



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

January 15, 2014

Mr. Kevin Walsh  
Site Vice President  
NextEra Energy Seabrook, LLC  
P.O. Box 300  
Seabrook, NH 03874

SUBJECT: REQUESTS FOR ADDITIONAL INFORMATION FOR THE REVIEW OF THE  
SEABROOK STATION, LICENSE RENEWAL APPLICATION – SET 20  
(TAC NO. ME4028)

Dear Mr. Walsh:

By letter dated May 25, 2010, NextEra Energy Seabrook, LLC, submitted an application pursuant to Title 10 of the *Code of Federal Regulations* Part 54 (10 CFR Part 54), to renew the operating license NPF-86 for Seabrook Station, for review by the U.S. Nuclear Regulatory Commission (NRC or the staff). The staff is reviewing the information contained in the license renewal application and has identified, in the enclosure, areas where additional information is needed to complete the review.

These requests for additional information were discussed with Edward Carley, and a mutually agreeable date for the response is within 60 days from the date of this letter. If you have any questions, please contact me at 301-415-1427 or e-mail [Richard.Plasse@nrc.gov](mailto:Richard.Plasse@nrc.gov).

Sincerely,

A handwritten signature in black ink, appearing to read "R. Plasse", is located below the "Sincerely," text.

Richard Plasse, Project Manager  
Projects Branch 1  
Division of License Renewal  
Office of Nuclear Reactor Regulation

Docket No. 50-443

Enclosure:  
Requests for Additional Information

cc w/encl: Listserv

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Dear Mr. Walsh:

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Sincerely,

*/RA/*

Richard Plasse, Project Manager  
Projects Branch 1  
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Letter to K. Walsh from Richard Plasse dated January 15, 2014

SUBJECT: REQUESTS FOR ADDITIONAL INFORMATION FOR THE REVIEW OF THE  
SEABROOK STATION, LICENSE RENEWAL APPLICATION (TAC NO.  
ME4028)

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SEABROOK STATION  
LICENSE RENEWAL APPLICATION  
REQUESTS FOR ADDITIONAL INFORMATION SET 20

**RAIs relating to the Alkali-Silica Reaction (ASR) Monitoring Program for the Seabrook  
Station License Renewal Application**

**RAI B.2.1.31A-1**

Background:

By letter dated November 2, 2012, in response to follow-up RAI B.2.1.28-3, the applicant stated that "the Containment Building, which is within the scope of the American Society of Mechanical Engineers (ASME) Section XI, Subsection IWL Aging Management Program (AMP), is within the scope of the plant-specific ASR Monitoring Program."

In the Program Description section of the September 13, 2013, revisions to the ASR Monitoring Program, the applicant stated "to manage these aging effects, the existing Structures Monitoring Program (SMP), B.2.1.31, has been augmented by this plant-specific ASR Monitoring Program, B.2.1.31A." The "scope of program" program element states that "License Renewal structures within the scope of this program include: Containment Building (including equipment hatch missile shield)..."

Issue:

The staff noted in license renewal application (LRA) Section B.2.1.28 that the ASME Section XI, Subsection IWL AMP will be used to manage aging of Primary Containment. It is clear that the results from routine inspections as prescribed by the SMP feed into the acceptance criteria of the ASR Monitoring Program; however, it is not clear that the results of the containment inservice inspection will feed directly into the ASR Monitoring Program. The ASR Monitoring Program description does not indicate whether, similar to the SMP, the applicant's ASME Section XI, Subsection IWL AMP will also be augmented by the ASR Monitoring Program to manage cracking due to expansion from reaction with aggregates. Additionally, the ASME Section XI, Subsection IWL AMP has not been revised to indicate that the program will be augmented by the ASR Monitoring Program.

Request:

Clarify whether the ASME Section XI, Subsection IWL AMP will also be augmented by the ASR Monitoring Program. If so, make the necessary revisions to the LRA including the plant-specific ASR Monitoring and ASME Section XI, Subsection IWL AMPs, their respective updated final safety analysis report (UFSAR) supplements, and the Tier 1 acceptance criteria of the ASR Monitoring Program to indicate that the IWL AMP is also augmented by the ASR Monitoring Program. If not, explain how the results of the ASME Section XI, Subsection IWL examination are incorporated into the ASR Monitoring Program.

ENCLOSURE

## **RAI B.2.1.31A-2**

### Background:

Plant-specific AMPs are reviewed against the criteria described in NUREG 1800, Revision 2, "Standard Review Plan for Review of License Renewal Applications for Nuclear Power Plants" (SRP-LR), Appendix A.1. The SRP-LR, Section A.1.2.3.4, states that for a condition monitoring program, when sampling is used to represent a larger population of structures and components, applicants should provide the basis for the inspection population and sample size.

