



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**
REGION I
2100 RENAISSANCE BOULEVARD, SUITE 100
KING OF PRUSSIA, PENNSYLVANIA 19406-2713

August 11, 2021

Mr. Robert Coffey
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, UNIT NO. 1 – INTEGRATED INSPECTION REPORT
05000443/2021002**

Dear Mr. Coffey:

On June 30, 2021, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at Seabrook Station, Unit No. 1. On July 8, 2021, the NRC inspectors discussed the results of this inspection with Mr. 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 did not involve a violation of NRC requirements.

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 a non-cited violation (NCV) consistent with Section 2.3.2 of the Enforcement Policy.

If you contest the violation or the significance or severity of the violation 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, Unit No. 1.

If you disagree with a cross-cutting aspect assignment or a finding not associated with a regulatory requirement 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, Unit No. 1.

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,

Brice A. Bickett, Chief
Reactor Projects Branch 3
Division of Operating Reactor Safety

Docket No. 05000443
License No. NPF-86

Enclosure:
As stated

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SUBJECT: SEABROOK STATION, UNIT NO. 1 – INTEGRATED INSPECTION REPORT
05000443/2021002 DATED AUGUST 11, 2021

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**U.S. NUCLEAR REGULATORY COMMISSION
Inspection Report**

Docket Number: 05000443

License Number: NPF-86

Report Number: 05000443/2021002

Enterprise Identifier: I-2021-002-0005

Licensee: NextEra Energy Seabrook, LLC

Facility: Seabrook Station, Unit No. 1

Location: Seabrook, New Hampshire

Inspection Dates: April 01, 2021 to June 30, 2021

Inspectors: C. Newport, Senior Resident Inspector
T. Daun, Resident Inspector
J. Brand, Reactor Inspector
P. Cataldo, Senior Reactor Inspector
L. Dumont, Reactor Inspector
N. Floyd, Senior Reactor Inspector
C. Kline, Project Engineer
B. Lehman, Structural Engineer
G. Thomas, Senior Civil Engineer

Approved By: Brice A. Bickett, Chief
Reactor Projects Branch 3
Division of Operating Reactor Safety

Enclosure

SUMMARY

The U.S. NRC continued monitoring the licensee's performance by conducting an integrated inspection at Seabrook Station, Unit No. 1, 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 NCV is documented in report section: 71111.15.

List of Findings and Violations

Inadequate Operability Determination for Structures Outside the Alkali-Silica Reaction Evaluation Methodology			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Mitigating Systems	Green FIN 05000443/2021002-01 Open/Closed	[P.4] - Trending	71152
The NRC inspectors identified a Green finding associated with NextEra procedure EN-AA-203-1001, Revision 37, "Operability Determinations/Functionality Assessments," because NextEra staff did not adequately account for the future progression of alkali-silica reaction (ASR) (i.e., a time dependent mechanism) in their prompt operability determination (POD) for several Seabrook structures. Specifically, NextEra staff did not trend and project the periodic threshold monitoring data for the affected structural elements to ensure the structures would remain capable of performing their safety functions to the next scheduled inspection.			

Additional Tracking Items

None.

PLANT STATUS

Seabrook Station began the inspection period operating at 100 percent rated thermal power. There were no operational power changes of regulatory significance 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 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.

Starting on March 20, 2020, in response to the National Emergency declared by the President of the United States on the public health risks of the coronavirus (COVID-19), resident and regional inspectors were directed to begin telework and to remotely access licensee information using available technology. During this time, the resident inspectors performed periodic site visits each week, increasing the amount of time on-site as local COVID-19 conditions permitted. As part of their on-site activities, resident inspectors conducted plant status activities as described in IMC 2515, Appendix D; observed risk significant activities; and completed on-site portions of IPs. In addition, resident and regional baseline inspections were evaluated to determine if all or a portion of the objectives and requirements stated in the IP could be performed remotely. If the inspections could be performed remotely, they were conducted per the applicable IP. In some cases, portions of an IP were completed remotely and on-site. At the time of the issuance of this report, the resident inspectors have transitioned back to a full on-site presence and have been conducting the bulk of their inspection activities on-site.

