



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

May 23, 2011

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

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION RELATED TO THE REVIEW OF  
THE SEABROOK STATION LICENSE RENEWAL APPLICATION  
(TAC NO. ME4028)

Dear Mr. Freeman:

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, to renew Operating License NPF-86 for Seabrook Station, Unit 1, 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.

The request for additional information was discussed with Mr. Rick Cliche, and a mutually agreeable date for the response is June 27, 2011. If you have any questions, please contact me at 301-415-6459 or by e-mail at [michael.wentzel@nrc.gov](mailto:michael.wentzel@nrc.gov).

Sincerely,

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

Michael J. Wentzel, Project Manager  
Projects Branch 1  
Division of License Renewal  
Office of Nuclear Reactor Regulation

Docket No. 50-443

Enclosure:  
As stated

cc w/encl: Listserv

**SEABROOK STATION**  
**LICENSE RENEWAL APPLICATION**  
**REQUEST FOR ADDITIONAL INFORMATION SET 14**

**RAI B.1.4-1**

Background

Pursuant to 10 CFR 54.21(a)(3), a license renewal applicant is required to demonstrate that the effects of aging on structures and components subject to an aging management review are adequately managed so that their intended functions will be maintained consistent with the current licensing basis for the period of extended operation. Section 3.0.1 of NUREG-1800, "Standard Review Plan for Review of License Renewal Applications for Nuclear Power Plants," Revision 2 (SRP-LR), defines an aging management review as the identification of the materials, environments, aging effects, and aging management programs (AMPs) credited for managing the aging effects. In turn, SRP-LR Section A.1.2.3 defines an acceptable AMP as consisting of ten elements. Element 10, "Operating Experience," in part, is described in SRP-LR Section A.1.2.3.10, paragraph 1, as follows:

Consideration of future plant-specific and industry operating experience relating to aging management programs should be discussed. Reviews of operating experience by the applicant in the future may identify areas where aging management programs should be enhanced or new programs developed. An applicant should commit to a *future review of plant-specific and industry operating experience to confirm the effectiveness of its aging management programs or indicate a need to develop new aging management programs* [emphasis added]. This information should provide objective evidence to support the conclusion that the effects of aging will be managed adequately so that the structure and component intended function(s) will be maintained during the period of extended operation.

In addition, 10 CFR 54.21(d) requires the application to contain a final safety analysis report (FSAR) supplement. This supplement must contain a summary description of the programs and activities for managing the effects of aging and the evaluation of time-limited aging analyses for the period of extended operation.

Based on its review of the Seabrook Station, Unit 1 license renewal application (LRA), the staff determined that Section B.1.4 provides a general description of how the applicant gathered and considered operating experience in preparing its LRA, and Sections B.2.1.1 through B.2.1.37, B.2.2.1 through B.2.2.3, B.2.3.1, and B.2.3.2 summarize the specific operating experience considered for each AMP.

Issue

Although LRA Sections B.1.4, B.2.1.1 through B.2.1.37, B.2.2.1 through B.2.2.3, B.2.3.1, and B.2.3.2 describe how the applicant incorporated operating experience into its AMPs, they do not fully describe how the applicant will use future operating experience to ensure that the AMPs will remain effective for managing the aging effects during the period of extended operation. The main focus of these LRA sections is on how the applicant evaluated operating experience

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available at the time the application was prepared to justify the adequacy of its proposed AMPs. Some of the program descriptions contain statements indicating that future plant-specific and industry operating experience will be used to adjust the programs as appropriate. However, for the majority of the AMPs, it is not clear whether the applicant currently has or intends to develop procedures to monitor operating experience on an ongoing basis and use it to ensure the continued effectiveness of the AMPs. The LRA also does not state whether new AMPs will be developed, as necessary.

### Request

Describe the programmatic activities that will be used to continually identify aging issues, evaluate them, and, as necessary, enhance the AMPs or develop new AMPs for license renewal. In this description, address the following:

- Describe the sources of plant-specific and industry operating experience that will be monitored on an ongoing basis to identify potential aging issues. Indicate whether these plant-specific sources require monitoring: corrective action program, system health reports, licensee event reports (LERs), and the results of inspections performed under the AMPs. Similarly, indicate whether these industry sources require monitoring: vendor recommendations, revisions to industry standards on which the AMPs are based, LERs from other plants, NRC Bulletins, Generic Letters, Regulatory Issue Summaries, Information Notices, Regulatory Guides, License Renewal Interim Staff Guidance, and revisions to NUREG-1801, "Generic Aging Lessons Learned (GALL) Report." Describe the criteria used to classify a particular piece of information as aging related and outline the training provided to plant personnel so that they can adequately make such classifications.
- Describe how the identified aging issues will be further evaluated to determine their potential impact on the plant aging management activities. Indicate whether the affected structures and components and their materials, environments, aging effects, aging mechanisms, and AMPs are identified and documented consistent with the methods used to prepare the LRA. Describe how the results of AMP inspections will be considered to adjust the frequency of future inspections, establish new inspections, and ensure an adequate depth and breadth of component, material, environment, and aging effect combinations. Describe the records of these evaluations and indicate whether they will be maintained in an auditable and retrievable form.
- Describe the process and criteria used to ensure that the identified enhancements will be implemented in a timely manner.
- Describe the administrative controls over these programmatic activities.

