NEXTera® ENERGY
SEABROOK

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SBK-L-14086
Docket No. 50-443

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

Seabrook Station

Response to Requests for Additional Information for the Review of the Seabrook Station, License Renewal Application- SET 20 (TAC NO. ME4028) Relating to the Alkali-Silica Reaction (ASR) Monitoring Program

References:

1. NextEra Energy Seabrook, LLC letter SBK-L-10077, "Seabrook Station Application for Renewed Operating License," May 25, 2010. (Accession Number ML101590099)
2. NextEra Energy Seabrook, LLC letter SBK-L-12101, "Seabrook Station, NextEra Energy Seabrook License Renewal Application, Structures Monitoring Program Supplement-Alkali-Silica Reaction (ASR) Monitoring," May 16, 2012 (Accession Number ML12142A323).
3. NextEra Energy Seabrook, LLC letter SBK-L-12217, "Seabrook Station Response to Request for Additional Information, NextEra Energy Seabrook License Renewal Application, Request for Additional Information – Set 19," November 2, 2012 (Accession Number ML12312A017).
4. NextEra Energy Seabrook, LLC letter SBK-L-12247, "Clarification for Response to Follow up RAI B.2.1.31-1 Item (b)(2) provided in SBK-L-12217," November 20, 2012 (Accession Number ML12333A237).
5. NextEra Energy Seabrook, LLC letter SBK-L-13162, "NextEra Energy Seabrook License Renewal Application, Alkali-Silica Reaction (ASR) Monitoring Program," September 13, 2013 (Accession Number ML13261A145).
6. NRC Letter, Requests For Additional Information for the Review of the Seabrook Station, License Renewal Application- Set 20 (TAC NO. ME4028), January 15, 2014, (Accession Number ML13357A628)

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NRR

In Reference 1, NextEra Energy Seabrook, LLC (NextEra) submitted an application for a renewed facility operating license for Seabrook Station Unit 1 in accordance with the Code of Federal Regulations, Title 10, Parts 50, 51, and 54.

In Reference 2, NextEra provided changes to the License Renewal Application (LRA) associated with managing the effects of Alkali-Silica Reaction. A plant specific Alkali-Silica Reaction (ASR) Monitoring Program, B.2.1.31A, which augments the existing Structures Monitoring Program, B.2.1.31, was contained in this correspondence.

In References 3 and 4, NextEra provided supplemental information related to staff RAIs regarding the Alkali-Silica Reaction Monitoring Program.

In Reference 5 NextEra provided an updated Alkali-Silica Reaction (ASR) Monitoring Program.

Enclosure 1 contains NextEra responses to the information requested in Reference 6. Within these responses, changes to LRA Appendix A – Updated UFSAR Supplement, and Appendix B – Aging Management Programs associated with the Alkali-Silica Reaction Monitoring Program are provided. The changes are explained, and where appropriate to facilitate understanding, portions of the LRA are repeated with the change highlighted by strikethroughs for deleted text and bolded italics for inserted text. In some instances the entire text of a section has been replaced or added. In these cases a note is included in the introduction indicating the replacement of the entire text of the section.

Enclosure 2 provides a revised LRA Appendix A - Final Safety Report Supplement Table A.3, License Renewal Commitment List, updated to reflect the license renewal commitment changes made in NextEra correspondence to date. This letter contains one revised commitment (#67) and two new commitments (#83 and #84).

If there are any questions or additional information is needed, please contact Mr. Edward J. Carley, Engineering Supervisor - License Renewal, at (603) 773-7957.

If you have any questions regarding this correspondence, please contact Mr. Michael Ossing Licensing Manager, at (603) 773-7512.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on May15, 2014

Sincerely,

Dean Curtland
Site Vice President
NextEra Energy Seabrook, LLC

Enclosures:

Enclosure 1 - 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

Enclosure 2 - LRA Appendix A - Final Safety Report Supplement Table A.3, License Renewal Commitment List Updated to Reflect Changes to Date

cc:

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Enclosure 1 to SBK-L-14086

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.2.1.31 A-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.

NextEra Energy Seabrook Response to RAI B.2.1.31 A-1

In response to RAI B.2.1.31 A-1, the following changes have been made to the LRA.

1) The following new paragraphs have been added to the end of Program Description of Section B.2.1.28, ASME Section XI, Subsection IWL Program, as follows:

The Containment Building, which is within the scope of the ASME Section XI, Subsection IWL, is also within the scope of the plant specific Alkali-Silica Reaction Monitoring Program. To manage the aging effects of cracking due to expansion and reaction with aggregates in concrete structures, the existing ASME Section XI, Subsection IWL Program, B.2.1.28, and the Structures Monitoring Program, B.2.1.31, have been augmented by the plant specific Alkali-Silica Reaction Monitoring Program, B.2.1.31A.

Areas that have no indication of pattern cracking or water ingress (i.e. no visual presence of ASR) are considered acceptable (Tier 1). A Combined Cracking Index (CCI) of less than the 1.0 mm/m or Individual Crack Width of less than 1.0 mm can be deemed Acceptable with Deficiencies (Tier 2). Areas with deficiencies determined to be acceptable with further review are trended for evidence of further degradation. A CCI of 1.0 mm/m or greater, or an Individual Crack Width of 1.0 mm or greater are deemed Unacceptable and require further evaluation (Tier 3).

Tier 2 and Tier 3 locations are monitored and trended in accordance with the plant specific Alkali-Silica Reaction Monitoring Program, B.2.1.31A.

2) The 1st and 2nd paragraphs of the Conclusion Section of the Program Description for Section B.2.1.31A, Alkali-Silica Reaction Monitoring Program, have been revised as follows:

Conclusion

To manage the aging effects of cracking due to expansion and reaction with aggregates in concrete structures, the existing Structures Monitoring Program, B.2.1.31, ***and ASME Section XI, Subsection IWL Program, B.2.1.28 have*** ~~has~~ been augmented by this plant specific Alkali-Silica Reaction (ASR) Monitoring Program, B.2.1.31A. The ASR Monitoring Program will be structured according to the guidelines in ACI 349.3R, "Evaluation of Existing Nuclear Safety-Related Concrete Structures."

