NEXTera ENERGY SEABROOK

August 29, 2018
10 CFR 54
Docket No. 50-443
SBK-L-18151

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

Seabrook Station
Supplement 61 - Additional Changes to the
NextEra Energy Seabrook License Renewal Application

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-13084, "Seabrook Station NextEra Energy Seabrook License Renewal Application Revised Response to RAI B.2.1.3-5 and RAI 4.7.2-1" May 8, 2013. (Accession Number ML13135A005)

In Reference 1, NextEra Energy Seabrook, LLC (NextEra Energy Seabrook) 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 Energy Seabrook provided a revised response to RAI B.2.1.3-5 and 4.7.2-1 concerning fracture mechanics evaluation for performing fatigue assessments, and Reactor Coolant Pump Flywheel examination frequency changes.

Upon discussion with the NRC staff, NextEra Energy Seabrook agreed to supplement a portion of the previously provided information. Enclosure 1 provides additional changes to the License Renewal Application (LRA), Section A.2.4.5.1 and Section 4.7.2, pertaining to Reactor Coolant Pump Flywheel inspection frequencies. Changes are also provided to the LRA, Section 4.2.1, Section 4.2.4, and Section A.2.1.4, pertaining to Reactor Vessel Pressure-Temperature Limits and Neutron Fluence Analyses.

To facilitate understanding, the changes are explained, and where appropriate, portions of the LRA are repeated with the change highlighted by strikethroughs for deleted text and bolded italics for inserted text.

There is one completed regulatory commitment contained in this letter, Commitment 43. Enclosure 2 provides the revised LRA Appendix A - Final Safety Report Supplement Table A.3, License Renewal Commitment List.

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. Kenneth Browne, Licensing Manager, at (603) 773-7932.

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

Executed on August 29, 2018

Sincerely,

NextEra Energy Seabrook, LLC

Eric McCartney
Regional Vice President – Northern Region

Enclosure 1: Additional Changes to the NextEra Energy Seabrook 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

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Enclosure 1 to SBK-L-18151

Additional Changes to the
NextEra Energy Seabrook License Renewal Application

License Amendment 134 extended the Reactor Coolant Pump flywheel examination frequency from 10 years to an interval not to exceed 20 years. The following are the resulting License Renewal Application (LRA) changes:

4.7.2 REACTOR COOLANT PUMP FLYWHEEL FATIGUE CRACK GROWTH ANALYSES

Disposition

Validation, 10 CFR 54.21(c)(1)(i) – Since the number of analyzed start/stop cycles exceeds the 60-year cycle projections, the reactor coolant pump flywheel analysis remains valid for the period of extended operation.

Based on WCAP 15666; Amendment 134 to the Facility Operating License extended the Reactor Coolant Pump (RCP) flywheel examination frequency from a 10 year inspection interval to an interval not to exceed 20 years. During the period of extended operation the reactor coolant pump flywheels will be inspected per the recommendations of Regulatory Position C.4.b of Regulatory Guide 1.14, Revision I, August 1975. In lieu of Position C.4.b(I) and C.4.b(2), this inspection shall be by either of the following examinations:

a. An in-place examination, utilizing ultrasonic testing, over the volume from the inner bore of the flywheel to the circle of one-half the outer radius; or

b. A surface examination, utilizing magnetic particle testing and/or penetrant testing, of the exposed surfaces of the disassembled flywheel.

A.2.4.5.1 Reactor Coolant Pump Flywheel Fatigue Crack Growth Analyses

Westinghouse Report WCAP-14535-A, Rev. 0, "*Topical Report on Reactor Coolant Pump Flywheel Inspection Elimination*" includes a fatigue crack growth analysis that has been identified as a TLAA. The report was submitted for NRC review and the NRC issued a Safety Evaluation Report in September 1996. The purpose of the report was to provide an engineering basis for elimination of reactor coolant pump (RCP) flywheel in-service inspection requirements for all operating Westinghouse plants and certain Babcock and Wilcox plants. The number of cycles (pump starts and stops) used in this report was 6,000 for a 60-year plant life. Crack growth was shown to be negligible from exposure to these 6,000 cycles.

