UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION I
475 ALLENDALE RD, STE 102
KING OF PRUSSIA, PENNSYLVANIA 19406-1415

August 11, 2022

Bob Coffey
Executive Vice President, Nuclear
and Chief Nuclear Officer
Florida Power & Light Company
700 Universe Blvd.
Mail Stop: EX/JB
Juno Beach, FL 33408

SUBJECT: SEABROOK STATION – INTEGRATED INSPECTION REPORT
05000443/2022002

Dear Bob Coffey:

On June 30, 2022, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at Seabrook Station. On July 14, 2022, the NRC inspectors discussed the results of this inspection with Brian Booth, Site Vice President and other members of your staff. The results of this inspection are documented in the enclosed report.

One finding of very low safety significance (Green) is documented in this report. This finding involved a violation of NRC requirements. We are treating this violation as a non-cited violation (NCV) consistent with Section 2.3.2 of the Enforcement Policy.

A licensee identified violation which was determined to be of very low safety significance is documented in this report. We are treating this violation as an NCV consistent with Section 2.3.2 of the Enforcement Policy.

If you contest the violations or the significance or severity of the violations documented in this inspection report, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator, Region I; the Director, Office of Enforcement; and the NRC Resident Inspector at Seabrook Station.

If you disagree with a cross-cutting aspect assignment in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your disagreement, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator, Region I; and the NRC Resident Inspector at Seabrook Station.

This letter, its enclosure, and your response (if any) will be made available for public inspection and copying at http://www.nrc.gov/reading-rm/adams.html and at the NRC Public Document Room in accordance with Title 10 of the *Code of Federal Regulations* 2.390, "Public Inspections, Exemptions, Requests for Withholding."

Sincerely,

Matthew R. Young

Digitally signed by Matthew R. Young
Date: 2022.08.11 10:21:40 -04'00'

Matt R. Young, Chief
Projects Branch 2
Division of Operating Reactor Safety

Docket No. 05000443
License No. NPF-86

Enclosure:
As stated

cc w/ encl: Distribution via LISTSERV

SUBJECT: SEABROOK STATION – INTEGRATED INSPECTION REPORT 05000443/2022002 DATED AUGUST 11, 2022

DISTRIBUTION:
MYoung, DORS
LCline, DORS
EBrady, DORS
JBresson, DORS
CNewport, DORS, SRI
TDaun, DORS, RI
ACass, DORS, AA
ROrlikowski, RI OEDO
RidsNrrPMSeabrook Resource
RidsNrrDorlLpl1 Resource

DOCUMENT NAME: https://usnrc.sharepoint.com/teams/Region-I-Branch-2/Shared Documents/Inspection Reports/Seabrook/2022/SB IR 2022-002.docx
ADAMS ACCESSION NUMBER: ML22222A090

X SUNSI Review		X Non-Sensitive ☐ Sensitive		X Publicly Available ☐ Non-Publicly Available	
OFFICE	RI/DORS	RI/DORS	RI/DORS		
NAME	CNewport	LCline	MYoung		
DATE	8/10/22	8/8/22	8/9/22		

OFFICIAL RECORD COPY

U.S. NUCLEAR REGULATORY COMMISSION
Inspection Report

Docket Number:	05000443
License Number:	NPF-86
Report Number:	05000443/2022002
Enterprise Identifier:	I-2022-002-0041
Licensee:	NextEra Energy Seabrook, LLC
Facility:	Seabrook Station, Unit No. 1
Location:	Seabrook, New Hampshire
Inspection Dates:	April 1, 2022 to June 30, 2022
Inspectors:	C. Newport, Senior Resident Inspector T. Daun, Resident Inspector N. Floyd, Senior Reactor Inspector B. Lehman, Structural Engineer G. Thomas, Senior Civil Engineer S. Veunephachan, Health Physicist
Approved By:	Matt R. Young, Chief Projects Branch 2 Division of Operating Reactor Safety

Enclosure

SUMMARY

The U.S. Nuclear Regulatory Commission (NRC) continued monitoring the licensee's performance by conducting an integrated inspection at Seabrook Station, in accordance with the Reactor Oversight Process. The Reactor Oversight Process is the NRC's program for overseeing the safe operation of commercial nuclear power reactors. Refer to https://www.nrc.gov/reactors/operating/oversight.html for more information. A licensee identified non-cited violation is documented in report section: 71111.15.