Routine inspections are performed by the Structures Monitoring Program, B.2.1.31 and the ASME Section XI, Subsection IWL Program, B.2.1.28. Areas that have no indication of pattern cracking or water ingress (i.e. no visual presence of ASR) are considered acceptable (Tier 1). A Combined Cracking Index (CCI) of less than the 1.0 mm/m and Individual Crack Width of less than 1.0 mm can be deemed Acceptable with Deficiencies

(Tier 2). Areas with deficiencies determined to be acceptable with further review are trended for evidence of further degradation. A CCI of 1.0 mm/m or greater, or an Individual Crack Width of 1.0 mm or greater are deemed Unacceptable and require further evaluation ***(Tier 3)***.

Tier 2 and Tier 3 locations are monitored and trended in accordance with the Plant Specific Alkali-Silica Reaction Monitoring Program, B.2.1.31A.

3) A new paragraph has been added to the end of Program Description for ASME Section XI, Subsection IWL, A.2.1.28 as follows:

To manage the aging effects of cracking due to expansion and reaction with aggregates in concrete structures, the existing ASME Section XI, Subsection IWL Program, A.2.1.28, and the Structures Monitoring Program, A.2.1.31, have been augmented by the plant specific Alkali-Silica Reaction (ASR) Monitoring Program, A.2.1.31A.

4) The 3rd paragraph of the Program Description for Section A.2.1.31A, Alkali-Silica Reaction Monitoring Program, has been revised as follows:

To manage the aging effects of ASR in concrete structures, the existing Structures Monitoring Program, ***A.2.1.31, and ASME Section XI, Subsection IWL Program, A.2.1.28 have*** ~~has~~ been augmented by this plant specific Alkali-Silica Reaction (ASR) Monitoring Program. The ASR Monitoring Program is structured according to the guidelines in ACI 349.3R, "Evaluation of Existing Nuclear Safety-Related Concrete Structures".

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 8.2.1.31A, 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.

NextEra Energy Seabrook Response to RAI B.2.1.31A-2

1. All areas meeting the Tier 3 structures monitoring criteria will be monitored on a 6 month frequency.

2. The reference to performing monitoring of 20 areas with the greatest Combined Crack Indexing (CCI) on a 6 month basis was initially established as a minimum sample to provide sufficient data to monitor the progression of ASR. Since all areas meeting the Tier 3 structures monitoring criteria are monitored on a 6 month frequency, the original reference to monitoring 20 locations with the greatest CCI is bounded by the larger population of the currently identified Tier 3 areas. Any additional areas identified meeting the Tier 3 structures monitoring criteria will be inspected on a six month interval.

3. All locations meeting the Tier 2 structures monitoring criteria will be monitored on a 2.5 year frequency. The basis for establishing 2.5 years as the Tier 2 structures monitoring criteria interval was to establish a median inspection interval between the Tier 3 structures monitoring criteria frequency of 6 months and the Tier 1 structures monitoring criteria of 5 years. Monitoring of ASR progression to date has been in place for approximately 2 years and the observed slow progression of ASR in Tier 3 and three (3) Tier 2 monitoring locations provides additional validation that this period of time is adequate to ensure structural integrity is maintained.

4. Currently there are no plans to change the inspection frequency for structures monitoring of ASR progression. In the event ASR monitoring results indicate a need to amend either the monitoring program acceptance criteria or the frequency of monitoring, NextEra will take such action under the Operating Experience element of the Alkali-Silica Reaction Monitoring Program.

Based on the above discussion, the following changes have been made to the LRA.

1. The last paragraph of Element 5 (Monitoring and Trending) of LRA Section B.2.1.31A, Alkali-Silica Reaction Monitoring Program has been revised as follows:

   Deficiencies being repaired or trended are subject to follow-up inspections of increased frequency. Newly discovered areas exhibiting visual signs of ASR are identified during routinely performed Structural Monitoring Program inspections and documented as deficiencies. Deficiencies are reviewed in accordance with the Structural Monitoring Program and established guidelines of ACI 349.3R, *"Structural Condition Assessment of Buildings."* ***All locations meeting Tier 3 criteria will be monitored on a 6 month frequency. All locations meeting the Tier 2 structures monitoring criteria will be monitored on a 2.5 year frequency. The basis for establishing 2.5 years as the Tier 2 structures monitoring***

criteria interval was to establish a median inspection interval between the Tier 3 structures monitoring criteria frequency of 6 months and the Tier 1 structures monitoring criteria of 5 years. Monitoring of ASR progression to date has been in place for approximately 2 years and the observed slow progression of ASR in Tier 3 and three (3) Tier 2 monitoring locations provides additional validation that this period of time is adequate. In the event ASR monitoring results indicate a need to amend either the monitoring program acceptance criteria or the frequency of monitoring, NextEra will take such action under the Operating Experience element of the Alkali-Silica Reaction Monitoring Program.

2. The fifth paragraph of LRA Section A.2.1 31A (Alkali-Silica Reaction Monitoring Program) has been revised as follows:

A Combined Cracking Index (CCI) and Individual Crack Width criteria are established as thresholds at which structural evaluation is necessary. The Cracking Index is the summation of the crack widths on the horizontal or vertical sides of a 0.5m (20-inch) by 0.5m (20-inch) square on the ASR-affected concrete surface. The horizontal and vertical Cracking Indices are averaged to obtain a Combined Cracking Index (CCI) for each area of interest. A CCI of less than the 1.0 mm/m and Individual Crack Width of less than 1.0 mm can be deemed acceptable with deficiencies ***(Tier 2)***. Deficiencies determined to be acceptable with further review are trended for evidence of further degradation. A CCI of 1.0 mm/m or greater, or an Individual Crack Width of 1.0 mm or greater requires structural evaluation ***(Tier 3)***. ***All locations meeting Tier 3 criteria will be monitored on a 6 month inspection frequency. All locations meeting the Tier 2 structures monitoring criteria will be monitored on a 2.5 year frequency. In the event ASR monitoring results indicate a need to amend either the monitoring program acceptance criteria or the frequency of monitoring, NextEra will take such action under the Operating Experience element of the Alkali-Silica Reaction Monitoring Program.***

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".