Based on WCAP 15666; Amendment 134 to the Facility Operating License extended the reactor coolant pump (RCP) flywheel examination frequency from a 10 year inspection interval to an interval not to exceed 20 years. During the period of extended operation the reactor coolant pump flywheels will be inspected per the recommendations of Regulatory Position C.4.b of Regulatory Guide 1.14, Revision I, August 1975. In lieu of Position C.4.b(l) and C.4.b(2), this inspection shall be by either of the following examinations:

a. An in-place examination, utilizing ultrasonic testing, over the volume from the inner bore of the flywheel to the circle of one-half the outer radius; or

b. A surface examination, utilizing magnetic particle testing and/or penetrant testing, of the exposed surfaces of the disassembled flywheel.

Based on the current cycle count projected to 60 years, the projected cycle count is much less than the analyzed cycle counts of 6,000 cycles. The reactor coolant pump flywheel analysis remains valid for the period of extended operation in accordance with 10 CFR 54.21(c)(1)(i).

License Amendment 151 approved 10CFR50, Appendix G, Pressure-Temperature Limits applicable to 55 Effective Full Power Years (EFPY). As a result, the following LRA changes have been added as the last paragraphs in the Analysis portion of Section 4.2.1, Neutron Fluence Analysis:

The 60-Year Neutron Fluence Projections (55 EFPY) were subsequently updated in support of the preparation of the 55 EFPY pressure temperature limit curve TLAA in Section 4.2.4. The updated neutron fluence analysis was based on nuclear cross-section data derived from ENDF/B-VI.3 and made use of the latest available calculation tools. Furthermore, the neutron transport evaluation methodologies follow the guidance of NRC Regulatory Guide 1.190. Additionally, the methods used to develop the calculated pressure vessel fluence are consistent with the NRC-approved methodology described in WCAP-14040-A, Revision 4 [WCAP-14040-A, Revision 4, "Methodology Used to Develop Cold Overpressure Mitigating System Setpoints and RCS Heatup and Cooldown Limit Curves," J. D. Andrachek, et al., May 2004].

The updated 55 EFPY projected fluence values are reported in WCAP-17441-NP, Rev 0 and submitted as part the technical basis for License Amendment Request 14-04 to revise the Reactor Vessel Pressure–Temperature Limits applicable for 55

EFPY and subsequently approved in License Amendment 151 (ML15096A255). The updated 55 EFPY projected fluence values were compared to the projected fluence values shown in Table 4.2.1-1, above, and the values in Table 4.2.1-1 were found to be bounding. Therefore the neutron fluence and projected values used to evaluate the other TLAA's in subsection 4.2.2 for Upper Shelf Energy Analyses and subsection 4.2.3 for Pressurized Thermal Shock Analyses are bounding.

License Amendment 151 approved 10CFR50, Appendix G, Pressure-Temperature Limits applicable to 55 Effective Full Power Years (EFPY). As a result, the following LRA changes have been added as the first paragraph in the Analysis portion of Section 4.2.4, as well as the Disposition portion of Section 4.2.4, Reactor Vessel Pressure-Temperature Limits, Including Low Temperature Overpressure Protection Limit:

4.2.4 REACTOR VESSEL PRESSURE–TEMPERATURE LIMITS, INCLUDING LOW TEMPERATURE OVERPRESSURE PROTECTION LIMIT

Analysis

The provisions of 10 CFR 50, Appendix G, require Seabrook to operate within the currently licensed P-T limit curves. These curves are required to be maintained and updated as necessary to maintain plant operation consistent with 10 CFR 50. The Reactor Vessel Integrity Surveillance Program maintains the P-T limit curves for the period of extended operation. Prior to the period of extended operation, updated P-T limit calculations will be prepared using fluence values valid for the Seabrook Station reactor vessel beltline region materials, inlet and outlet nozzles, and closure head flange locations for normal heatup, normal cooldown, and in-service leak and hydrostatic test conditions. ~~The current heatup and cooldown limit curves are valid for 20 EFPY.~~ In determining the allowable operating pressure-temperature limits, the minimum bolt-up temperatures, minimum temperature of core criticality, pressure test limits and low-temperature overpressure protection (LTOP) system limits are determined. These P-T limits are expressed in the form of a set of curves of allowable pressure versus temperature (P-T limit curves). These curves are updated on a periodic basis to account for increasing vessel fluence.

