the relief request states that a corrosion rate of 40 mills per year (mpy) is assumed for the corrosion of the encapsulated pipe wall and inner surface of the cap and its attachment welds remain intact during the intended service life of the repair. (a) Explain how the 40 mpy is used in the encapsulation design. (b) Is the 40 mpy used in the corrosion loss of the base metal in the lateral direction as well as the depth direction of the pipe wall? (c) Explain how the corrosion rate is used to determine the

corrosion of welds and inner surface of the cap. (d) Discuss all potential degradation mechanisms involving seawater affecting carbon steel piping. (e) Discuss the degradation mechanism(s) to which a corrosion rate of 40 mpy is applicable because a 40-mpy corrosion rate cannot possibly be applicable to all potential degradation mechanisms involving seawater affecting carbon steel piping. (f) Discuss whether a coating will be applied to the surface of the repair to minimize corrosion.

8. Figure A of the relief request shows that the weldment is applied around the perimeter of the encapsulation. (a) Provide a detailed drawing of the weld design with respect to the contour of the encapsulation including dimensions if possible. (b) Provide the detailed plane view, side view, and 3-dimensional view of the repair design.

9. (a) Provide the thickness of the final repaired location, as compared to the thickness of the existing pipe with the cement liner. In this regard, provide the thickness of the encapsulation (the Inconel 625 liner and the air gap). (b) The staff's concern is that if the repaired location is much thicker than the existing wall thickness (pipe plus cement liner), the fluid flow will impinge on the side (the cross-sectional area, or skirt) of the encapsulation and affect its structural integrity. (c) Discuss any fluid dynamic calculations performed to address the forces impinging on the encapsulation and to ensure that the encapsulation will not be affected by the fluid flow. (d) Discuss any limitations on the number of the encapsulations that can be installed in the subject pipe run, so as not to restrict the fluid flow.

10. The proposed relief request discusses the repair for wall thinning. Clarify whether the proposed design is also applicable to repair a 100-percent through-wall flaw (through the cement liner and pipe). If yes, describe how groundwater will not flow from outside into the inside of the pipe when a 100-percent through-wall flaw exists, which could cause corrosion inside the encapsulation. If not, confirm that the proposed repair method will not be applicable to a known 100-percent through-wall flaw.

11. Explain what is meant by "3/32 inch (Ref)" in Figure A of the relief request. Does this dimension refer to the root opening (i.e., the gap between the encapsulation and the pipe inside surface to facilitate the welding) or coating on the inside surface of the pipe prior to the installation of the encapsulation?

12. Section 6 states that the encapsulation device will have a limited service life of two operating cycles (approximately 36 months). Describe how the 36-month duration is obtained.

13. Submit the design calculations, including the stress analyses of the encapsulation, the weld sizing calculations, and corrosion calculations of pipe wall thinning, as part of the design. The corrosion calculations should show that the encapsulation will contain the potential wall thinning and associated growth within the effective life of the design.

14. Provide the operating and design pressures and temperatures of the subject piping.

Installation

15. Describe the step-by-step process of how the repair will be performed.

16. Figure A of the relief request shows the restored liner material. (a) Discuss whether the "restored liner material" is the same material as the existing cement liner material. (b) Describe how the restored liner material is attached/joined to the existing cement liner on one side and the encapsulation on the other side. (c) Discuss how the bonding of the restored liner to the existing liner and encapsulation will provide corrosion protection to the steel piping.

17. Figure A identifies an "Inconel 625 liner." The encapsulation is SA 105 or SA 350 Grade LF2 as stated in Section 5.a of the relief request. (a) Explain how the Inconel 625 liner is attached to the encapsulation. (b) Please confirm that the Inconel 625 liner is used to minimize corrosion of the encapsulation. However, the staff noted that the Inconel 625 liner is applied to the top of the encapsulation only and not to the sides of the encapsulation (the side that faces the fluid flow in the cross-sectional area). Discuss how the sides of the encapsulation will be protected from corrosion.

18. Figure A of the relief request shows that the weldment is in contact with the restored liner material. Discuss whether there is a limit imposed on the distance between the two adjacent encapsulations (i.e., how close can two encapsulations be installed next to each other) to minimize weld shrinkage in the pipe and high weld stresses.

Post-Repair Inspection (Acceptance Examination)

19. Section 5.c of the relief request states that liquid penetrant or magnetic particle examination of the final attachment weld pass shall be performed. Discuss the acceptance criteria of the post-installation inspection results.

20. Section 5.d of the relief request states that "...[a] future excavation of the piping will be performed prior to the end of the 36 months service period for the purpose of defect removal from the exterior and repair of the external wrap..." (a) Discuss how the defect will be removed. (b) Does the above statement imply that the degraded pipe will be removed and a new pipe will be installed within 36 months of installing the encapsulation?

Inservice Monitoring Plan

21. Section 5.d of the relief request states that post repair monitoring is not possible because the pipe is buried. However, the licensee will place the repaired location into the NextEra Energy Seabrook Buried Pipe Inspection Program. (a) Describe how the buried pipe inspection program will monitor the repaired location. (b) Confirm that after the installation of the encapsulation, the pipe run will follow the requirements of the system leakage testing in accordance with the ASME Code, Section XI, IWA-5000 and IWD-5000 for buried piping.

Hardship

22. The licensee submitted the relief request under Title 10, *Code of Federal Regulations* (CFR), paragraph 50.55a(a)(3)(ii). Section 4 of the relief request presents the hardship but the basis for the hardship is not clearly understood by the NRC staff. Clarify the

hardship of performing an ASME Code repair, without a compensating increase in the level of quality and safety (i.e., how does the relief request satisfy 10 CFR 50.55a(a)(3)(ii)?).

General Comments

23. The staff requests that the licensee revise and enhance the relief request by incorporating the information that is requested in this RAI, in addition to responding to the above RAI questions because the relief request is not clear in several aspects of the proposed repair (e.g., design, inspection and installation). In addition, the NRC staff suggests that the relief be requested for the remaining third 10-year inservice inspection interval. However, the effective design life of the proposed repair should remain as-is.

If you have any questions, please contact me at (301) 415-3100.

Sincerely,

/ra/

John G. Lamb, Senior Project Manager
Plant Licensing Branch I-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-443

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