NextEra Energy Seabrook Response to RAI B.2.1.31A-3

Per the Structures Monitoring Program (SMP), B.2.1.31, which has been augmented by the plant specific Alkali-Silica Reaction Monitoring Program, B.2.1.31A, visual inspections are initially performed and the Tier 2 qualitative criteria are applied. If there is no visual presence of ASR (e.g. pattern crack or water ingress), the location is considered Tier 1 and no further evaluation is performed. However, Tier 1 locations continue to be monitored on a five year basis. The results of the inspections are documented for trending and future inspections per the SMP.

In areas that have qualitative indications of pattern cracking and water ingress, a crack inspection grid is laid out and measurements are taken and the Tier 2 quantitative criteria are applied (e.g. 0.5 mm/m or greater or individual crack width 0.2 mm or greater). Based on the crack measurements, the area may be added to the list of Tier 2 areas subject to quantitative re-inspection on a 2.5 year basis.

The change from qualitative monitoring to quantitative monitoring occurs when the width of the pattern cracking equals or is greater than 0.05 mm. Concrete crack widths less than 0.05 mm cannot be accurately measured and reliably repeated with standard, visual inspection equipment.

Based on the above discussion, a new paragraph has been added to the end of the table provided in the program description of the Alkali-Silica Reaction Monitoring Program, B.2.1.31A, as follows:

Structural Monitoring Program Categories	Recommendation for Individual Concrete Components	Combined Cracking Index CCI	Individual Crack Width
Unacceptable (requires further evaluation)	Structural Evaluation	1.0 mm/m or greater	1.0 mm or greater
Acceptable with Deficiencies	Quantitative Monitoring and Trending	0.5 mm/m or greater	0.2 mm or greater
	Qualitative Monitoring	Any area with indications of pattern cracking or water ingress	
Acceptable	Routine inspection as prescribed by Structures Monitoring Program	Area has no indications of pattern cracking or water ingress – No visual presence of ASR	

Visual inspections are initially performed and the Tier 2 qualitative criteria are applied. If there is no visual presence of ASR (e.g. pattern crack or water ingress), the location is considered Tier 1 and no further evaluation is performed. However, Tier 1 locations continue to be monitored on a five year basis. The results of the inspections are documented for trending and future inspections per the Structures Monitoring Program.

In areas that have qualitative indications of pattern cracking and water ingress, a crack inspection grid is laid out and measurements are taken and the Tier 2 quantitative criteria are applied (e.g. 0.5 mm/m or greater or individual crack width 0.2 mm or greater). Based on the crack measurements, the area may be added to the list of Tier 2 areas subject to quantitative re-inspection on a 2.5 year basis.

The change from qualitative monitoring to quantitative monitoring occurs when the width of the pattern cracking equals or is greater than 0.05 mm. Concrete crack widths less than 0.05 mm cannot be accurately measured and reliably repeated with standard, visual inspection equipment.

RAI B.2.1.31 A-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.

NextEra Energy Seabrook Response to RAI B.2.1.31 A-4

The large scale testing program does not have a role in establishing the technical basis for developing the Alkali-Silica Reaction Monitoring Program. The technical basis for the Alkali-Silica Reaction Monitoring Program is identified in the section of the Program entitled "Industry Expert Engagement." The large scale testing program is confirmatory in nature. It is being performed to provide confirmation that the monitoring parameters established within the Structures Monitoring Program as augmented by the Alkali-Silica Reaction (ASR) Monitoring Program are appropriate for monitoring ASR progression. The in progress large scale testing program involves the fabrication of test specimens with similar reinforcement details, concrete strength and concrete materials to Seabrook plant structures, but with a concrete admixture and controlled curing conditions designed to accelerate ASR progression. Several parameters are being monitored in the test specimens to track the levels of ASR progression. These parameters include direct physical measurement of expansion in three directions, Combined Crack Indexing (CCI) measurement in the in-plane direction, petrographic examinations, and materials property testing. Monitoring of these parameters has two main objectives. The first is to track ASR progression so test specimens can be tested at different levels of concrete expansion resulting from ASR. Secondly, these monitoring parameters will be used to confirm the correlation between levels of ASR progression in the test specimens and those ASR progression levels observed in plant structures. The monitoring parameters that provide the best correlation with ASR progression will be used to correlate the test specimens with the impacted plant areas such that structural impact at different ASR progression levels can be confirmed. The detailed parameter monitoring will also provide confirmation of the various monitoring parameters that have been implemented within Seabrook Stations Structures Monitoring Program as augmented by the Alkali-Silica Reaction (ASR) Monitoring Program. Seabrook Station is currently monitoring expansion in the in-plane direction and is evaluating instrumentation and developing

techniques for monitoring out of plane expansion. The current Structures Monitoring Program and Aging Management Program (AMP) for monitoring ASR progression utilize a crack indexing technique or CCI (Combined Crack Indexing) for monitoring the progression of ASR.

Based upon preliminary review of large scale testing results to date, the test specimens appear to confirm that CCI monitoring is an effective method of monitoring areas with no ASR indication, monitoring areas that are starting to develop a progression of ASR and identifying areas that need structural evaluation and more frequent monitoring. In the event these test results indicate a need to amend either the monitoring program acceptance criteria or the frequency of monitoring, NextEra will take such action under the Operating Experience element of the ASR Monitoring Program.

Based on the above discussion, the following changes have been made to the LRA.