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: emergency diesel generator, emergency feedwater, and alternating current distribution

71111.04 - Equipment Alignment

Partial Walkdown Sample (IP Section 03.01) (2 Samples)

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

- (1) 'B' emergency diesel generator during 'A' emergency diesel generator interlock testing on April 12 and April 13
- (2) 'A' residual heat removal during 'B' residual heat removal system maintenance on May 27

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

- (1) The inspectors evaluated system configurations during a complete walkdown of the emergency feedwater system on May 27

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) 'A' residual heat removal vault (RHR-F-1B) on April 28
- (2) 'C' electrical tunnel (PAB-F-1G-A) on May 5
- (3) Volume control tank valve room (PAB-F-3B-Z) on May 5
- (4) Control building mechanical room (CB-F-2C-A/2B-A) on June 14
- (5) 'B' residual heat removal vault (RHR-F-1A) on June 26

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:
 - Power reduction, turbine control valve testing, and power ascension on May 14
 - Normal control room activities on May 25

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

- (1) The inspectors observed and evaluated licensed operator training on shutdown cooling transients in the plant-reference simulator on June 30

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 (SSCs) remain capable of performing their intended function:

- (1) Jacket water temperature control valve for the 'B' emergency diesel generator failure and maintenance rule functional failure determination on May 4
- (2) Emergency feedwater system during the week of June 1

- (3) ASR portion of the Structures Monitoring Program 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 'A' emergency diesel generator testing on April 12
- (2) Elevated risk during supplemental emergency power system maintenance on May 17
- (3) Elevated risk during failure of inverter 1-ED-I-4 on June 6
- (4) Elevated risk during emergent supplemental emergency power system work window with planned switchyard work on June 7
- (5) Elevated risk during 'A' emergency diesel generator planned major maintenance on June 21

71111.15 - Operability Determinations and Functionality Assessments

Operability Determination or Functionality Assessment (IP Section 03.01) (5 Samples)

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

- (1) Primary component cooling water pump ventilation area tornado damper PAH-DP-358 degradation (AR 02391741) on May 5
- (2) Penetration seal 1-PB-021-EV101-7101 tears (AR 02383080) on May 7
- (3) 345kV switchyard breaker loss of indication and control power (AR 02392628) on May 10
- (4) 'B' control building air chiller trouble alarm (AR 02394323) on June 1
- (5) 'B' containment spray pump incorrect oil addition (AR 02394965) on June 2

71111.17T - Evaluations of Changes, Tests, and Experiments

Sample Selection (IP Section 02.01) (24 Samples)

The inspectors reviewed the following evaluations, screenings, and/or applicability determinations for 10 CFR 50.59 from May 17, 2021, to May 21, 2021:

- (1) Safety Evaluation (SE) 18-003, RCP UV RX Trip Response Time Margin Reallocation (EC 290992), Revision 0
- (2) SE 18-004, Issue Calculation for EFW Pump Exhaust Stack Tornado (EC 291808), Revision 0
- (3) SE 18-005, Digital Subcomponents for 7300 NLL Cards (EC 145020 R13), Revision 0
- (4) SE 18-006, MSLB Containment Response Verification Model (EC 291611), Revision 0
- (5) SE 19-001, Revise TR 23 to Extend Control Valve Testing Interval (EC 292653), Revision 0
- (6) SE 20-001, FWV Normalization for LEFM AOT Alternate Power Indication (EC 285407), Revision 0