List of Findings and Violations

Failure to Monitor Through-wall Expansion of Alkali-Silica Reaction (ASR) in Required Tier 3 Locations			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000443/2022002-01 Open/Closed	[H.5] - Work Management	71111.12
The NRC inspectors identified a Green finding and associated violation of Seabrook Station Operating License Condition 2.J when NextEra did not install extensometers for monitoring through-wall expansion in Tier 3 locations as prescribed by their Structures Monitoring Program Manual.			

Additional Tracking Items

None.

PLANT STATUS

Seabrook Station began the inspection period operating at 100 percent rated thermal power and remained at or near full power for the inspection period.

INSPECTION SCOPES

Inspections were conducted using the appropriate portions of the inspection procedures (IPs) in effect at the beginning of the inspection unless otherwise noted. Currently approved IPs with their attached revision histories are located on the public website at http://www.nrc.gov/reading-rm/doc-collections/insp-manual/inspection-procedure/index.html. Samples were declared complete when the IP requirements most appropriate to the inspection activity were met consistent with Inspection Manual Chapter (IMC) 2515, "Light-Water Reactor Inspection Program - Operations Phase." The inspectors performed activities described in IMC 2515, Appendix D, "Plant Status," conducted routine reviews using IP 71152, "Problem Identification and Resolution," observed risk significant activities, and completed on-site portions of IPs. The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel to assess licensee performance and compliance with Commission rules and regulations, license conditions, site procedures, and standards.

REACTOR SAFETY

71111.01 - Adverse Weather Protection

Seasonal Extreme Weather Sample (IP Section 03.01) (1 Sample)

(1) The inspectors evaluated readiness for seasonal extreme weather conditions prior to the onset of elevated temperatures experienced during the summer months for the following systems: heating, ventilation, and air conditioning, service water, and alternating current distribution.

71111.04 - Equipment Alignment

Partial Walkdown Sample (IP Section 03.01) (4 Samples)

The inspectors evaluated system configurations during partial walkdowns of the following systems/trains:

(1) 'B' emergency feedwater following restoration from quarterly pump test on May 19
(2) 'A' and 'B' emergency feedwater during 'B' emergency diesel generator maintenance outage on June 3
(3) 'A' emergency diesel generator during 'B' emergency diesel generator maintenance outage on June 8
(4) Supplemental emergency power system during 'A' emergency diesel generator maintenance outage on June 21

Complete Walkdown Sample (IP Section 03.02) (1 Sample)

The inspectors evaluated system configurations during a complete walkdown of the following systems/trains:

(1) 'B' primary component cooling water system on June 30

71111.05 - Fire Protection

Fire Area Walkdown and Inspection Sample (IP Section 03.01) (5 Samples)

The inspectors evaluated the implementation of the fire protection program by conducting a walkdown and performing a review to verify program compliance, equipment functionality, material condition, and operational readiness of the following fire areas:

(1) Control building mechanical room (CB-F-3B-A) on April 26
(2) Main steam/feedwater pipe enclosure East (MS-F-A) on June 7
(3) Main steam/feedwater pipe enclosure West (MS-F-B) on June 7
(4) Control building mechanical room (CB-F-2B-A/CB-F-2C-A) on June 23
(5) Control building computer room (CB-F-3C-A) on June 27

71111.06 - Flood Protection Measures

Inspection Activities - Internal Flooding (IP Section 03.01) (1 Sample)

The inspectors evaluated internal flooding mitigation protections in the:

(1) Emergency feedwater pump house and manhole 11 on April 28

71111.07A - Heat Exchanger/Sink Performance

Annual Review (IP Section 03.01) (1 Sample)

The inspectors evaluated readiness and performance of:

(1) 'A' and 'B' emergency diesel generator heat exchangers

71111.11Q - Licensed Operator Requalification Program and Licensed Operator Performance

Licensed Operator Performance in the Actual Plant/Main Control Room (IP Section 03.01) (1 Sample)

(1) The inspectors observed and evaluated licensed operator performance of the following activities in the control room:
    - Quarterly control rod testing on May 31
    - Plant downpower to 94 percent for main turbine valve testing on June 2
    - Emergency feedwater pump testing on June 16

Licensed Operator Requalification Training/Examinations (IP Section 03.02) (1 Sample)

(1) The inspectors observed and evaluated licensed operator annual requalification exams in the simulator on May 23

71111.12 - Maintenance Effectiveness

Maintenance Effectiveness (IP Section 03.01) (3 Samples)

The inspectors evaluated the effectiveness of maintenance to ensure the following structures, systems, and components remain capable of performing their intended function:

