



April 2, 2014

10 CFR 50.55a

Docket No. 50-443
SBK-L-14064

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555-0001

Seabrook Station

Response to Request for Additional Information Regarding Relief Request No. 3IR-6
Alternative Examination of Reactor Vessel Flange Leak-Off Lines

References:

1. NextEra Energy Seabrook, LLC letter SBK-L-14057, "Relief Request No. 3IR-6 Alternative Examination of Reactor Vessel Flange Leak-Off Lines," dated March 24, 2014.
2. NRC Letter, "Seabrook Station Unit 1 - Request for Additional Information Regarding Request for Relief 3IR-6 (TAC NO. MF3674)," dated April 1, 2014.

On February 25, 2014, the U.S. Nuclear Regulatory Commission (NRC) issued information notice (IN) 2014-02, Failure to Properly Pressure Test Reactor Vessel Flange Leak-off Lines, identifying instances in which inspection of the reactor vessel flange leak-off lines were not performed as required by Section XI of the American Society of Mechanical Engineers (ASME) Code and 10 CFR 50.55a.

NextEra Energy Seabrook, LLC (NextEra) reviewed the information for applicability for Seabrook Station and determined that the required system leakage test of the reactor vessel flange leak-off lines, as described by ASME Code Section XI, Rules for In-service Inspection of Nuclear Power Plant Components, was not previously performed.

In Reference 1, NextEra submitted Relief Request 3IR-6 for an alternative examination of the Seabrook Station reactor vessel flange leak-off lines.

In Reference 2, the NRC requested additional information regarding NextEra's Relief Request 3IR-6 for an alternative examination of the reactor vessel flange leak-off lines.

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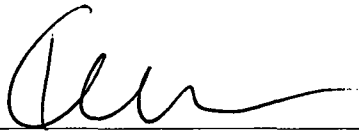
Attachment 1 of this letter provides the response to the NRC request for additional information.

Attachment 2 contains the NextEra commitment described below.

NextEra commits to perform an additional inspection of the inaccessible sections of the leak-off lines by removing a cavity seal ring hatch during refueling to provide access to the inaccessible area below the cavity seal ring to permit direct inspection of the leak-off line piping for evidence of leakage by observation of boric acid. This commitment is proposed on a frequency of once per ISI interval.

If you have any questions or require additional information, please contact Mr. Michael Ossing, Licensing Manager, at (603) 773-7512.

Sincerely,

A handwritten signature in black ink, appearing to read 'Kevin T. Walsh', written over a horizontal line.

Kevin T. Walsh
Site Vice President
NextEra Energy Seabrook, LLC

Attachments

cc: NRC Region I Administrator
NRC Project Manager, Project Directorate I-2
NRC Senior Resident Inspector

Attachment 1 to SBK-L-14064

Response to Request for Additional Information Regarding Relief Request No. 3IR-6
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Attachment to SBK-L-14064

Response to Request for Additional Information Regarding Relief Request No. 3IR-6
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By letter dated March 24, 2014, NextEra Energy Seabrook, LLC submitted for staff review and approval ISI Program Relief Request 3IR-6, which requests an alternative to the ASME Section XI code requirement of subarticle IWC-5220 for pressure testing of the Class 2 reactor vessel flange leak-off line each inspection period. To complete its review, the NRC staff requests the following additional information.

RAI#1: On page 4 of the Attachment to the March 24, 2014 submittal the second paragraph discusses the Seabrook service history of finding a through-wall leak in the normally inaccessible portions of leak-off line 1-RC-89-1-2501-1". Describe the cause of this through-wall leak and discuss the actions taken to prevent recurrence.

NextEra Response:

Cause of the Through-wall Leak

The apparent cause of the through wall leak was stress corrosion cracking per the Apparent Cause Evaluation (AR 1812870) that was founded on material analysis performed on the removed piping section. The cause of the through wall leak initiation was not able to be determined from the material analysis.

Corrective Actions

- 1) Developed a design change (EC 277544) to replace the affected pipe segment.
- 2) Reviewed material analysis results and validated the apparent cause.
- 3) Replaced the pipe segment containing the through-wall leak under EC 277544
- 4) Performed visual inspection of outer O-ring leak-off line for boric acid
- 5) Step added to OS1001.06, "Pressurizer Bubble Formation", to open RC-V-147 (leak-off line isolation valve) prior to drawing a pressurizer bubble in September 2011. This step was added to prevent inadvertently leaving RC-V-147 closed during an RCS heat-up which would result in pressurization of the leak-off line.

Actions to Prevent Recurrence

In accordance with the Seabrook Station Reactor Coolant System Degradation Management Manual, Seabrook has been visually inspecting the alloy 600 portion of the reactor vessel leak off lines on an every other outage frequency since OR13. In addition, Seabrook performs boric acid walkdowns at the beginning and end of each refueling outage to inspect the accessible portions of the reactor vessel leak off lines for boric acid.