- (7) 10 CFR 50.59 Screenings Reviewed
2018-94, SWCT Fan Gearbox Oil Immersion Heater Equivalency 1-SW-H-67-B (EC 291835), Revision 0
- (8) 2018-122, 'A' Train Switchgear AC Unit Temporary Installation (EC 291835), Revision 0
- (9) 2019-17, SW-FT-6181 Replacement with Rosemount EC 292810, Revision 0
- (10) 2019-47, Solid State Protection System Power Supply Replacement EC 293136, Revision 0
- (11) 2019-172, OS1456.99, Cold Leg Recirculation Valve Interlock Surveillance, PCR 2319495, AR 02313731, Revision 0
- (12) 2019-184, Seabrook Unit 1 Cycle 21 Reload Design EC 293360, Revision 0
- (13) 2019-178, Containment Recirculation Fans CAH-FN-3A/B Loading Reanalysis EC 293964, Revision 0
- (14) 2019-189, Fire Pump Skid and Controller Replacement EC 290177, Revision 0
- (15) 2020-27, 1-EAH-DP-30-A/B Pneumatic Damper Actuator Substitution EC 294379, Revision 0
- (16) 2020-36, 1-SW-1801-004 Bypass Line Leak Repair EC 294429, Revision 0
- (17) 2020-58, Fuel System Transfer Car-Temporary Modification EC 294635, Revision 0
- (18) 2020-59, Replacement Size 1 Starter Cubicles (Phase 3, OR21), EC 294291, Revision 0
- (19) 2020-101, AOP Methods for Establishing RCS Letdown Revised to Prevent Relief Valve Lifting, PCR 02241254, Revision 0
- (20) 2020-103, 1-MS-V-393, Valve Relocation and Piping Reroute, EC 295211, Revision 0
- (21) 2020-111, Upgrade CS Piping to Support Increased Letdown Cleanup Flow, EC 293647, Revision 0
- (22) 2020-122, RHR Cooldown Time Calculations, EC 295305, Revision 0
- (23) 2020-151, Westinghouse Vital Inverter 1-C Replacement, EC 294150, Revision 0
- (24) 2021-20, Replace SI-V3 and SI-V47 Actuator Motor, EC 295882, Revision 0

71111.18 - Plant Modifications

Temporary Modifications and/or Permanent Modifications (IP Section 03.01 and/or 03.02) (2 Samples)

The inspectors evaluated the following temporary or permanent modifications:

- (1) Replacement of the 'A' train service water cooling tower fan 51A 3.0kW lube oil immersion heater with a 3.75kW lube oil immersion heater on April 30
- (2) Containment enclosure ventilation area north wall structural modification on June 14

71111.19 - Post-Maintenance Testing

Post-Maintenance Test Sample (IP Section 03.01) (7 Samples)

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

- (1) Component cooling water valve CC-V-1095 planned maintenance and nine-year surveillance test on April 7
- (2) Service water cooling tower agastat actuating relay calibration and maintenance on April 15

- (3) 'A' service water cooling tower spray bypass recirculation valve SW-V-139 diagnostic testing and maintenance on April 20
- (4) Supplemental emergency power supply following maintenance on May 20
- (5) 'B' emergency diesel generator jacket water heater replacement on May 24
- (6) Supplemental emergency power system central processing unit card replacement on June 7
- (7) 'A' emergency diesel generator annual major maintenance outage on June 23

71111.22 - Surveillance Testing

Surveillance Tests (other) (IP Section 03.01) (4 Samples)

The inspectors evaluated the following surveillance tests:

- (1) 'B' emergency diesel generator interlock test and startup/standby surveillance on April 13
- (2) 'B' emergency diesel generator hot restart surveillance on April 27
- (3) Turbine driven auxiliary feedwater pump quarterly surveillance on June 21
- (4) Surveillance frequency change for solid state protection system on June 28

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

- (1) 'A' residual heat removal engineered safety features actuation system slave relay test and quarterly flow and valve stroke test on April 12

71114.06 - Drill Evaluation

Select Emergency Preparedness Drills and/or Training for Observation (IP Section 03.01) (1 Sample)

- (1) The inspectors evaluated the conduct of a routine, full participation emergency planning drill on May 26

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

- (1) The inspectors evaluated the emergency planning aspects of a licensed operator simulator evaluation conducted in the plant-reference simulator on June 1. This evaluation included the initiating conditions that resulted in associated emergency classification and notifications in accordance with NextEra's emergency plan.