(1) Alkali-silica reaction and building deformation monitoring portion of the Structures Monitoring Program on May 9
(2) Service water cables and support structures running to the emergency feedwater pump house on June 15
(3) Service water system and associated a(1) action plan on June 17

71111.13 - Maintenance Risk Assessments and Emergent Work Control

Risk Assessment and Management Sample (IP Section 03.01) (5 Samples)

The inspectors evaluated the accuracy and completeness of risk assessments for the following planned and emergent work activities to ensure configuration changes and appropriate work controls were addressed:

(1) Elevated risk during 345kV bus 2 outage on April 19
(2) Elevated risk during 345kV bus 1 outage and cooling tower fan maintenance on May 24
(3) Elevated risk during 'B' emergency diesel generator major maintenance outage on June 6
(4) Elevated risk during ‘A’ turbine driven emergency feedwater pump quarterly testing on June 16
(5) Elevated risk during ‘A’ emergency diesel generator major maintenance outage on June 21

71111.15 - Operability Determinations and Functionality Assessments

Operability Determination or Functionality Assessment (IP Section 03.01) (6 Samples)

The inspectors evaluated the licensee's justifications and actions associated with the following operability determinations and functionality assessments:

(1) Thermal barrier cooling pump oil leakage on April 20
(2) Potentially wetted below ground 4KV electrical cables from service water pump house to emergency feedwater pump house on April 28
(3) NI-44 power range neutron detector channel 4 high rate trip abnormal indication on May 5
(4) Residual heat removal equipment vaults identified as exceeding their building deformation stage 3 limits on May 10
(5) ‘A’ centrifugal charging pump auxiliary lube oil leak on June 2

(6) 'A' emergency diesel generator lube oil temperature control valve with out-of-specification power pills on June 23

71111.19 - Post-Maintenance Testing

Post-Maintenance Test Sample (IP Section 03.01) (8 Samples)

The inspectors evaluated the following post-maintenance testing activities to verify system operability and/or functionality:

(1) 'A' emergency diesel generator air start system following filter changes and air leak repairs on April 13
(2) Alternate DC supply breaker to 'D' DC bus following interlock failure on April 26
(3) 'B' cooling tower fans following gearbox oil change and heater replacement on May 26
(4) 'B' emergency diesel generator following major maintenance outage on June 10
(5) 'B' emergency diesel generator speed control governor following oil change on June 10
(6) ‘A’ centrifugal charging pump following shaft alignment on June 14
(7) ‘A’ emergency diesel generator following major maintenance outage on June 21
(8) ‘A’ emergency diesel generator following air handling system DAH-CP-295 relay replacement on June 22

71111.22 - Surveillance Testing

The inspectors evaluated the following surveillance testing activities to verify system operability and/or functionality:

Surveillance Tests (other) (IP Section 03.01) (3 Samples)

(1) In-service inspection surveillance of safety injection lines on April 28
(2) 'B' primary component cooling water head tank level calibration on May 3
(3) Refueling water storage tank level (L-930) calibration on May 16

In-service Testing (IP Section 03.01) (1 Sample)

(1) Startup feed pump quarterly in-service test on April 20

71114.06 - Drill Evaluation

Drill/Training Evolution Observation (IP Section 03.02) (1 Sample)

The inspectors evaluated:

(1) The emergency planning aspects of a licensed operator simulator evaluation that was conducted in the plant-reference simulator on May 16. This evaluation including the initiating conditions that resulted in associated emergency classification and notifications in accordance with NextEra’s emergency plan.

RADIATION SAFETY

71124.01 - Radiological Hazard Assessment and Exposure Controls

Radiological Hazard Assessment (IP Section 03.01) (1 Sample)

(1) The inspectors evaluated how the licensee identifies the magnitude and extent of radiation levels and the concentrations and quantities of radioactive materials and how the licensee assesses radiological hazards.

Instructions to Workers (IP Section 03.02) (1 Sample)

(1) The inspectors evaluated how the licensee instructs workers on plant-related radiological hazards and the radiation protection requirements intended to protect workers from those hazards.