1. The last paragraph of the Program Description for Section A.2.1.31A, Alkali-Silica Reaction Monitoring Program has been revised as follows:

   The Alkali-Silica Reaction Monitoring Program is based on published studies describing screening methods to determine when structural evaluations of ASR affected concrete are appropriate. Confirmatory large scale destructive testing of concrete beams with accelerated ASR ~~confirms~~ ***are being performed to confirm that*** parameters being monitored are appropriate to manage the effects of ASR and that acceptance criteria used provides sufficient margin. Anchor bolt testing ***will*** quantify ~~ies~~ the impact of ASR on anchor capacity as a function of the severity of ASR degradation. ***Anchor bolt testing completed as of April 2014 has determined that there is no decrease in anchor failure load in test specimens that represent the current levels of ASR observed in plant structures.***

2. The first sentence of the "Large Scale Testing" in the program description of the Alkali-Silica Reaction Monitoring Program, B.2.1.31A, has been revised as follows:

   While the monitoring program action levels are currently based on the generic information available in the literature, a full scale testing program has been undertaken to ~~refine the impacts for structures similar to those impacted by ASR at Seabrook Station~~ ***confirm that parameters being monitored are appropriate to manage the effects of ASR and that acceptance criteria used provides sufficient margin.***

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.

NextEra Energy Seabrook Response to RAI B.2.1.31A-5

1. The current Structures Monitoring Program as augmented by the Alkali-Silica Reaction Monitoring Program utilizes a crack indexing technique or CCI (Combined Crack Indexing) for monitoring alkali-silica reaction (ASR) progression. As demonstrated by data from the Federal Highway Administration, crack indexing provides a readily available surrogate for monitoring expansion in the planer directions (x and y) of concrete surfaces. The actual total expansion of the concrete in any direction is a combination of strain in the un-cracked concrete and the summation of crack widths in the measured direction. The magnitude of ASR expansion (strain) in a reinforced direction will be smaller than in a non-reinforced direction. Additionally a larger number of smaller cracks would be anticipated in the restrained direction relative to a smaller number of larger width cracks in an unrestrained direction for the same amount of ASR progression.

   Based upon a preliminary review of large scale testing results to date, the test specimens appear to confirm CCI as an appropriate monitoring parameter for ASR progression as discussed in SBK-L-13162 (Reference 5). Observations of the test specimens show that CCI correlates well with the expansion in the x and y directions (in-plane with the reinforcing steel) as ASR progresses. However, expansion in the test specimens in x and y plane appears to level off over time and is smaller in magnitude than the out-of-plane direction. Several parameters are being monitored in the test specimens to track ASR progression. The test specimens continue to generate information for other parameters including out-of-plane direction expansion, material property changes (e.g., modulus) and the results will be used to confirm and adjust monitoring parameters in accordance with Element 10, Operating Experience), of the Alkali-Silica Reaction Monitoring Program. To date in accelerated-ASR test specimens, the measured CCI values are correlating with expansion in the rebar constrained directions (in-plane) as expected.

2. To monitor expansion due to ASR in the out-of-plane direction, NextEra will install instrumentation in representative sample areas of structures designed with two-way reinforcement. The instrumentation will be selected based on a review of the accuracy and reliability of different instruments as well as the best technique for installing these instruments in plant structures. Expansion data from deep pins installed in test specimens will be used to correlate with out-of-plane expansion measurements from instruments to be installed in plant structures. If an additional monitoring parameter in the out-of-plane direction is determined to be necessary as part of the Alkali-Silica Reaction Monitoring Program, NextEra will enhance the Alkali-Silica Reaction Monitoring Program using the instrument and pin expansion data to establish acceptance criteria and monitoring frequencies

for monitoring out of plane expansion. NextEra will take such action under the Operating Experience element of the Alkali-Silica Reaction Monitoring Program.

Based on the above discussion, in LRA Section A-3 (License Renewal Commitment List), a new commitment #83 has been added as follows:

No.	PROGRAM or TOPIC	COMMITMENT	UFSAR LOCATION	SCHEDULE
83.	***Alkali-Silica Reaction Monitoring***	***Install instrumentation in representative sample areas of structures to monitor expansion due to alkali-silica reaction in the out-of-plane direction. Evaluate instrument and pin expansion data under the Operating Experience Element of the Alkali-Silica Reaction Monitoring Program to determine whether there is a need to enhance the program to monitor expansion in the out-of-plane direction. If the evaluation concludes that out-of-plane monitoring is necessary, establish acceptance criteria and monitoring frequencies for expansion in the out-of-plane direction using the instrument and pin expansion data.***	*A.2.1.31A*	***Prior to the period of extended operation.***

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.

NextEra Energy Seabrook Response to RAI B.2.1.31A-6

1. No separate evaluation has been performed for inaccessible areas. However, inspection of inaccessible areas of concrete will be performed during opportunistic or focused inspections for buried concrete performed under the Maintenance Rule every 5 years. These inspections will establish the baseline inspection for future monitoring and trending of inaccessible areas of concrete. The concrete materials used to produce the concrete placed in inaccessible areas were the same as the concrete materials used to produce the concrete placed in accessible areas. Thus, the performance and aging of inaccessible concrete would be the same as the performance and aging of accessible concrete.

2. The same three Tier evaluation process and acceptance criteria specified in the ASR Monitoring Program will be applied during the initial assessment of inaccessible areas of concrete. These areas will also be monitored and trended at the same frequency as the accessible areas as specified in the ASR Monitoring Program. In other words, if a Tier 2 or 3 ASR location is identified during an opportunistic or focused inspection of an inaccessible area, the re-inspection of this ASR location would be every 2.5 years for a Tier 2 location and every 6 months for a Tier 3 location.

3. Yes. The concrete core sample removed from the Spent Fuel Pool will also be subjected to petrographic examination for concrete degradation due to ASR per ASTM Standard Practice C856, *Petrographic Examination of Hardened Concrete.*

Based on the above discussion, the following changes have been made to the LRA:

1. A new paragraph has been added to the end of Element 5 (Monitoring and Trending) Section of B.2.1.31A, Alkali-Silica Reaction Monitoring Program, as follows:

Inspection of inaccessible areas of concrete will be performed during opportunistic or focused inspections for buried concrete performed under the Maintenance Rule every 5 years. These inspections will establish the baseline inspection for future monitoring and trending of inaccessible areas of concrete. The concrete materials used to produce the concrete placed in inaccessible areas were the same as the concrete materials used to produce the concrete placed in accessible areas. Thus, the performance and aging of inaccessible concrete would be the same as the performance and aging of accessible concrete. The same three Tier evaluation process and acceptance criteria specified in the ASR Monitoring Program will be applied during the initial assessment of inaccessible areas of concrete. These areas will also be monitored and trended at the same frequency as the accessible areas as specified in the ASR Monitoring Program. In other words, if a Tier 2 or 3 ASR location is identified during an opportunistic or focused inspection of an inaccessible area, the re-inspection of this ASR location would be every 2.5 years for a Tier 2 location and every 6 months for a Tier 3 location.