Disposition

Aging Management, 10 CFR 54.21(c)(1)(iii) – The provisions of 10 CFR 50, Appendix G, require Seabrook to operate within the currently licensed P-T limit curves. These curves are required to be maintained and updated as necessary to maintain plant operation consistent with 10 CFR 50. The Reactor Vessel Integrity

Surveillance Program maintains the P-T limit curves for the period of extended operation. Therefore, the P-T limit curves TLAA has been dispositioned in accordance with 10 CFR 54.21(c)(1)(iii). ~~Prior to the period of extended operation, updated P-T limit calculations will be prepared for the Seabrook Station reactor vessel beltline region materials, inlet and outlet nozzles, and closure head flange locations for normal heatup, normal cooldown, and in-service leak and hydrostatic test conditions.~~ ***Subsequent to the License Renewal Application, License Amendment Request 14-04 to revise the Reactor Vessel Pressure–Temperature Limits applicable for 55 EFPY was submitted using updated fluence projections identified in subsection 4.2.1, updated limiting 1/4T and 3/4T limiting ART values, and approved in Technical Specification Amendment 151 (ML15096A255).***

The Reactor Vessel Integrity Surveillance Program, B.2.1.19 monitors reactor vessel embrittlement. This program provides data to update the P-T limits and, therefore, permits Seabrook Station to manage the P-T limits going forward in accordance with 10 CFR 54(c)(1)(iii). ~~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 Reactor Vessel Pressure-Temperature Limits, Including Low Temperature Overpressure Protection Limits

Title 10 CFR Part 50, Appendix G requires that the reactor pressure vessel be maintained within established pressure-temperature (P-T) limits, including heatup and cooldown operations. The P-T limits must account for the anticipated reactor vessel fluence. ~~The current minimum Low Temperature Overpressure Protection (LTOP) setpoint for Seabrook Station is 561 psig.~~ ***The current Low Temperature Overpressure Protection (LTOP) system uses a combination of residual heat removal suction relief valves and/or power operated relief valves as identified in Technical Specifications.***

The current Seabrook Station P-T and ***Low Temperature Overpressure Protection (***LTOP***)*** limit calculations are effective through ~~20~~ ***55*** EFPY. ***The 55 EFPY P-T curves and LTOP limits meet the criteria of ASME Code, Section XI, Appendix G, and are in compliance with the fracture toughness requirements of 10 CFR 50.60 and 10 CFR 50, Appendix G through 55 EFPY.*** ~~Heatup and cooldown P-T limit curves for 55 EFPY will be prepared using the most limiting value of RT_{NDT} (reference nil ductility transition temperature) corresponding to the limiting material in the beltline region of the reactor vessel. This is determined by using the unirradiated reactor vessel material fracture toughness properties adjusted to account for the estimated irradiation-induced shift in the Reference Temperature – Nil Ductility Transition (ΔRT_{NDT}).~~

~~The P-T and LTOP limit analyses will not be submitted at this time.~~ The effects of aging on the intended function(s) will be adequately managed for the period of

extended operation in accordance with 10 CFR 54(c)(1)(iii). ~~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.~~

Based on the issuance of Amendment No. 151, License Renewal Commitment No. 43 is now complete and the revised A.3 table is shown below:

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.~~ ***Complete***

Enclosure 2 to SBK-L-18151

LRA Appendix A - Final Safety Analysis 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	Provide confirmation and acceptability of the implementation of MRP-227-A by addressing the plant-specific Applicant/Licensee Action Items outlined in section 4.2 of the NRC SER.	A.2.1.7	Complete
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 commence during the ten year period prior to the period of extended operation and continue through 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 1) In-scope outdoor tanks, except fire water storage tanks, constructed on soil or concrete, 2) Indoor large volume storage tanks (greater than 100,000 gallons) designed to near-atmospheric internal pressures, sit on concrete or soil, and exposed internally to water, 3) Visual, surface, and volumetric examinations of the outside and inside surfaces for managing the aging effects of loss of material and cracking, 4) External visual examinations to monitor degradation of the protective paint or coating, and 5) Inspection of sealant and caulking for degradation by performing visual and tactile examination (manual manipulation) consisting of pressing on the sealant or caulking to detect a reduction in the resiliency and pliability.	A.2.1.17	Within 10 years prior to the period of extended operation.