Contamination and Radioactive Material Control (IP Section 03.03) (2 Samples)

The inspectors observed/evaluated the following licensee processes for monitoring and controlling contamination and radioactive material:

(1) Workers exiting the radiological controlled area after entering containment at-power
(2) Licensee surveys of potentially contaminated material leaving the radiological controlled area

Radiological Hazards Control and Work Coverage (IP Section 03.04) (3 Samples)

The inspectors evaluated the licensee's control of radiological hazards for the following radiological work:

(1) Entering containment at-power to tagout equipment and exchange air sample
(2) CS-F-1 filter exchange
(3) Mechanical penetration structural remediation

High Radiation Area and Very High Radiation Area Controls (IP Section 03.05) (3 Samples)

The inspectors evaluated licensee controls of the following areas:

(1) Locked high radiation area 7' elevation primary auxiliary building demineralizer alley
(2) Locked high radiation area containment personnel hatch
(3) Locked high radiation area volume control tank

Radiation Worker Performance and Radiation Protection Technician Proficiency (IP Section 03.06) (1 Sample)

(1) The inspectors evaluated radiation worker and radiation protection technician performance as it pertains to radiation protection requirements.

OTHER ACTIVITIES – BASELINE

71151 - Performance Indicator Verification

The inspectors verified licensee performance indicators submittals listed below:

MS05: Safety System Functional Failures Sample (IP Section 02.04) (1 Sample)

(1) For the period April 1, 2021 through March 31, 2022

MS06: Emergency AC Power Systems (IP Section 02.05) (1 Sample)

(1) For the period April 1, 2021 through March 31, 2022

MS07: High Pressure Injection Systems (IP Section 02.06) (1 Sample)

(1) For the period April 1, 2021 through March 31, 2022

71152A - Annual Follow-up Problem Identification and Resolution

Annual Follow-up of Selected Issues (Section 03.03) (1 Sample)

The inspectors reviewed the licensee's implementation of its corrective action program related to the following issues:

(1) Review of NextEra's evaluation of three safety-related structures affected by alkali-silica reaction

71152S - Semiannual Trend Problem Identification and Resolution

Semiannual Trend Review (Section 03.02) (1 Sample)

(1) The inspectors reviewed the licensee's corrective action program for potential adverse trends that might be indicative of a more significant safety issue.

INSPECTION RESULTS

Failure to Monitor Through-wall Expansion of Alkali-Silica Reaction (ASR) in Required Tier 3 Locations			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000443/2022002-01 Open/Closed	[H.5] - Work Management	71111.12
The NRC inspectors identified a Green finding and associated violation of Seabrook Station Operating License Condition 2.J when NextEra did not install extensometers for monitoring through-wall expansion in Tier 3 locations as prescribed by their Structures Monitoring Program Manual.			
Description: During the week of May 9, 2022, the inspectors reviewed NextEra's implementation and the results of monitoring activities at the Seabrook Station for the ASR			

and building deformation programs in accordance with the plant's operating license and Structures Monitoring Program.

Chapter 3, "ASR Monitoring," of the Structures Monitoring Program Manual addresses the effects of ASR on the microscopic scale and establishes the programmatic requirements for managing those effects in the concrete structures. In 2019, the NRC approved a license amendment for a methodology to evaluate Seabrook safety-related structures affected by ASR, which included the results from a large-scale testing program conducted by NextEra. This testing program concluded ASR expansion has no adverse impact on structural performance, provided that the through-thickness and volumetric expansion of the concrete remains below the tested limits. Expansion monitoring is accomplished through in-plane expansion measurements, material property testing of concrete cores affected by ASR, and through-thickness expansion measurements. The through-thickness expansion is monitored via the installation of a snap-ring bore hole extensometer.

Section 1.4, "Program Instructions," in chapter 3 states that "an extensometer shall be installed at each Tier 3 location to measure and monitor any through-thickness expansion after the instrument is installed" and "all locations meeting Tier 3 criteria will be monitored via CCI/pin-pin and extensometer reading on a ½ year (six month) inspection frequency." This section further states that "in the event that an area previously categorized as Tier 2 has progressed to Tier 3, an AR (type CR) shall be written for the deficiency, and an evaluation of the deficiency performed. Cores shall be taken to establish expansion to date and an extensometer installed to track through-thickness expansion." The Structures Monitoring Program criteria for Tier 3 is when the ASR grid for in-plane expansion is 1.0 mm/m (0.1%) or greater strain as measured by the combined cracking index or pin-to-pin distances.

Step 4.2.8 in Seabrook procedure SMP3.1, "ASR Monitoring Walkdowns, Data Collection, and Evaluation," states that monitoring locations that progress to Tier 3 status shall be captured and formally evaluated in a condition report as well as prompt the removal of testing cores and installation of an extensometer.