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, 2020 through March 31, 2021

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

- (1) For the period April 1, 2020 through March 31, 2021

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

- (1) For the period April 1, 2020 through March 31, 2021

71152 - Problem Identification and Resolution

Semiannual Trend Review (IP Section 02.02) (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

Annual Follow-up of Selected Issues (IP Section 02.03) (3 Samples)

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

- (1) Atomic Safety and Licensing Board (ASLB) ASR order compliance
- (2) Review of NextEra's evaluation of four safety-related structures affected by ASR
- (3) Inadequate verification testing of main plant computer system (MPCS)

INSPECTION RESULTS

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's corrective action program and is being treated as a non-cited violation (NCV), consistent with Section 2.3.2 of the Enforcement Policy.	
Violation: On May 28, 2021, while an operations' non-licensed system operator (NSO) was performing a scheduled oil sample on the 'B' containment building spray pump, four ounces of Mobile DTE 732 oil was added to the motor outboard bearing reservoir instead of the required Mobil DTE medium. After notification to the control room of the error, the NSO misunderstood a conversation with the Shift Manager as direction to conduct a complete oil changeout of the containment building spray pump and proceeded to carry out the evolution, despite the fact that it is not normally conducted by operations personnel. The NSO did this without a required pre-job brief, work instruction, or precautions taken to administratively prevent the pump from starting as a result of a spurious actuation or actual event. The pump was inoperable and unable to perform its safety function during the approximately 30 minute period that the oil was drained from the motor reservoir.	
Seabrook Technical Specification 6.7 "Procedures and Programs," Section 6.7.1.a requires that written procedures shall be established, implemented, and maintained covering the applicable procedures recommended in Appendix A of Regulatory Guide 1.33, Revision 2, February 1978. Regulatory Guide 1.33, Revision 2, Section 9.a. requires, in part, that "maintenance that can affect the performance of safety-related equipment should be properly pre-planned and performed in accordance with written procedures, documented instructions, or drawings appropriate to the circumstances." Contrary to the above, on May 28, 2021 a NSO changed the oil of the 'B' containment building spray pump (CBS-P-9B), a task normally performed by mechanical maintenance technicians, without following required work	

processes, including pre-job briefs, using written guidance, or ensuring proper equipment protection.

Significance/Severity: Green. This violation is of very low safety significance, since this degraded condition did not represent a loss of probabilistic risk assessment function of one train of a multi-train Technical Specification required system for greater than its Technical Specification allowed outage time.

Corrective Action References: AR 02394438

Inadequate Operability Determination for Structures Outside the ASR Evaluation Methodology			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Mitigating Systems	Green FIN 05000443/2021002-01 Open/Closed	[P.4] - Trending	71152
<p>The NRC inspectors identified a Green finding associated with NextEra procedure EN-AA-203-1001, Revision 37, "Operability Determinations/Functionality Assessments," because NextEra staff did not adequately account for the future progression of ASR (i.e., a time dependent mechanism) in their POD for several Seabrook structures. Specifically, NextEra staff did not trend and project the periodic threshold monitoring data for the affected structural elements to ensure the structures would remain capable of performing their safety functions to the next scheduled inspection.</p> <p><u>Description:</u> During the week of June 14, 2021, the inspectors reviewed the consolidated POD documented under AR 02276197 that evaluates Seabrook structures affected by ASR with discrete structural elements that do not meet NextEra's current licensing and design basis. The inspectors focused on four specific structures:</p> <ul style="list-style-type: none"> • emergency feedwater pumphouse • service water cooling tower • control and diesel generator building • mechanical penetration area <p>These are Seismic Category I reinforced concrete structures designed as described in the Seabrook Updated Final Safety Analysis Report Section 3.8.4 and house various safety-related systems and components.</p> <p>The inspectors identified that, while the consolidated POD provided evaluations that were technically adequate to show these four structures remained functional, the POD did not look forward and account for the future progression of ASR to demonstrate there is reasonable assurance the structures would remain functional to the next periodic ASR-related inspection. For several locations with local grids used for measuring in-plane expansion (e.g., crack indexing and pin-to-pin), the inspectors noted the expansion trend showed a relatively linear rate of increase, which correlates to an additional ASR-related load. For instance, grids DG102-01B and MF101-01A Index 2 in the control and diesel generator building exhibited an average vertical expansion trend of 12 mils/month between March 2020 and March 2021. This was the highest linear rate of expansion noted by the inspectors' sampling review of data.</p> <p>NextEra staff assessed the additional loads resulting from the measurements collected during</p>			

the previous inspections, but they did not project these trends and assess the loads that would likely result at the next inspection for those structural elements exhibiting adverse trends.