13.	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.2.1.16	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 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 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.~~ ***Complete***

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 the period of extended operation.

45.	Alkali-Silica Reaction (ASR) Monitoring Program	NextEra will obtain additional cores in the vicinity of 20% of the extensometers and perform modulus testing. Using these test results, NextEra will determine the change in through-thickness expansion since installation of the extensometers and compare it to change determined from extensometer readings. Consistency between these results will provide additional corroboration of the methodology in MPR-4153.	A.2.1.31.A	At least 5 years prior to the period of extended operation (initial study) and 10 years thereafter (follow-up study).
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 of the accessible areas of the containment liner plate in the vicinity of the moisture barrier for loss of material. Perform opportunistic UT of inaccessible areas.	A.2.1.27	ructural deformation will also eted during OR16. Repeat containment liner UT thickness examinations at intervals of no more than five (5) refueling outages.

51.	Bolting Integrity	Enhance the program to manage the aging effects for closure bolting within air and gas filled systems by using an applicable inspection technique that ensures the integrity of bolted joints will be demonstrated. For closure bolting within systems at atmospheric pressure, tightness checks will be performed on 20 percent of bolts with a maximum of 25 bolts per population. Populations will be of the same material and environment combination. Inspections will occur before the period of extended operation, and then every 10 years after the initial inspection date.	A.2.1.9	Prior to the period of extended operation.
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	Complete
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.	ASME Section XI, Subsection IWL	Concrete Surface Suspect areas identified during the 2010 and 2016 Containment IWL inspections will be incorporated into the Seabrook Station Containment Inservice Inspection (CISI) Plan.	A.2.1.28	September 1, 2020
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 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 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 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 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.	A.2.1.2	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	Within ten years prior to 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	Complete.