The inspectors noted that through-thickness expansion monitoring is required as part of the implementation of several ASR license conditions contained in Appendix C for Amendment 159 of the Seabrook Operating License. Specifically, (a) conduct assessments of expansion behavior to confirm that future expansion behavior of ASR-affected structures at Seabrook Station is comparable to what was observed in the large-scale testing program and to check margin for future expansion; and (e) evaluate the suitability of the six-month monitoring interval for Tier 3 areas based on the measured through-thickness expansion rate per year. If extensometers are not installed where they are required to be installed the licensee cannot complete the monitoring required in the license conditions.

The inspectors performed a detailed review of the most recent ASR in-plane and through-wall expansion data to verify that adequate margin remained compared to the large-scale testing program limits and to verify that the data was collected within the frequency required by the program. The inspectors also reviewed the Structures Monitoring Program Manual for the list of expansion monitoring locations denoted as Tier 3 (Appendix B, Table 1) and installed extensometers (Appendix B, Table 2). The inspectors observed several Tier 3 locations did not have an associated extensometer installed for monitoring through-wall expansion. The inspectors discussed their observation with licensee staff and noted that certain locations did not require an extensometer per their approved program due to the configuration of the rebar (i.e., heavily or triaxially reinforced). However, licensee staff did not document a justification

when an extensometer was not installed. The inspectors noted there were seven remaining Tier 3 locations (out of a total of 54) that required an extensometer as follows:

- Six locations were previously identified under draft engineering change EC 295008 and awaited extensometer installation. The implementing work order was in a planning status and last updated in June 2020. The oldest location was identified in July 2017 with the remainder identified in March 2020.

- One location was not being tracked for an extensometer installation, but the in-plane expansion monitoring data showed a slow, increasing trend indicative of ASR induced expansion.

The inspectors noted that for these seven locations, the timeframe for not installing extensometers was well beyond the specified six-month interval for monitoring.

The inspectors reviewed the structures and evaluations for these locations and noted that all the structures have been evaluated for impact from ASR including margin for additional expansion. Only one location was associated with a structure currently being monitored under Seabrook's prompt operability determination process that included enhanced monitoring at an increased frequency. The licensee's most recent review and trend of expansion monitoring data (through-wall and volumetric) showed satisfactory margin to the large-scale testing limits such that the test results remained valid for the Seabrook structures. Therefore, the inspectors concluded there was reasonable assurance that the structures remained capable of performing their functions.

Corrective Actions: NextEra staff entered the issue in their corrective action program and planned to install extensometers in the required locations. NextEra will update the Structures Monitoring Program Manual to include a reference to each extensometer for the Tier 3 areas or document an appropriate justification for exemption.

Corrective Action References: AR 02232680, 02217717, 02350483, and 02427774

Performance Assessment:

Performance Deficiency: The licensee did not install extensometers for monitoring through-wall expansion as a result of ASR in Tier 3 locations as required by License Condition 2.J and the Structures Monitoring Program Manual.

Screening: The inspectors determined the performance deficiency was more than minor because if left uncorrected, it would have the potential to lead to a more significant safety concern. Specifically, through-wall expansion over time as a result of ASR in the seven locations identified as "Tier 3" could result in unmonitored volumetric expansion that may impact building evaluation results supporting their capability to perform their specified safety functions.

Significance: The inspectors assessed the significance of the finding using IMC 0609, Appendix A, "The Significance Determination Process for Findings At-Power." The inspectors determined the finding to be of very low safety significance (Green), because the structures maintained their functionality based on the supporting structural evaluations and monitoring data.

Cross-Cutting Aspect: H.5 - Work Management: The organization implements a process of planning, controlling, and executing work activities such that nuclear safety is the overriding priority. The work process includes the identification and management of risk commensurate to the work and the need for coordination with different groups or job activities. Specifically, the licensee identified most locations requiring an extensometer but failed to execute the work activities for completing the installation and did not otherwise coordinate or track the completion as part of the Structures Monitoring Program requirements.

Enforcement:

Violation: Seabrook Station, Unit 1 Facility Operating License Condition 2.J requires, in part, NextEra Energy Seabrook, LLC to operate the facility in accordance with the Additional Conditions contained in Appendix C of the renewed operating license. Amendment 159 of Appendix C requires that the licensee perform specified actions to confirm that future expansion behavior of ASR-affected concrete structures at Seabrook aligns with observations from the large-scale testing program and that associated expansion limits remain applicable. The specified actions include, in part, (a) conduct assessments of expansion behavior using the approach provided in Appendix B of Report MPR-4273, Revision 1 (Seabrook FP#101050); and (e) engineering evaluation of the suitability of the six-month monitoring interval for Tier 3 areas based on the measured through-thickness ASR expansion rate per year. The licensee implements these license condition activities through Chapter 3, “ASR Monitoring,” of their Structures Monitoring Program Manual.