2. In LRA Section A-3 (License Renewal Commitment List), commitment #67 has been revised as follows:

No.	PROGRAM or TOPIC	COMMITMENT	UFSAR LOCATION	SCHEDULE
67.	Structures Monitoring Program	Perform one shallow core bore in an area that was continuously wetted from borated water to be examined for concrete degradation and also expose rebar to detect any degradation such as loss of material. ***The removed core will also be subjected to petrographic examination for concrete degradation due to ASR per ASTM Standard Practice C856.***	A.2.1.31	No later than December 31, 2015.

3. In LRA Section A-3 (License Renewal Commitment List), a new commitment #84 has been added as follows:

No.	PROGRAM or TOPIC	COMMITMENT	UFSAR LOCATION	SCHEDULE
84.	***ASME Section XI, Subsection IWL***	***Evaluate the acceptability of inaccessible areas for structures within the scope of ASME Section XI, Subsection IWL Program.***	***A.2.1.28***	***Prior to the period of extended operation.***

Enclosure 2 to SBK-L-14086

LRA Appendix A - Final Safety Report Supplement Table A.3,
License Renewal Commitment List Updated to Reflect Changes to Date

A.3 LICENSE RENEWAL COMMITMENT LIST

No.	PROGRAM or TOPIC	COMMITMENT	UFSAR LOCATION	SCHEDULE
1.	PWR Vessel Internals	An inspection plan for Reactor Vessel Internals will be submitted for NRC review and approval.	A.2.1.7	Program to be implemented prior to the period of extended operation. Inspection plan to be submitted to NRC not later than 2 years after receipt of the renewed license or not less than 24 months prior to the period of extended operation, whichever comes first.
2.	Closed-Cycle Cooling Water	Enhance the program to include visual inspection for cracking, loss of material and fouling when the in-scope systems are opened for maintenance.	A.2.1.12	Prior to the period of extended operation.
3.	Inspection of Overhead Heavy Load and Light Load (Related to Refueling) Handling Systems	Enhance the program to monitor general corrosion on the crane and trolley structural components and the effects of wear on the rails in the rail system.	A.2.1.13	Prior to the period of extended operation.
4.	Inspection of Overhead Heavy Load and Light Load (Related to Refueling) Handling Systems	Enhance the program to list additional cranes for monitoring.	A.2.1.13	Prior to the period of extended operation.
5.	Compressed Air Monitoring	Enhance the program to include an annual air quality test requirement for the Diesel Generator compressed air sub system.	A.2.1.14	Prior to the period of extended operation.
6.	Fire Protection	Enhance the program to perform visual inspection of penetration seals by a fire protection qualified inspector.	A.2.1.15	Prior to the period of extended operation.
7.	Fire Protection	Enhance the program to add inspection requirements such as spalling, and loss of material caused by freeze-thaw, chemical attack, and reaction with aggregates by qualified inspector.	A.2.1.15	Prior to the period of extended operation.

8.	Fire Protection	Enhance the program to include the performance of visual inspection of fire-rated doors by a fire protection qualified inspector.	A.2.1.15	Prior to the period of extended operation.
9.	Fire Water System	Enhance the program to include NFPA 25 (2011 Edition) guidance for "where sprinklers have been in place for 50 years, they shall be replaced or representative samples from one or more sample areas shall be submitted to a recognized testing laboratory for field service testing".	A.2.1.16	Prior to the period of extended operation.
10.	Fire Water System	Enhance the program to include the performance of periodic flow testing of the fire water system in accordance with the guidance of NFPA 25 (2011 Edition).	A.2.1.16	Prior to the period of extended operation.
11.	Fire Water System	Enhance the program to include the performance of periodic visual or volumetric inspection of the internal surface of the fire protection system upon each entry to the system for routine or corrective maintenance to evaluate wall thickness and inner diameter of the fire protection piping ensuring that corrosion product buildup will not result in flow blockage due to fouling. Where surface irregularities are detected, follow-up volumetric examinations are performed. These inspections will be documented and trended to determine if a representative number of inspections have been performed prior to the period of extended operation. If a representative number of inspections have not been performed prior to the period of extended operation, focused inspections will be conducted. These inspections will be performed within ten years prior to the period of extended operation.	A.2.1.16	Within ten years prior to the period of extended operation.
12.	Aboveground Steel Tanks	Enhance the program to include components and aging effects required by the Aboveground Steel Tanks and to perform visual, surface, and volumetric examinations of the outside and inside surfaces for managing the aging effects of loss of material and cracking.	A.2.1.17	Prior to the period of extended operation. Within 10 years prior to the period of extended operation.
13.	Aboveground Steel Tanks Fire Water System	Enhance the program to perform exterior inspection of the fire water storage tanks annually for signs of degradation and include an ultrasonic inspection and evaluation of the internal bottom surface of the two Fire Protection Water Storage Tanks per the guidance provided in NFPA 25 (2011 Edition).	A.2.1.17 A.2.1.16	Within ten years prior to the period of extended operation.