NextEra procedure EN-AA-203-1001, Revision 37, "Operability Determinations/Functionality Assessments," provides instructions for establishing the acceptability of continued operation of a plant structure, system, or component that is degraded or non-conforming and requires the preparer to document the POD using form EN-AA-203-1001-F01 as well as the guidance in Attachments 4 and 5. Section 6.C of the form is used to document whether the failure mechanism is time dependent and states that the determination must be forward looking. Section 6.E of the form is used to identify impacts on design and operating margins/limits where the procedure states to provide new operating limits with sufficient margin to ensure normal operation and transients will not exceed the limits for operability or functionality. Attachment 4, Section 21, of the procedure states in part that declining trends need to be reviewed to ensure the equipment will be capable of performing specified safety functions when needed, including a reasonable expectation that it will be operable or functional until the next surveillance.

The inspectors determined that while NextEra staff appropriately collected the periodic structural monitoring data, typically on a six month frequency, NextEra staff were not analyzing the expansion measurement trends and the resultant additional ASR-related loading to project and document in their POD that there would remain sufficient margin to support functionality to the next scheduled inspection.

Corrective Actions: NextEra staff entered the issue in their corrective action program and planned to develop guidance for evaluating affected structures, including additional action limits, safety factors, and consideration for future ASR expansion in their POD. NextEra continues to perform compensatory measures in the form of additional monitoring at an increased frequency.

Corrective Action References: AR 02276197, AR 02396914

Performance Assessment:

Performance Deficiency: NextEra staff did not adequately account for the future progression of ASR (i.e., a time dependent mechanism) in their POD for several Seabrook structures. Specifically, NextEra staff did not trend the periodic threshold monitoring data for the affected discrete individual structural elements and did not provide new limits with sufficient margin to ensure the structures remain capable of performing their intended safety functions for the duration the POD remained in effect, that is to the next scheduled examination.

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. This issue was similar to several examples in NRC Inspection Manual Chapter 0612, Appendix E, including 3.h and 3.k. where margin was unfavorable and had to be addressed by different design approaches to establish functionality or operability.

Significance: The inspectors assessed the significance of the finding using Appendix A, "The Significance Determination Process for Findings At-Power." The issue screened to green because the licensee demonstrated that the structures maintained their functionality.

Cross-Cutting Aspect: P.4 - Trending: The organization periodically analyzes information from the corrective action program and other assessments in the aggregate to identify programmatic and common cause issues. Specifically, NextEra staff did not periodically analyze the threshold monitoring data to identify the adverse trends in expansion data for several grids in the control and diesel generator building.

Enforcement: Inspectors did not identify a violation of regulatory requirements associated with this finding.

Semiannual Trend Review

71152

Minor Violation: 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 the timeliness of generating action requests (ARs) after an issue that could potentially impact the operability of safety-related systems, structures, and components (SSCs) was identified. When degraded conditions are identified by plant personnel, ARs are required to be generated in a timely manner (defined as within 24 hours) per PI-AA-104-1000, Corrective Action, Revision 29. The purpose of this requirement, in part, is to ensure that licensed operators become promptly aware of any conditions that could potentially impact the operability of plant SSCs and perform required operability determinations if necessary.

The inspectors identified two conditions potentially impacting SSCs in which ARs were not generated in a timely manner in accordance with PI-AA-104-1000. The first condition involved a forensics report received from a vendor by plant engineering personnel. The report outlined a forensics analysis related to the safety-related service water cooling tower fans that could potentially impact the other two in-service fans. The report was received on April 27, 2021. An AR was not generated until May 12, 2021, after prompting by the NRC inspectors. The second condition involved a report received from a vendor outlining two ASR threshold limit measurements exceeding their limits. The report was received by engineering personnel in December of 2020. An AR documenting the results was not generated until February 4, 2021, after prompting by the NRC inspectors. Both conditions, after screening by operations personnel, were determined to not impact the operability of the associated SSCs. An adverse trend in timely AR initiation was generated by the licensee and corrective actions were assigned including tasks to verbally reinforce procedural standards and requirements with the maintenance, chemistry, engineering, security, emergency preparedness, licensing, and operations departments.

Screening: The inspectors determined the performance deficiency was minor. The performance deficiency was screened to minor in accordance with Inspection Manual Chapter 0612, Appendix B as it was not associated with one of the cornerstone attributes and did not adversely affect an associated cornerstone objective. Specifically, neither of the issues identified, when screened by operations personnel, represented a degraded condition that would lead to the inoperability of SSCs.