SRP-LR, Section A.1.2.3.5, states that the "monitoring and trending" activities should provide a prediction of the extent of degradation and thus affect timely corrective or mitigative actions. This program element should describe how the data collected are evaluated, which includes an evaluation of the results against the acceptance criteria and a prediction regarding the rate of degradation in order to confirm that timing of the next scheduled inspection will occur before a loss of structure and component intended function.

The applicant's response to follow-up RAI B.1.31-7 stated that "trend data may be used in the future to adjust inspection frequency." This is reflected in The Program Description and the Operating Experience program elements of the ASR Monitoring AMP, which state that "trend data from...follow-up inspections will be used in determining the progression of ASR degradation and a basis for any change to the frequency of the inspection of ASR-affected areas."

### Issue:

LRA section B.2.1.31A, ASR Monitoring Program, submitted by letter dated May 16, 2012, states in the "monitoring and trending" program element that NextEra has performed a baseline inspection and assessed 131 accessible areas to date. The May 16, 2012, letter also states that monitoring of combined cracking index (CCI) and individual crack widths of at least 20 areas identified in the baseline inspection as having the largest combined cracking index will be performed at 6-month intervals.

The applicant's response to RAI B.2.1.31-7, by letter dated November 2, 2012, states that of the 131 locations, at least 20 areas that have the largest CCI will be quantitatively monitored at six month intervals to establish a rate of progression. The applicant's response states that these areas are those that currently meet the Tier 3 criteria, and that all other locations exhibiting the presence of ASR will be qualitatively or quantitatively monitored according to Tier 2 acceptance criteria on a 2 ½-year inspection frequency.

It is not clear if all areas that meet Tier 3 criteria will be inspected on a 6-month frequency, or if the 20+ areas referenced by the applicant that have the largest CCI are a sample size of a larger population of Tier 3 areas.

In addition, the ASR Monitoring Program and UFSAR supplement do not specify the inspection frequency for Tier 2 locations, nor the technical basis for the 2 ½-year inspection frequency. The AMP also does not include criteria for reducing the inspection frequency.

Request:

1. Explain whether the ASR Monitoring Program will monitor all affected areas meeting Tier 3 criteria on a 6-month inspection frequency, and revise the LRA and UFSAR supplement as necessary to reflect such clarification.
2. If the ASR Monitoring Program is intended to monitor 20 areas having the largest combined cracking index on a 6-month inspection frequency, provide the technical basis for both the selection of locations and sample size.
3. If all Tier 2 locations will be monitored on a 2 ½-year inspection frequency, revise the LRA and UFSAR supplement to reflect the inspection frequency, and provide the technical basis for the 2 ½-year inspection frequency.
4. Describe the criteria to be used to change the inspection frequency, and include the supporting technical basis.

**RAI B.2.1.31A-3**

Background:

The “acceptance criteria” program element of the applicant’s ASR Monitoring Program states that the program will use the thresholds stated in its report MPR-3727, Revision 0, “Seabrook Station: Impact of ASR on Concrete Structures and Attachments” as the acceptance criteria for evaluating ASR-affected structures. The acceptance criteria stated in that report is also described in the ASR Monitoring Program description. The acceptance criteria chart in the AMP program description indicates that there are two sub-categories of Tier 2 locations, one requiring “quantitative monitoring and trending”, one requiring only “qualitative monitoring”.

Issue:

The staff noted that the applicant has performed a baseline inspection and that structural evaluations were performed for locations exceeding the Tier 3 criteria, which require structural evaluations. For the remaining areas, the staff noted that those locations exceeding the Tier 2 criteria for monitoring and trending will be inspected using crack indexing measurements and trended to monitor the progression of ASR. However, it is not clear how new locations will be identified for crack indexing at the Tier 2 frequency. If some of the Tier 2 locations are “qualitatively monitored”, (i.e., visual examination with no crack indexing), the staff is unclear as to how the program will identify when new locations meet the threshold for quantitative monitoring.

Request:

If crack indexing will only be used for locations that exceed a CCI of .5 mm/m or individual crack width of .2 mm (Tier 2 criteria), state how the program will identify when a location is required to change from “qualitative monitoring” to “quantitative monitoring and trending”.

**RAI B.2.1.31A-4**

Background:

In its September 13, 2013, revision to the ASR Monitoring Program, the applicant stated “large scale destructive testing of concrete beams with accelerated ASR will be conducted to determine actual structural impact of ASR. Structural performance will be established based on correlation between the structural testing results and observed expansion levels/crack mapping. Large scale tests will confirm that parameters being monitored are appropriate to manage the effects of ASR and that the acceptance criteria used provides sufficient margin.” The September 13, 2013, letter also states, in LRA Section A.2.1.31A (UFSAR Supplement), that “large scale destructive testing of concrete beams with accelerated ASR confirms parameters being monitored are appropriate to manage the effects of ASR and that acceptance criteria used provides sufficient margin. Anchor bolt testing quantifies the impact of ASR on anchor capacity as a function of the severity of ASR degradation.”