14.	Fuel Oil Chemistry	Enhance program to add requirements to 1) sample and analyze new fuel deliveries for biodiesel prior to offloading to the Auxiliary Boiler fuel oil storage tank and 2) periodically sample stored fuel in the Auxiliary Boiler fuel oil storage tank.	A.2.1.18	Prior to the period of extended operation.
15.	Fuel Oil Chemistry	Enhance the program to add requirements to check for the presence of water in the Auxiliary Boiler fuel oil storage tank at least once per quarter and to remove water as necessary.	A.2.1.18	Prior to the period of extended operation.
16.	Fuel Oil Chemistry	Enhance the program to require draining, cleaning and inspection of the diesel fire pump fuel oil day tanks on a frequency of at least once every ten years.	A.2.1.18	Prior to the period of extended operation.
17.	Fuel Oil Chemistry	Enhance the program to require ultrasonic thickness measurement of the tank bottom during the 10-year draining, cleaning and inspection of the Diesel Generator fuel oil storage tanks, Diesel Generator fuel oil day tanks, diesel fire pump fuel oil day tanks and auxiliary boiler fuel oil storage tank.	A.2.1.18	Prior to the period of extended operation.
18.	Reactor Vessel Surveillance	Enhance the program to specify that all pulled and tested capsules, unless discarded before August 31, 2000, are placed in storage.	A.2.1.19	Prior to the period of extended operation.
19.	Reactor Vessel Surveillance	Enhance the program to specify that if plant operations exceed the limitations or bounds defined by the Reactor Vessel Surveillance Program, such as operating at a lower cold leg temperature or higher fluence, the impact of plant operation changes on the extent of Reactor Vessel embrittlement will be evaluated and the NRC will be notified.	A.2.1.19	Prior to the period of extended operation.
20.	Reactor Vessel Surveillance	Enhance the program as necessary to ensure the appropriate withdrawal schedule for capsules remaining in the vessel such that one capsule will be withdrawn at an outage in which the capsule receives a neutron fluence that meets the schedule requirements of 10 CFR 50 Appendix H and ASTM E185-82 and that bounds the 60-year fluence, and the remaining capsule(s) will be removed from the vessel unless determined to provide meaningful metallurgical data.	A.2.1.19	Prior to the period of extended operation.
21.	Reactor Vessel Surveillance	Enhance the program to ensure that any capsule removed, without the intent to test it, is stored in a manner which maintains it in a condition which would permit its future use, including during the period of extended operation.	A.2.1.19	Prior to the period of extended operation.

22.	One-Time Inspection	Implement the One Time Inspection Program.	A.2.1.20	Within ten years prior to the period of extended operation.
23.	Selective Leaching of Materials	Implement the Selective Leaching of Materials Program. The program will include a one-time inspection of selected components where selective leaching has not been identified and periodic inspections of selected components where selective leaching has been identified.	A.2.1.21	Within five years prior to the period of extended operation.
24.	Buried Piping And Tanks Inspection	Implement the Buried Piping And Tanks Inspection Program.	A.2.1.22	Within ten years prior to entering the period of extended operation
25.	One-Time Inspection of ASME Code Class 1 Small Bore-Piping	Implement the One-Time Inspection of ASME Code Class 1 Small Bore-Piping Program.	A.2.1.23	Within ten years prior to the period of extended operation.
26.	External Surfaces Monitoring	Enhance the program to specifically address the scope of the program, relevant degradation mechanisms and effects of interest, the refueling outage inspection frequency, the inspections of opportunity for possible corrosion under insulation, the training requirements for inspectors and the required periodic reviews to determine program effectiveness.	A.2.1.24	Prior to the period of extended operation.
27.	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components	Implement the Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program.	A.2.1.25	Prior to the period of extended operation.
28.	Lubricating Oil Analysis	Enhance the program to add required equipment, lube oil analysis required, sampling frequency, and periodic oil changes.	A.2.1.26	Prior to the period of extended operation.
29.	Lubricating Oil Analysis	Enhance the program to sample the oil for the Reactor Coolant pump oil collection tanks.	A.2.1.26	Prior to the period of extended operation.
30.	Lubricating Oil Analysis	Enhance the program to require the performance of a one-time ultrasonic thickness measurement of the lower portion of the Reactor Coolant pump oil collection tanks prior to the period of extended operation.	A.2.1.26	Prior to the period of extended operation.
31.	ASME Section XI, Subsection IWL	Enhance procedure to include the definition of "Responsible Engineer".	A.2.1.28	Prior to the period of extended operation.

32.	Structures Monitoring Program	Enhance procedure to add the aging effects, additional locations, inspection frequency and ultrasonic test requirements.	A.2.1.31	Prior to the period of extended operation.
33.	Structures Monitoring Program	Enhance procedure to include inspection of opportunity when planning excavation work that would expose inaccessible concrete.	A.2.1.31	Prior to the period of extended operation.
34.	Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements	Implement the Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements program.	A.2.1.32	Prior to the period of extended operation.
35.	Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Used in Instrumentation Circuits	Implement the Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Used in Instrumentation Circuits program.	A.2.1.33	Prior to the period of extended operation.
36.	Inaccessible Power Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements	Implement the Inaccessible Power Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements program.	A.2.1.34	Prior to the period of extended operation.
37.	Metal Enclosed Bus	Implement the Metal Enclosed Bus program.	A.2.1.35	Prior to the period of extended operation.
38.	Fuse Holders	Implement the Fuse Holders program.	A.2.1.36	Prior to the period of extended operation.

39.	Electrical Cable Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements	Implement the Electrical Cable Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements program.	A.2.1.37	Prior to the period of extended operation.
40.	345 KV SF6 Bus	Implement the 345 KV SF6 Bus program.	A.2.2.1	Prior to the period of extended operation.
41.	Metal Fatigue of Reactor Coolant Pressure Boundary	Enhance the program to include additional transients beyond those defined in the Technical Specifications and UFSAR.	A.2.3.1	Prior to the period of extended operation.
42.	Metal Fatigue of Reactor Coolant Pressure Boundary	Enhance the program to implement a software program, to count transients to monitor cumulative usage on selected components.	A.2.3.1	Prior to the period of extended operation.
43.	Pressure –Temperature Limits, including Low Temperature Overpressure Protection Limits	Seabrook Station will submit updates to the P-T curves and LTOP limits to the NRC at the appropriate time to comply with 10 CFR 50 Appendix G.	A.2.4.1.4	The updated analyses will be submitted at the appropriate time to comply with 10 CFR 50 Appendix G, Fracture Toughness Requirements.