Provide a summary description of these activities for the FSAR supplement required by 10 CFR 54.21(d). If enhancements for license renewal are necessary, also provide the updates for the FSAR supplement.

If such an operating experience program is determined to be unnecessary, provide a detailed explanation of the bases for this determination.

**RAI B.2.1.12-9**

**Background:**

By letter dated January 21, 2011, the staff issued RAI B.2.1.12-7 requesting that the applicant justify why the Closed-Cycle Cooling Water System Program, which is based on EPRI 1007820, "Closed Cooling Water Chemistry Guideline," does not need to manage microbiologically influenced corrosion (MIC) in the closed cycle cooling water systems. In its response dated February 18, 2011, the applicant stated that the GALL Report does not include any line items for PWRs that include the closed-cycle cooling water environment with MIC as an aging effect, and therefore, it did not consider MIC to be an aging effect requiring management. The applicant also stated that its review of plant-specific operating experience did not identify any MIC issues in the close-cycle cooling water systems, and reiterated that the Closed Cycle Cooling Water System Program does not manage loss of material due to MIC.

The staff noted that the applicant's closed cycle cooling systems for its diesel generator jacket water, fire pump diesel coolant, and control building air handling systems use glycol as a chemical treatment. The staff also noted that MIC is a stated concern in EPRI 1007820 for closed cycle cooling systems utilizing glycol formulations.

**Issue:**

The applicant did not provide a technical basis for why loss of material due to MIC does not need to be included as part of the Closed-Cycle Cooling Water System Program. The staff's position-and that stated in EPRI 1007820-is that MIC can occur in closed cycle cooling water systems. The staff further noted that the applicant's lack of plant-specific operating experience associated with MIC may be attributable to the existing additives that mitigate this mechanism. However, as noted in SRP-LR Section A.1.2.1, "Applicable Aging Effects," an aging effect should be identified as applicable for license renewal even if there is a prevention or mitigation program associated with that aging effect.

**Request:**

Please provide plant-specific data to demonstrate that the lack of problems with MIC at the site cannot be attributed to the existing chemical treatment in the closed cooling water systems or revise the Closed-Cycle Cooling Water System Program to include monitoring for MIC.

**Follow up RAI 3.2.2.2.4.2-1A (also applicable as follow up to RAI 3.3.2.2.2-1)**

**Background:**

By letter dated February 24, 2011, the staff issued RAI 3.2.2.2.4.2-1 concerning the further evaluation for reduction of heat transfer in stainless steel heat exchanger tubes exposed to treated water environment, and requested the technical basis for not managing reduction in heat transfer due to fouling as an aging effect. In its response dated March 22, 2011, the applicant stated that fouling of these components would only occur through the buildup of corrosion products, and since the Seabrook's treated borated water contains boron, a corrosion inhibitor, this was not a credible aging effect/mechanism. The response also stated this determination was based on plant and industry operating experience, in that, fouling has not been identified in

treated borated water environment which caused reduction of heat transfer in stainless steel heat exchanger tubes. The response further stated that Seabrook's conclusion is consistent with the NRC staff conclusions as stated in the Beaver Valley (Section 3.2.2.3.2) and Prairie Island (Section 3.2.2.2.4) Safety Evaluation Report (SER).

With regard to the cited SERs, the staff notes that in every instance where heat transfer was identified as an intended function in treated borated water for Engineered Safeguards and Auxiliary Systems, both of the associated LRAs had line items that addressed reduction in heat transfer as an aging effect requiring management. The staff also noted for Beaver Valley that in many of these instances, in addition to using the water chemistry AMP, a separate verification of the AMP's effectiveness was also performed.