66.	Alkali-Silica Reaction (ASR) Monitoring Program	NextEra will perform an integrated review of expansion trends at Seabrook Station by conducting a periodic assessment of ASR expansion behavior to confirm that the MPR/FSEL large-scale test programs remain applicable to plant structures. This review will include the following specific considerations: • Review of all cores removed to date for trends of any indications of mid-plane cracking. • Comparison of in-plane expansion to through-thickness expansion of all monitored points by plotting these data on a graph of in-plane expansion versus through-thickness expansion. • Comparison of in-plane expansions, volumetric expansions, and through-thickness expansions recorded to date to the limits from the MPR/FSEL large-scale test programs and check of margin for future expansion.	A.2.1.31.A	At least 5 years prior to the period of extended operation and every 10 years thereafter.
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	Complete
68.	Structures Monitoring Program	Perform sampling at the leak off collection points for chlorides, sulfates, pH and iron once every three months.	A.2.1.31	Complete
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	Complete
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 / Building Deformation Monitoring Program	NextEra has completed testing at the University of Texas Ferguson Structural Engineering Laboratory which demonstrates the parameters being monitored and acceptance criteria used are appropriate to manage the effects of ASR. NextEra Implement the Alkali-Silica Reaction (ASR) Monitoring Program and Building Deformation Monitoring Program described in B.2.1.31A and B.2.1.31B of the License Renewal Application.	A.2.1.31A A.2.1.31B	Prior to 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 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 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	Prior to the period of extended operation.
75.	Fire Water System	Enhance the program to a) 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) and b) If the presence of sufficient foreign organic or inorganic material to obstruct pipe or sprinklers is detected during pipe inspections, the material will be removed and its source is determined and corrected. In buildings having multiple wet pipe systems, every other system shall have an internal inspection of piping every 5 years as described in NFPA 25 (2011 Edition), Section 14.2.2.	A.2.1.16	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	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	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 sample of outdoor component surfaces that are insulated and a sample of indoor insulated components exposed to condensation (due to the in-scope component being operated below the dew point), will be periodically inspected every 10 years during the period of extended operation.	A.2.1.24	Prior to the period of extended operation.
79.	Open-Cycle Cooling Water System	Enhance the program to include visual inspection of internal coatings/linings 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 internal coatings/linings 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 internal coatings/linings 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 internal coatings/linings for loss of coating integrity.	A.2.1.25	Within 10 years prior to the period of extended operation.
83.	Alkali-Silica Reaction Monitoring	Enhance the ASR AMP to install extensometers in all Tier 3 areas of two dimensional reinforced structures to monitor expansion due to alkali-silica reaction in the out-of-plane direction. Monitoring expansion in the out-of-plane direction will commence upon installation of the extensometers and continue on a six month frequency through the period of extended operation.	A.2.1.31A	Complete
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.
85.	Fire Water System	Enhance the program to perform additional tests and inspections on the Fire Water Storage Tanks as specified in Section 9.2.7 of NFPA 25 (2011 Edition) in the event that it is required by Section 9.2.6.4, which states "Steel tanks exhibiting signs of interior pitting, corrosion, or failure of coating shall be tested in accordance with 9.2.7."	A.2.1.16	Prior to the period of extended operation.
86.	Fire Water System	Enhance the program to include disassembly, inspection, and cleaning of the mainline strainers every 5 years.	A.2.1.16	Prior to the period of extended operation.
87.	Fire Water System	Increase the frequency of the Open Head Spray Nozzle Air Flow Test from every 3 years to every refueling outage to be consistent with LR-ISG-2012-02, AMP XI.M27, Table 4a.	A.2.1.16	Prior to the period of extended operation.
88.	Fire Water System	Enhance the program to include verification that a) the drain holes associated with the transformer deluge system are draining to ensure complete drainage of the system after each test, b) the deluge system drains and associated piping are configured to completely drain the piping, and c) normally-dry piping that could have been wetted by inadvertent system actuations or those that occur after a fire are restored to a dry state as part of the suppression system restoration.	A.2.1.16	Within five years prior to the period of extended operation.

89.	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components	Incorporate Coating Service Level III requirements into the RCP Motor Refurbishment Specification for the internal painting of the motor upper bearing coolers and motor air coolers. All four RCP motors will be refurbished and replaced using the Coating Service Level III requirements prior to entering the period of extended operation.	A.2.1.25	Prior to the period of extended operation.
90.	PWR Vessel Internals	Implement the PWR Vessel Internals Program. The program will be implemented in accordance with MRP-227-A (Pressurized Water Reactor Internals Inspection and Evaluation Guidelines) and NEI 03-08 (Guideline for the Management of Materials Issues).	A.2.1.7	Prior to the period of extended operation

91	Building Deformation Monitoring	Implement the Building Deformation Monitoring Program Enhance the Structures Monitoring Program to require structural evaluations be performed on buildings and components affected by deformation as necessary to ensure that the structural function is maintained. Evaluations of structures will validate structural performance against the design basis, and may use results from the large-scale test programs, as appropriate. Evaluations for structural deformation will also consider the impact to functionality of affected systems and components (e.g., conduit expansion joints). NextEra will evaluate the specific circumstances against the design basis of the affected system or component. Enhance the Building Deformation AMP to include additional parameters to be monitored based on the results of the CEB Root Cause, Structural Evaluation and walk downs. Additional parameters monitored will include: alignment of ducting, conduit, and piping; seal integrity; laser target measurements; key seismic gap measurements; and additional instrumentation. Develop a design standard to implement Aging Management Program B.2.1.31B Building Deformation, Program Element 3 - Parameters Monitored/Inspected. The design standard will clarify the deformation evaluation process and provide an auditable format to assess it. The design standard will include steps for each of the three evaluation stages that include parameters monitored, basis for why the parameter is monitored, and conditions that prompts action for the subsequent step.	A.2.1.31B	March 15, 2020