Enforcement: This failure to comply with PI-AA-104-1000, Corrective Action constitutes a minor violation that is not subject to enforcement action in accordance with the NRC's Enforcement Policy.

Minor Performance Deficiency: The inspectors performed an in-depth review of Seabrook's actions following the station identification of a negative trend associated with the MPCS. The inspectors reviewed NextEra's assessment, the work order associated with the design modification of the MPCS, and the corrective actions taken and planned. The inspectors assessed Seabrook's problem identification threshold, prioritization of the issue, apparent cause analysis, and timeliness of corrective actions. The sample was selected due to recent operator challenges with the MPCS alarms. The inspectors identified one minor performance deficiency during the inspection.

The inspectors identified station personnel did not perform adequate verification testing of MPCS. IM-AA-101, Software Quality Assurance Program, Revision 14, states in part: "Verification shall be sufficient to establish that the test requirements are satisfied and that the computer program produces a valid result for each intended function." Contrary to the above, NextEra personnel failed to verify, during the testing phase of the MPCS, that specified system design requirements were validated. Specifically, on June 22, 2020, the station identified a potential trend with MPCS issues. Subsequently, NextEra performed an assessment which highlighted numerous issues associated with the MPCS. The following are three examples of issues identified:

On May 1, 2020, several points fed to MPCS from the digital control system (DCS) network were indicating "BAD" or "unknown" quality. Many of these were important to operations. The DCS database were feeding points that were needed in the old MPCS, but not needed in the new MPCS. These points were being read as erroneous points in the new system and led to the MPCS info servers to not have functioning alarms.

On May 5, 2020, station personnel attempted to perform IS1610.102 (CS-F-111 Boric Acid Total Makeup Flow Calibration). However, technicians were not able to perform step 4.1.4 of the procedure because the new MPCS did not include that feature, therefore the test was not able to be performed.

On May 25, 2020, during operation station staff found the rod bank update screen on the MPCS reading zero for all groups bank demand. This should have read 225 steps, which was the current rod full out position. No rod deviation alarm was received. After further investigations with the vendor, the station learned that the rod bank update application was working as intended by the vendor. The new application was not intended to display the current demand position, like it was in the previous system.

Screening: The inspectors determined the performance deficiency was minor. The inspectors determined this issue was minor because the performance deficiency did not lead to any significant events and did not adversely affect any cornerstone objectives. Specifically, MPCS were used as an aid, but not as primarily alarms to the operators. In addition, NextEra had corrected the DCS database issues last year. In addition, early this year, the station performed a thorough review of their design system requirements and subsequently generated a requirement tracking matrix to reconcile plant drawings with the MPCS system logics to ensure that plant requirements are adequately represented in the MPCS system logics. Moreover, Seabrook's design engineering plans on generating engineering changes in the near future to fix all issued identified during their review. During the inspection the licensee generated AR 02395747 to correct the identified performance deficiency.

The inspectors observed that Seabrook performed thorough extent of condition and extent of cause reviews, performed a thorough review of MPCs logics and plant design requirement, and completed or planned timely corrective actions.

Observation: Evaluation of Compliance with ASLB Order LBP-20-9 Related to License Amendment Request (LAR) 16-03	71152
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The resident inspectors and a team of structural engineers from the Region I office and headquarters evaluated NextEra's compliance with the ALSB order LBP-20-9. The order is related to LAR 16-03. LAR 16-03 revised the Seabrook Updated Final Safety Analysis Report to include methods for analyzing the impact of concrete degradation caused by ASR affecting seismic Category I reinforced concrete structures at Seabrook. ASLB order LBP-20-9 added four additional license conditions to the Seabrook operating license related to the management of ASR on-site.