Issue:

The RAI response stated that reduction in heat transfer is not an aging effect in a treated borated water environment, and stated that this determination was based on plant and industry operating experience. The staff notes that the SRP-LR clearly states that heat transfer functions should be considered for heat exchanger components because heat transfer may be a primary safety function. Furthermore, Branch Technical Position RLSB-1, for Applicable Aging Effects states that an aging effect should be identified as applicable for license renewal even if there is a prevention or mitigation program associated with that aging effect. The staff noted that Seabrook's LRA cited heat transfer as an intended function for heat exchanger components exposed to treated borated water in the containment building spray, residual heat removal, chemical and volume control, and spent fuel pool cooling systems; however, the LRA did not cite an aging management program to manage reduction of heat transfer.

In addition, the staff noted that all the LRA's submitted for pressurized water reactors (PWRs) in the last three years have included reduction in heat transfer as an aging effect requiring management in treated borated water for heat exchanger components.

Request:

Provide specific technical justification to demonstrate that heat exchanger tubes exposed to treated borated water which have an intended function of heat transfer need not include reduction of heat transfer as an aging effect requiring management. As part of the justification, include the plant-specific and industry operating experience cited in the response, showing that reduction in heat transfer had been specifically included as an attribute being investigated, and subsequently demonstrated not to be a credible aging effect/mechanism.

**RAI 3.3.2.3.4-1 Second Follow up**

Background:

By letter dated March 30, 2011, the staff issued RAI 3.3.2.3.4-1, the staff requested that the applicant state the chlorine concentration in the chlorination system and state why no aging effect will occur, or propose an aging management program for the fiberglass components in LRA Table 3.3.2-4. In its response dated April 22, 2011, the applicant stated that components in the chlorination system could be exposed to chlorine levels up to 5400 ppm. The applicant also stated that the components exposed to chlorine are constructed of fiberglass reinforced

vinyl ester or bisphenol-A polyester. The applicant further stated that based on input from the vendor of the components, given the system operating parameters, less than 65 °F, pH greater than 10, and no direct ultraviolet exposure; and plant-specific operating experience to date, there is no potential aging effect.

Issue:

Based on independent research, the staff does not agree with the applicant's assessment that there is no aging effect for these components. While the applicant's response to the RAI establishes that the materials are suitable for the design parameters of the system, proper design does not establish the basis for a 60-year life with no aging effects when the environment is an oxidizer and the material is an organic polymer.

Request:

Please state what inspections have been performed to establish a baseline of operating experience and what inspections will be conducted (e.g., quantity, type, frequency, timing) to manage aging of the fiberglass piping and fittings in the chlorination system exposed to raw water, including sodium hypochlorite.

**Follow-up RAI 4.3.3-1c**

Background:

In its response to RAI 4.3.3-1b dated April 22, 2011, the applicant revised LRA Section 4.3.3 indicating that "the effects of fatigue on these limiting locations will be monitored by cycle counting under the Seabrook Station Fatigue Monitoring Program". The applicant also revised the TLAA disposition basis to 10 CFR 54(c)(1)(i), that the Metal Fatigue of Reactor Coolant Pressure Boundary Program will monitor the number of design cycles assumed in the fatigue analysis to assure that these will not be exceeded.

Issue:

The staff noted that the aging management program for metal fatigue in LRA Appendix B is called Metal Fatigue of Reactor Coolant Pressure Boundary Program and not Fatigue Monitoring Program, as indicated by the applicant in the revised LRA Section 4.3.3. Furthermore, as indicated in SRP-LR Section 4.3.2.1.1.3, the applicant-proposed aging management program to address metal fatigue of the reactor coolant systems components should be 10 CFR 54.21(c)(1)(iii) and not 10 CFR 54(c)(1)(i), as indicated by the applicant in the revised TLAA disposition. The staff also noted that LRA Section A.2.4.2.2.2 is not updated to reflect the changes in LRA Section 4.3.3 due to the letter dated April 22, 2011.

Request:

- (1) Revise and identify the appropriate metal fatigue aging management program in LRA Section 4.3.3.
- (2) Revise the TLAA disposition in LRA Section 4.3.3 and Table 4.1-1.
- (3) Provide an updated UFSAR supplement section in LRA Section A.2.4.2.2.2 consistent with the changes in LRA Section 4.3.3.

May 23, 2011

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Site Vice President  
c/o Mr. Michael O'Keefe  
NextEra Energy Seabrook, LLC  
P.O. Box 300  
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*/RA/*

Michael J. Wentzel, Project Manager  
Projects Branch 1  
Division of License Renewal  
Office of Nuclear Reactor Regulation

Docket No. 50-443

Enclosure:  
As stated

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<b>NAME</b>	YEdmonds	MWentzel	MSpencer	DWrona	MWentzel
<b>DATE</b>	05/19/2011	05/19/2011	05/23/2011	05/23/2011	05/23/2011

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Letter to Paul Freeman from Michael J. Wentzel dated May 23, 2011

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              (TAC NO. ME4028)**

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