Issue:

The UFSAR Supplement suggests that the large-scale destructive testing may provide the technical basis to show that the parameters monitored are appropriate; however, the objectives of the large-scale destructive testing described in the Program Description portion of the ASR Monitoring Program do not link the testing to the technical basis for the parameters being monitored. It is not clear whether the testing provides the technical basis for the parameters monitored, or if the testing is meant to be confirmatory in nature.

Request:

Provide further clarification regarding the role that the large-scale testing has, if any, in developing the technical basis for the ASR Monitoring Program.

**RAI B.2.1.31A-5**

Background:

Plant-specific AMPs are reviewed against the criteria described in SRP-LR, Appendix A.1. SRP-LR, Section A.1.2.3.3, states that the “parameters monitored or inspected” program element should identify the aging effects that the program manages and should provide a link between the parameter or parameters that will be monitored and how the monitoring of these parameters will ensure adequate aging management. It also states that for a condition monitoring program, the parameter monitored or inspected should be capable of detecting the presence and extent of aging effects.

SRP-LR, Section A.1.2.3.4, states that the discussion for the “detection of aging effects” program element should address how the program element would be capable of detecting or

identifying the occurrence of age-related degradation of an aging effect prior to a loss of structure and component intended function.

Issue:

The “parameters monitored or inspected” and “detection of aging effects” program elements of the applicant’s plant-specific ASR Monitoring Program indicate that cracking due to expansion from reaction with aggregates will be detected by visual inspection of cracking on the surface of the concrete. The applicant proposes to monitor this aging effect using a combined cracking index method and measuring individual crack widths at select locations on the surface of the concrete.

In its supplement dated September 13, 2013, the applicant provided its technical basis for using the crack index methodology in the “program description.” However; ASR causes concrete to expand in all directions, and the crack widths and number of cracks that appear on the surface of the concrete may not be indicative or bounding of the expansion in the out-of-plane, or transverse direction. This may be the case for many of the structures at Seabrook which do not include transverse reinforcement, and therefore expansion is not restrained by reinforcing steel. It is not clear that the parameters being monitored (i.e., combined cracking index and individual crack width in the “x-y” direction at the surface of the concrete) would provide sufficient information to appropriately monitor cracking due to expansion from reaction with aggregates, since the surface expansion of the concrete may not be indicative of the out-of-plane expansion.

Request:

1. Explain how the proposed crack index methodology provides sufficient information regarding cracking due to expansion from reaction with aggregates, when the proposed method only accounts for expansion in the in-plane direction, or
2. Propose a method or technique to monitor expansion in the out-of-plane direction, considering that many of the affected walls do not have transverse reinforcement.

**RAI B.2.1.31A-6**

Background:

Plant-specific AMPs are reviewed against the criteria described in SRP-LR, Appendix A.1. SRP-LR, Section A.1.2.3.4, states that the “detection of aging effects” program element should address how the program element would be capable of detecting or identifying the occurrence of age-related degradation or an aging effect prior to a loss of structure and component intended function. GALL Report AMPs XI.S1, ASME Section XI, Subsection IWL and XI.S6, Structures Monitoring Program, recommend (1) evaluating the acceptability of inaccessible areas when conditions exist in accessible areas that could indicate the presence of, or result in, degradation to such inaccessible areas, and (2) examining representative samples of the exposed portions of the below grade concrete, when excavated for any reason.

Issue:

By letter dated November 2, 2012, in its response to RAI B.2.1.31-9, the applicant stated that examination of inaccessible areas, such as buried concrete foundations, will be completed during opportunistic or focused inspections for buried concrete performed under the Maintenance Rule Program every 5 years. However, it is not clear that an assessment of



inaccessible areas has been performed as part of the baseline inspection to provide for adequate monitoring and trending of inaccessible areas.

The staff notes that the applicant has committed (Commitment No. 67) to perform a shallow core bore in an inaccessible area of the spent fuel pool concrete; however, it is not clear that the applicant will use this opportunity to identify and assess the potential presence of ASR in this area.

Request:

1. For inaccessible areas of concrete:
  - a. State whether an evaluation has been performed,
  - b. Provide a summary of the evaluation as recommended in the GALL Report, and
  - c. Provide the supporting technical basis.
2. Describe how the ASR Monitoring Program provides for adequate monitoring and trending for these inaccessible areas (i.e., will they be monitored the same as accessible areas).
3. Clarify if the shallow core being removed from the spent fuel pool will also be examined for concrete degradation due to ASR.