44.	Environmentally-Assisted Fatigue Analyses (TLAA)	NextEra Seabrook will perform a review of design basis ASME Class 1 component fatigue evaluations to determine whether the NUREG/CR-6260-based components that have been evaluated for the effects of the reactor coolant environment on fatigue usage are the limiting components for the Seabrook plant configuration. If more limiting components are identified, the most limiting component will be evaluated for the effects of the reactor coolant environment on fatigue usage. If the limiting location identified consists of nickel alloy, the environmentally-assisted fatigue calculation for nickel alloy will be performed using the rules of NUREG/CR-6909. (1) Consistent with the Metal Fatigue of Reactor Coolant Pressure Boundary Program Seabrook Station will update the fatigue usage calculations using refined fatigue analyses, if necessary, to determine acceptable CUFs (i.e., less than 1.0) when accounting for the effects of the reactor water environment. This includes applying the appropriate Fen factors to valid CUFs determined from an existing fatigue analysis valid for the period of extended operation or from an analysis using an NRC-approved version of the ASME code or NRC-approved alternative (e.g., NRC-approved code case). (2) If acceptable CUFs cannot be demonstrated for all the selected locations, then additional plant-specific locations will be evaluated. For the additional plant-specific locations, if CUF, including environmental effects is greater than 1.0, then Corrective Actions will be initiated, in accordance with the Metal Fatigue of Reactor Coolant Pressure Boundary Program, B.2.3.1. Corrective Actions will include inspection, repair, or replacement of the affected locations before exceeding a CUF of 1.0 or the effects of fatigue will be managed by an inspection program that has been reviewed and approved by the NRC (e.g., periodic non-destructive examination of the affected locations at inspection intervals to be determined by a method accepted by the NRC).	A.2.4.2.3	At least two years prior to entering the period of extended operation.

45.	Number Not Used			
46.	Protective Coating Monitoring and Maintenance	Enhance the program by designating and qualifying an Inspector Coordinator and an Inspection Results Evaluator.	A.2.1.38	Prior to the period of extended operation.
47.	Protective Coating Monitoring and Maintenance	Enhance the program by including, "Instruments and Equipment needed for inspection may include, but not be limited to, flashlight, spotlights, marker pen, mirror, measuring tape, magnifier, binoculars, camera with or without wide angle lens, and self sealing polyethylene sample bags."	A.2.1.38	Prior to the period of extended operation.
48.	Protective Coating Monitoring and Maintenance	Enhance the program to include a review of the previous two monitoring reports.	A.2.1.38	Prior to the period of extended operation.
49.	Protective Coating Monitoring and Maintenance	Enhance the program to require that the inspection report is to be evaluated by the responsible evaluation personnel, who is to prepare a summary of findings and recommendations for future surveillance or repair.	A.2.1.38	Prior to the period of extended operation.
50.	ASME Section XI, Subsection IWE	Perform UT testing of the containment liner plate in the vicinity of the moisture barrier for loss of material.	A.2.1.27	Within the next two refueling outages, OR15 or OR16, and repeated at intervals of no more than five refueling outages.
51.	Number Not Used			
52.	ASME Section XI, Subsection IWL	Implement measures to maintain the exterior surface of the Containment Structure, from elevation -30 feet to +20 feet, in a dewatered state.	A.2.1.28	Ongoing
53.	Reactor Head Closure Studs	Replace the spare reactor head closure stud(s) manufactured from the bar that has a yield strength > 150 ksi with ones that do not exceed 150 ksi.	A.2.1.3	Prior to the period of extended operation.

54.	Steam Generator Tube Integrity	NextEra will address the potential for cracking of the primary to secondary pressure boundary due to PWSCC of tube-to-tubesheet welds using one of the following two options: 1) Perform a one-time inspection of a representative sample of tube-to-tubesheet welds in all steam generators to determine if PWSCC cracking is present and, if cracking is identified, resolve the condition through engineering evaluation justifying continued operation or repair the condition, as appropriate, and establish an ongoing monitoring program to perform routine tube-to-tubesheet weld inspections for the remaining life of the steam generators, or 2) Perform an analytical evaluation showing that the structural integrity of the steam generator tube-to-tubesheet interface is adequately maintaining the pressure boundary in the presence of tube-to-tubesheet weld cracking, or redefining the pressure boundary in which the tube-to-tubesheet weld is no longer included and, therefore, is not required for reactor coolant pressure boundary function. The redefinition of the reactor coolant pressure boundary must be approved by the NRC as part of a license amendment request.	A.2.1.10	Complete
55.	Steam Generator Tube Integrity	Seabrook will perform an inspection of each steam generator to assess the condition of the divider plate assembly.	A.2.1.10	Within five years prior to entering the period of extended operation.
56.	Closed-Cycle Cooling Water System	Revise the station program documents to reflect the EPRI Guideline operating ranges and Action Level values for hydrazine and sulfates.	A.2.1.12	Prior to entering the period of extended operation.
57.	Closed-Cycle Cooling Water System	Revise the station program documents to reflect the EPRI Guideline operating ranges and Action Level values for Diesel Generator Cooling Water Jacket pH.	A.2.1.12	Prior to entering the period of extended operation.
58.	Fuel Oil Chemistry	Update Technical Requirement Program 5.1, (Diesel Fuel Oil Testing Program) ASTM standards to ASTM D2709-96 and ASTM D4057-95 required by the GALL XI.M30 Rev 1	A.2.1.18	Prior to the period of extended operation.
59.	Nickel Alloy Nozzles and Penetrations	The Nickel Alloy Aging Nozzles and Penetrations program will implement applicable Bulletins, Generic Letters, and staff accepted industry guidelines.	A.2.2.3	Prior to the period of extended operation.
60.	Buried Piping and Tanks Inspection	Implement the design change replacing the buried Auxiliary Boiler supply piping with a pipe-within-pipe configuration with leak detection capability.	A.2.1.22	Prior to entering the period of extended operation.