RAI#2: In the paragraph discussed in 1 above the licensee also states, "NextEra also commits to additional visual examination." The last sentence of this paragraph states the portions of the "inner and outer leak-off lines that are inaccessible for examination during the pressure test will receive a VT-2 examination by certified VT-2 examiners once every 10-Year ISI interval." As described in the "Applicable Code Requirement" section of your request Section XI, Table IWC-2500-1, Examination Category C-H, Item No. C7.10 requires the system leakage test with the VT-2 examination be performed once per inspection period (i.e., or three times per inspection interval). Elaborate on what additional exams are being performed and whether these are part of the alternative requested or an additional licensee commitment.

NextEra Response:

In lieu of the requirements of IWC-5221, NextEra proposes the following alternative examination: The accessible portions of the leak-off lines will be examined using the VT-2 visual examination method. The examination will be conducted with the cavity water level at 23 feet above the RPV flange for at least 4 hours. The examination will be performed each ISI period as required by the ASME Code. For sections of the leak-off lines that are inaccessible for direct VT-2 visual examination, examination of the surrounding area for evidence of leakage will be performed in accordance with ASME Code, paragraph IWA-5241 (b).

As a result of service history, NextEra proposes a licensee commitment to perform an additional inspection of the inaccessible sections of the leak-off lines. This inspection will remove a cavity seal ring hatch during refueling to provide access to the inaccessible area below the cavity seal ring to permit direct inspection of the leak-off line piping for evidence of leakage by observation of boric acid. This commitment is proposed on a frequency of once per ISI interval. This inspection method was successful in identifying the flaw in the inner leak-off line during refueling outage OR15 in October 2012 when boric acid was observed on the line.

RAI#3: Describe the Seabrook Station operating experience with regard to reactor pressure vessel flange O-ring leakage.

NextEra Response:

There has been one known instance of O-ring leakage at Seabrook Station. During heat-up following OR03 (Spring 1994), leakage was noted past the reactor vessel inner O-ring. Total leakage to the reactor coolant drain tank was estimated to be 0.25 gpm from all sources prior to isolating the inner O-ring leak-off line. The inner O-ring leak-off line was isolated and the plant operated during Cycle 4 relying on the outer O-ring.

RAI#4: What actions will be taken when using the proposed alternative to ensure the leak-off lines are clear of air prior to performance of the VT-2 examination?

NextEra Response:

The leak-off lines at the flange are at the high point of the piping system. The reactor cavity is progressively filled during flood-up for refueling. By design the leak-off lines progressively decrease in elevation from the reactor vessel flange to the Reactor Coolant Drain Tank without loop seals or high points for air to accumulate.

To provide additional assurance that the lines are clear of air, a flush of the leak-off lines will be performed after reactor cavity level has been raised above the reactor vessel flange and prior to performance of the VT-2 examination. Flushing the leak-off lines will also provide the additional benefit of preventing buildup of contaminants in the stagnant piping.

Supplemental Information Requested:

The relief request proposes that the alternative test will be performed after the refueling cavity has been filled to its minimum water level for refueling operations of 23 feet above the top of the RPV flange for at least four hours. If the leak-off line has a large through-wall crack, leakage would be evident under either a high-or low-pressure test condition. However, if the leak-off line has a very small and tight through-wall crack, the leakage may not be immediately evident under the proposed low pressure test condition.

NextEra Response:

During a refueling outage, the refueling cavity is normally kept filled for a period of approximately one week. The leak-off line visual examination, as proposed, would be performed at some time after the refueling cavity has been filled for an extended period. During OR16, which began on April 1, 2014, the refueling cavity is scheduled to be filled for approximately 2 days, then drained for approximately 1 day and then filled again for approximately 5 days. Flushing of the leak-off lines will precede the visual examination during OR 16.

Further, during OR15 the very small and tight through-wall leak in leak-off line 1-RC-89-1-2501-1 was identified by observation of boric acid residue. This residue was determined to be deposited during OR15 by chemical analysis of the boric acid. This indicates that the leakage occurred from the low pressure provided from filling the refueling pool. Identification of the very small and tight through-wall leak provides evidence that the proposed low test pressure is sufficient to demonstrate the leak tightness of the leak-off lines.

As the visual examination is looking for through-wall flaws, the proposed test is considered a reasonable and sufficient method, even for small leak rates that result from the proposed low test pressure, since the piping is exposed to the pressure for a number of days and has been demonstrated by previous operating experience.

Attachment 2 to SBK-L-14064

NextEra Energy Seabrook Commitment Regarding Relief Request No. 3IR-6
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NextEra Energy Seabrook Commitment Regarding Relief Request No. 3IR-6
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NextEra Energy Seabrook, LLC, commits to perform an additional inspection of the inaccessible sections of the leak-off lines by removing a cavity seal ring hatch during refueling to provide access to the inaccessible area below the cavity seal ring to permit direct inspection of the leak-off line piping for evidence of leakage by observation of boric acid. This commitment is proposed on a frequency of once per ISI interval.