During the week of May 25, 2021, inspectors reviewed NextEra's performance to meet ASR license conditions (c), (e), and (f). License condition (c) states, "NextEra shall undertake the monitoring required by MPR-4273, Revision 1, Appendix B, Check 3, for control extensometers every six months." License condition (e) states, "If the ASR expansion rate in any area of a Seabrook seismic Category I structure significantly exceeds 0.2 mm/m (0.02 percent) through-thickness expansion per year, NextEra's Management will perform an engineering evaluation focused on the continued suitability of the six month monitoring interval for Tier 3 areas. If the engineering evaluation concludes that more frequent monitoring is necessary, it shall be implemented under the Structures Monitoring Program." License condition (f) states, "Each core extracted from Seabrook Unit 1 will be subjected to a petrographic analysis to detect internal microcracking and delamination." The inspectors reviewed implementation of the three license conditions by verifying that licensee procedures and guidance documents were updated to ensure that each of the license conditions would be carried out during implementation of the ASR monitoring program. The inspectors also reviewed samples of completed inspections and documentation to ensure that the procedures were being implemented correctly. The inspectors did not note any significant deficiencies with the implementation of license conditions (c), (e), or (f).

During the week of June 14, 2021, inspectors with support from NRC headquarters technical staff, reviewed NextEra's performance to meet ASR license condition (d), which states, "if stress analyses conducted pursuant to the structural evaluation methodology show that the stress in the rebar from ASR-induced expansion and other loads will exceed the yield strength of the rebar, NextEra must develop a monitoring program sufficient to ensure that rebar failure or yielding does not occur, or is detected if it has already occurred, in the areas at-risk of rebar failure or yielding."

The inspectors noted that the structural evaluation method discussed in the license condition refers to the LAR 16-03 (License Amendment 159) methodology presented in NextEra's methodology document (FP101196, currently revision 3). The inspectors observed NextEra's methodology document included guidance on investigating the possibility of rebar yielding if crack index values exceed 2.0 mm/m when the acceptance criteria in the methodology document are met. However, the inspectors did not observe documented guidance or assessment related to this license condition in NextEra's POD for those specific structural elements that do not currently meet the acceptance criteria. The inspectors observed that for those instances where individual walls, beams or slabs in certain structures covered by NextEra's POD do not meet the code acceptance criteria, structural behavior may no longer

be assured within elastic limits, and rebar yielding, or failure should be addressed in the POD or other appropriate document to demonstrate conformance with this license condition.

Based on discussions with NextEra staff and as provided in a subsequent position paper by NextEra, the inspectors determined that structures not meeting the code acceptance criteria are subject to more frequent monitoring (typically two to three months) and include additional qualitative criteria to observe adverse rebar conditions such as the formation of structural cracking. NextEra staff also discussed their plans to develop additional measurement techniques to better estimate the demands on the rebar for the affected structures. The inspectors determined that NextEra staff are currently addressing the actions in license condition (d) related to structural elements in NextEra's POD; however, these actions were not documented in the plant procedures or in the POD to demonstrate to their organization how this requirement was being implemented for those structural elements subject to a POD. NextEra staff entered the inspectors' observation into their corrective action program under AR 02396115 and AR 02396914. The inspectors concluded there was not a performance deficiency in this instance because monitoring actions were initiated or being conducted to implement license condition (d). The inspectors noted these actions would provide for documented conclusions that would be available to both the broader Seabrook organization and NRC inspectors regarding license condition (d).

Observation: Review of NextEra's Evaluation of Four Safety-Related Structures Affected by ASR	71152
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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 June 14 to June 17, 2021 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 ARs 02383023, 02383025, 02383026, and 02394981 for the emergency feedwater pumphouse, service water cooling tower, control and diesel generator building, and the mechanical penetration area.

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. The structural evaluations amplify ASR loads by a threshold factor (described in chapter 6 and 7 of the methodology document) while keeping the demands below the capacity of the structure. The threshold factor, which is specific to each structure, represents the design margin in the structure to accommodate for the future progression of ASR, and is used to establish threshold limits for structural monitoring parameters. An example of a threshold monitoring limit is a quantitative limit for measured pin-to-pin in-plane expansion on a specific wall location. 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 seven structures into one consolidated POD under AR 02276197 and documented the additional evaluations and calculations performed and their basis for concluding these structures remained functional, that is, capable of performing their intended safety functions to support continued plant

safety. The inspectors reviewed Revision 14 of the POD, approved on May 17, 2021, which is the most current revision.