61.	Compressed Air Monitoring Program	Replace the flexible hoses associated with the Diesel Generator air compressors on a frequency of every 10 years.	A.2.1.14	Within ten years prior to entering the period of extended operation.
62.	Water Chemistry	Enhance the program to include a statement that sampling frequencies are increased when chemistry action levels are exceeded.	A.2.1.2	Prior to the period of extended operation.
63.	Flow Induced Erosion	Ensure that the quarterly CVCS Charging Pump testing is continued during the PEO. Additionally, add a precaution to the test procedure to state that an increase in the CVCS Charging Pump mini flow above the acceptance criteria may be indicative of erosion of the mini flow orifice as described in LER 50-275/94-023.	N/A	Prior to the period of extended operation.
64.	Buried Piping and Tanks Inspection	Soil analysis shall be performed prior to entering the period of extended operation to determine the corrosivity of the soil in the vicinity of non-cathodically protected steel pipe within the scope of this program. If the initial analysis shows the soil to be non-corrosive, this analysis will be re-performed every ten years thereafter.	A.2.1.22	Prior to entering the period of extended operation.
65.	Flux Thimble Tube	Implement measures to ensure that the movable incore detectors are not returned to service during the period of extended operation.	N/A	Prior to entering the period of extended operation.
66.	Number Not Used			
67.	Structures Monitoring Program	Perform one shallow core bore in an area that was continuously wetted from borated water to be examined for concrete degradation and also expose rebar to detect any degradation such as loss of material. ***The removed core will also be subjected to petrographic examination for concrete degradation due to ASR per ASTM Standard Practice C856.***	A.2.1.31	No later than December 31, 2015.
68.	Structures Monitoring Program	Perform sampling at the leakoff collection points for chlorides, sulfates, pH and iron once every three months.	A.2.1.31	Starting January 2014. Quarterly Preventive Maintenance Activity Implemented
69.	Open-Cycle Cooling Water System	Replace the Diesel Generator Heat Exchanger Plastisol PVC lined Service Water piping with piping fabricated from AL6XN material.	A.2.1.11	Prior to the period of extended operation.
70.	Closed-Cycle Cooling Water System	Inspect the piping downstream of CC-V-444 and CC-V-446 to determine whether the loss of material due to cavitation induced erosion has been eliminated or whether this remains an issue in the primary component cooling water system.	A.2.1.12	Within ten years prior to the period of extended operation.

71.	Alkali-Silica Reaction (ASR) Monitoring Program	Implement the Alkali-Silica Reaction (ASR) Monitoring Program. Testing will be performed to confirm that parameters being monitored and acceptance criteria used are appropriate to manage the effects of ASR.	A.2.1.31A	Prior to entering the period of extended operation.
72.	Flow-Accelerated Corrosion	Enhance the program to include management of wall thinning caused by mechanisms other than FAC.	A.2.1.8	Prior to entering the period of extended operation.
73.	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components	Enhance the program to include performance of focused examinations to provide a representative sample of 20%, or a maximum of 25, of each identified material, environment, and aging effect combinations during each 10 year period in the period of extended operation.	A.2.1.25	Prior to entering the period of extended operation.
74.	Fire Water System	Enhance the program to perform sprinkler inspections annually per the guidance provided in NFPA 25 (2011 Edition). Inspection will ensure that sprinklers are free of corrosion, foreign materials, paint, and physical damage and installed in the proper orientation (e.g., upright, pendant, or sidewall). Any sprinkler that is painted, corroded, damaged, loaded, or in the improper orientation, and any glass bulb sprinkler where the bulb has emptied, will be evaluated for replacement.	A.2.1.16	Within ten years prior to the period of extended operation.
75.	Fire Water System	Enhance the program to conduct an inspection of piping and branch line conditions every 5 years by opening a flushing connection at the end of one main and by removing a sprinkler toward the end of one branch line for the purpose of inspecting for the presence of foreign organic and inorganic material per the guidance provided in NFPA 25 (2011 Edition).	A.2.1.16	Within ten years prior to the period of extended operation.
76.	Fire Water System	Enhance the Program to conduct the following activities annually per the guidance provided in NFPA 25 (2011 Edition). • main drain tests • deluge valve trip tests • fire water storage tank exterior surface inspections	A.2.1.16	Within ten years prior to the period of extended operation.

77.	Fire Water System	The Fire Water System Program will be enhanced to include the following requirements related to the main drain testing per the guidance provided in NFPA 25 (2011 Edition). • The requirement that if there is a 10 percent reduction in full flow pressure when compared to the original acceptance tests or previously performed tests, the cause of the reduction shall be identified and corrected if necessary. • Recording the time taken for the supply water pressure to return to the original static (nonflowing) pressure.	A.2.1.16	Within ten years prior to the period of extended operation.
78.	External Surfaces Monitoring	Enhance the program to include periodic inspections of in-scope insulated components for possible corrosion under insulation.	A.2.1.8	Prior to the period of extended operation.
79.	Open-Cycle Cooling Water System	Enhance the program to include visual inspection of Service Level III (augmented) internal coatings for loss of coating integrity.	A.2.1.11	Within 10 years prior to the period of extended operation.
80.	Fire Water System	Enhance the program to include visual inspection of Service Level III (augmented) internal coatings for loss of coating integrity.	A.2.1.16	Within 10 years prior to the period of extended operation.
81.	Fuel Oil Chemistry	Enhance the program to include visual inspection of Service Level III (augmented) internal coatings for loss of coating integrity.	A.2.1.18	Within 10 years prior to the period of extended operation.
82.	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components	Enhance the program to include visual inspection of Service Level III (augmented) internal coatings for loss of coating integrity.	A.2.1.25	Within 10 years prior to the period of extended operation.

83.	*Alkali-Silica Reaction Monitoring*	***Install instrumentation in representative sample areas of structures to monitor expansion due to alkali-silica reaction in the out-of-plane direction. Evaluate instrument and pin expansion data under the Operating Experience Element of the Alkali-Silica Reaction Monitoring Program to determine whether there is a need to enhance the program to monitor expansion in the out-of-plane direction. If the evaluation concludes that out-of-plane monitoring is necessary, establish acceptance criteria and monitoring frequencies for expansion in the out-of-plane direction using the instrument and pin expansion data.***	*A.2.1.31A*	***Prior to the period of extended operation.***
84.	*ASME Section XI, Subsection IWL*	***Evaluate the acceptability of inaccessible areas for structures within the scope of ASME Section XI, Subsection IWL Program.***	*A.2.1.28*	***Prior to the period of extended operation.***