Seabrook Structures Monitoring Program Manual, Chapter 3, Section 1.4, “Program Instructions,” states, in part, that an extensometer shall be installed at each Tier 3 location to measure and monitor any through-thickness expansion after the instrument is installed and all locations meeting Tier 3 criteria will be monitored via CCI/pin-pin and extensometer reading on a six month inspection frequency.

Contrary to the above, from March 2019 to present, the licensee did not operate the facility in accordance with Additional Conditions contained in Appendix C of the renewed operating license and confirm that future expansion behavior of ASR-affected concrete structures at Seabrook aligns with observations from the large-scale testing program and that associated expansion limits remain applicable. Specifically, the licensee did not install an extensometer in seven out of a total of 54 Tier 3 locations to measure and monitor for through-thickness expansion.

Enforcement Action: This violation is being treated as a non-cited violation, consistent with Section 2.3.2 of the Enforcement Policy.

Licensee-Identified Non-Cited Violation	71111.15

This violation of very low safety significance was identified by the licensee and has been entered into the licensee corrective action program and is being treated as a non-cited violation, consistent with Section 2.3.2 of the Enforcement Policy.

Violation: 10 CFR Part 50, Appendix B, Criterion XVI, “Corrective Action”, states, in part, that conditions adverse to quality, such as failures, malfunctions, deficiencies, deviations, defective material and equipment, and nonconformances shall be promptly identified and corrected.

Contrary to the above, from June 2021 to April 2022, the licensee did not identify and correct a nonconforming condition associated with the safety function of residual heat removal

equipment vaults. Specifically, the licensee collected monitoring data for this structure in June 2021 and January 2022 which resulted in expansion measurements that exceeded the established threshold limits for structural performance and challenged the operability of the structure. The licensee did not identify and evaluate this condition until April 2022.

Significance/Severity: Green. The inspectors evaluated this finding in accordance with NRC's IMC 0609, Appendix A, "Significance Determination Process for Findings At-Power," and determined the finding to be of very low safety significance (Green), because the structure maintained its functionality based on the documented structural evaluation.

Corrective Action References: AR 02426322

Observation: Review of NextEra's Evaluation of Three Safety-Related Structures Affected by Alkali-Silica Reaction	71152A

NRC inspectors, with assistance from two technical staff members from the NRC Office of Nuclear Reactor Regulation, completed an on-site inspection at the Seabrook plant from May 9 to May 12, 2022, focused on NextEra's performance to monitor reinforced concrete structures affected by ASR and to establish corrective actions for those structures in accordance with their Structures Monitoring Program, approved methodology document, and their corrective action process. Specifically, the inspectors reviewed NextEra's evaluations and corrective actions associated with action requests AR 02276197, AR 02402556, and AR 02426322 for the primary auxiliary building, containment enclosure building, and residual heat removal equipment vaults.

As background, NextEra submitted License Amendment Request 16-03 and received NRC approval of their methodology to evaluate Seabrook safety-related structures affected by ASR. This methodology augments the original concrete design code of record to include ASR loads as an additional demand on the structure as a result of the effects of ASR expansion. Upon completion of the structural evaluations in accordance with this methodology, NextEra staff determined there were seven Seabrook structures that had specific structural elements (walls, slabs, or beams) that would require physical modification or additional analysis to comply with their current licensing and design basis requirements. NextEra staff combined the specific structural elements from these structures into one consolidated prompt operability determination (POD) under AR 02276197 and documented the additional evaluations and calculations performed and their basis for concluding these structures remained operable, that is, capable of performing their intended safety functions to support continued plant safety. The inspectors reviewed Revision 21 of the POD, approved on May 5, 2022, which is the most current revision.

The inspectors selected the primary auxiliary building, containment enclosure building, and residual heat removal equipment vaults for review because the consolidated POD was revised to include results from building deformation monitoring data collection and included updates to the associated structural evaluations. For the containment enclosure building, the entire structure was reanalyzed to increase the allowable ASR expansion. For the residual heat removal equipment vaults, the threshold limit was exceeded for the invar rod data set (average vertical expansion) which resulted in a re-evaluation of the structure and revision to the POD. The licensee identified that they missed an opportunity to identify the threshold limit exceedance during two previous exams which is documented as a licensee-identified violation in this inspection report.