The inspectors selected the emergency feedwater pumphouse, service water cooling tower, and the control and diesel generator building for review because NextEra staff had evaluated the structures in accordance with their methodology document (via a stage 3 evaluation), determined some specific structural elements (wall, slab or beam) did not meet demand to capacity ratio in localized areas as required by their current licensing and design basis, documented their basis for concluding the structures remained functional in their consolidated POD, monitored these areas at six month intervals using specific threshold limits, and then found some threshold limits were exceeded, which resulted in re-evaluation and revision to their POD to establish that these affected structures and their specific elements remained capable of performing as intended. The inspectors added to their inspection scope the mechanical penetration area structure because it was approaching the established limits, but had not yet exceeded them.

The inspectors performed independent walkdowns of these structures and reviewed reports of collected measurement data to verify that no conditions (i.e., structural cracks or significant deformations) would invalidate NextEra's conclusions documented in their POD, that these structures remained capable of performing their intended safety functions. 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 various 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 structures that had exceeded their established threshold limits (or approached the limits in the case of mechanical penetration area) as determined in accordance with NextEra's operability determination procedure and their methodology document. The inspectors noted that these are the first instances of structures exceeding a threshold limit since the establishment of the building deformation monitoring program. Structural re-evaluation is required once a threshold limit is exceeded and may result in corrective action such as a structural modification to alleviate the condition.

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 an ASR threshold factor of 1.0. 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 and determined that NextEra staff had identified appropriate conservatisms in the calculations to provide reasonable assurance the structures would remain functional until the next monitoring activity. Examples of identified conservatisms included additional shear-friction capacity in the members, not accounting for realistic moment redistribution in the calculations, and conservative estimate of the groundwater elevation to determine external ground water level loads. The inspectors noted that the PODs identified appropriate 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 and/or 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.

Although the inspectors determined the structures remained functional until the next enhanced monitoring activity, the inspectors observed that the supporting calculations set the ASR threshold factor to 1.0, which does not account for future ASR expansion. This indicates that the POD is only applicable to the current ASR loading conditions and may require reanalysis if future monitoring results identify additional ASR expansion. The inspectors identified the POD not addressing structural capability using trend data to the next scheduled monitoring activity was a performance deficiency and documented a finding in this inspection report (FIN 05000443/2021002-01).

The inspectors concluded that NextEra staff were monitoring safety-related reinforced concrete structures affected by ASR in accordance with their Seabrook program procedures. Furthermore, 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.

However, during a review of the periodic threshold monitoring data, the inspectors identified a potential adverse trend for several ASR grids that monitor in-plane expansion in the control building and diesel generator building. While NextEra staff appropriately collected measurement data as part of their building deformation monitoring program, the inspectors did not observe documentation in the consolidated POD or the corrective action program indicating this data was being trended to inform, adjust and validate the timing of longer-term corrective actions (i.e. physical modifications) being tracked. NextEra staff acknowledged this observation and entered it into their corrective action program under AR 02396914.

EXIT MEETINGS AND DEBRIEFS

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

- On June 17, 2021, the inspectors presented the preliminary ASR problem identification and resolution annual sample inspection results to Brian Booth, Site Vice President and other members of the licensee staff.
- On June 21, 2021, the inspectors presented the evaluation of changes, tests and experiments inspection results to Brian Booth, Site Vice President and other members of the licensee staff.
- On July 8, 2021, the inspectors presented the integrated inspection results to Mr. Brian Booth, Site Vice President and other members of the licensee staff.

DOCUMENTS REVIEWED

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
71111.17T	Corrective Action Documents Resulting from Inspection	02393861 02393930 02393946 02393947		
71152	Corrective Action Documents	02355177 02356418 02357235 02357411 02357715 02357826 02359734 02359758 02358849 02355972 02355855 02358848 02359061 02355281 02355513 02358909 02358990 02359622 02359679 02359661 02355581 02360575 02364989 02224048 02360942 02360949		
	Corrective Action Documents	02399574		

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
	Resulting from Inspection			
	Engineering Changes	EC283134	Main Plant Computer System - Software Quality Assurance Package	02/01/2020
	Procedures	IM-AA-101	Software Quality Assurance Program	Revision 14
		PI-AA-104-1000	Condition Reporting	Revision 29