The inspectors performed independent walkdowns of these structures and reviewed reports of collected measurement data to verify that no conditions (i.e., significant structural cracks or deformations indicative of distress) would invalidate NextEra's conclusions documented in their POD. In addition, the inspectors conducted interviews with responsible NextEra staff and their contractors to determine the status of ASR monitoring and the long-term corrective action plans to restore compliance of Seabrook structures with structural elements which do not meet the current license and design basis. The inspectors reviewed the POD and supporting structural evaluations and calculations to verify that NextEra staff appropriately justified the capability for these three selected structures as determined in accordance with NextEra's operability determination procedure and their methodology document.

The inspectors observed that the consolidated POD analyzed the limiting load combinations of these structures using the approved methodology with the most recent ASR expansion measurements and a reduced ASR threshold factor. The updated analyses showed that the structures have a demand to capacity ratio less than 1, except in a few structural elements. The inspectors reviewed the exceedances in these locations. NextEra staff identified conservatisms in the existing calculations, and enhanced the threshold monitoring, to provide reasonable assurance the structures would remain operable until the next monitoring activity. Examples of identified techniques included analyzing the controlling static load case plus the safe shutdown earthquake with the actual measured ASR values, using actual verified water table levels for hydrostatic pressure loads, and, where appropriate, identifying reasonable alternate load paths that can support the design loads. The inspectors noted that the PODs identified compensatory actions through enhanced monitoring activities, with a combination of quantitative and qualitative monitoring parameters and limits, that will be implemented on a frequency of two months to six months. The inspectors further noted that a physical modification will be required for certain structural elements, and that NextEra plans to maintain the POD in effect until completion of those modifications.

During an inspection in the second quarter of CY2021 (ADAMS Accession Number ML21222A126), the NRC documented two observations regarding the ASR program: 1) lack of trend data to inform the timeliness and prioritization of long-term corrective actions; and 2) lack of documentation on implementation of license condition (d) for rebar strain. As follow-up for these observations, the inspectors reviewed the licensee's updated building retrofit plan, which included a schedule for the physical modifications on the affected structures and noted that trend graphs were developed to support the timing of the planned corrective actions. The inspectors also reviewed the licensee's revised POD to address ASR license condition (d) and noted that a summary of rebar stress monitoring was documented for each structure. The specific calculational details were not documented in the POD, but the licensee presented these additional details during on-site discussions with the inspectors.

The inspectors concluded that NextEra staff were, in general, monitoring safety-related reinforced concrete structures affected by ASR in accordance with their Seabrook program procedures. However, the inspectors identified that the licensee did not install extensometers for measuring and monitoring through-wall expansion in several required locations which is documented as a violation in this report under section 71111.12. The inspectors concluded that the structural evaluations were completed in accordance with the approved methodology document, the structures remained capable of performing their intended safety function, and issues were appropriately identified and evaluated.

Observation: Semiannual Trend Review	71152S
The inspectors reviewed NextEra's corrective action program for trends that might be indicative of more significant safety issues. The inspectors reviewed condition reports, level one assessments, system health reports, and control room/panel deficiencies. In particular, the inspectors evaluated a trend of alarms being received for the 120VAC vital instrument ground detection system including multiple alarms being received for a similar issue over the past twelve months. The inspectors noted that the licensee dispositioned each alarm individually but recommended that the licensee also evaluate the alarms in the aggregate for potential adverse condition trending. The licensee generated a trend condition report to assess the condition. No violations or findings were identified.	

EXIT MEETINGS AND DEBRIEFS

The inspectors verified no proprietary information was retained or documented in this report.

- On May 12, 2022, the inspectors presented the ASR PI&R sample inspection results to Brian Booth, Site Vice President, and other members of the licensee staff.
- On July 14, 2022, the inspectors presented the integrated inspection results to Brian Booth, Site Vice President and other members of the licensee staff.

DOCUMENTS REVIEWED

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
71111.01	Corrective Action Documents	02424856		
	Procedures	ON1090.13	Response to Natural Phenomena Affecting Plant Operations	Revision 24
		OP-AA-102-1002	Seasonal Readiness	Revision 37
		OS1200.03	Severe Weather Conditions	Revision 32
	Work Orders	40794574		
		94220859		
		94229478		
71111.04	Corrective Action Documents	02341930		
		02352238		
		02353958		
		02363594		
		02422264		
		02427541		
	Drawings	1-CC-B20211	Primary Component Cooling Loop B Detail	Revision 22
		1-CC-B20212	Primary Component Cooling Loop B Detail	Revision 13
		1-CC-B20213	Primary Component Cooling Loop B Detail	Revision 14
		1-CC-B20215	Primary Component Cooling Loop B Detail	Revision 8
	Procedures	OX1436.03	Electric EFW Pump Quarterly, 18 Month/30 Days Cold Shutdown And Comprehensive Pump Tests, And Monthly Valve Verification Surveillance	Revision 28
		OX1461.03	SEPS Operational Readiness Status Surveillance	Revision 5
	Work Orders	40702203		
		40719424		
		40734259		
		40736561		
71111.05	Drawings	CB-F-2B-A/CB-F-2C-A	Unit No. 1 Control Building Pre-Fire Strategies	Revision 00
		CB-F-3C-A	Unit No. 1 Control Building Pre-Fire Strategies	Revision 00
71111.06	Corrective Action Documents	02431391		

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
	Resulting from Inspection	02431394		
	Drawings	9763-F-101652	Main Steam and Feedwater Pipe Chase (East) Concrete Sections	Revision 7
		FP26251	NTTF Recommendation 2.1 (Hazard Reevaluations): Flooding NextEra Energy	Revision 1
	Miscellaneous	CALC 9763-b-18-18	Tubing Overspans	Revision 0
71111.07A	Corrective Action Documents	02429226		
		02430329		
		02430380		
	Miscellaneous	C-S-1-25115	DG Heat Exchanger (DG-E-42A/B) Performance After Tube Plugging	Revision 1
	Procedures	MS0515.60	Heat Exchanger Tube Cleaning and Inspections	Revision 3
	Work Orders	40788875		
		40791164		
71111.11Q	Procedures	OP-AA-100-1000	Conduct of Operations	Revision 34
71111.12	Corrective Action Documents	02148021		
		02391699		
		02404429		
		02417523		
	Miscellaneous		Maintenance Rule a(1) Improvement Plan for the Service Water Cooling Tower Fans	Revision 0
		PMID 6452		
		PMID 6637		
		PMID 84403		
	Work Orders	01191866		
		40043257		
		40048857		
		40733560		
		40734538		
		40743854		
		40760837		

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
		40778772		
71111.13	Procedures	OP-AA-102-1003	Guarded Equipment	Revision 41
		WM-AA-100-1000	Work Activity Risk Management	Revision 23
	Work Orders	40772747		
		40832098		
71111.15	Corrective Action Documents	02377717		
		02380807		
		02381446		
		02419092		
		02419982		
		02425558		
		02426322		
		02429367		
		02429367		
		02430421		
	Engineering Changes	EC144952		
	Procedures	EN-AA-203-1001	Operability Determinations/Functionality Assessments	Revision 38
	Work Orders	40676501		
		40716198		
		40783136		
		40814657		
		94218482		
71111.19	Corrective Action Documents	02429909		
		02430313		
	Procedures	MS0523.26	Horizontal Shaft Alignment	Revision 41
	Work Orders	40676886		
		40702203		
		40702242		
		40707544		
		40729900		
		40736561		
		40767965		

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
		40767965		
		40778467		
		40783574		
		40783860		
		40785345		
		40787590		
		40787590		
		40787591		
		40787591		
		40789614		
		40789614		
		40789615		
		40789623		
		40789624		
		40790002		
		40790561		
		40791356		
		40791357		
		40791357		
		40794670		
		40814688		
		40820165		
71111.22	Corrective Action Documents	02425569		
		02425569		
		02426191		
	Procedures	IX1622.231	CBS-L-930 Refueling Water Storage Tank Level Protection Channel I Calibration	Revision 11
		OS1464.206	Charging System – Charging Pump Discharge Pipe ISI System Leakage Test	Revision 1
		OX1436.08	Startup Feed Pump Quarterly Surveillance	Revision 17
		OX1436.08	Startup Feed Pump Quarterly Surveillance	Revision 17
	Work Orders	40783158		
		40783158		

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
		40783582		
71151	Miscellaneous	SBK-1FJR-20-031	Seabrook MSPI Basis Document	Revision 0
	Procedures	EN-AA-105-1005	Mitigating Systems Performance Index (MSPI)	Revision 5
		LI-AA-100-10003	NRC Performance Indicator	Revision 4
71152S	Corrective Action Documents	02400725		
		02402391		
		02402743		
		02414335		
		02414837		
		02419962		
		02425168		
		02425405		
		02429752		
		02430738		
		02430739		
		02430739		