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

August 6, 2020

Mr. Don Moul
Vice President, Nuclear Division and
Chief Nuclear Officer
Florida Power & Light Company
NextEra Energy Seabrook, LLC
Mail Stop: NT3/JW
15430 Endeavor Drive
Jupiter, FL 33478

SUBJECT: SEABROOK STATION, UNIT NO. 1 – INTEGRATED INSPECTION REPORT 05000443/2020002

Dear Mr. Moul:

On June 30, 2020, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at Seabrook Station, Unit No. 1. On July 16, 2020, the NRC inspectors discussed the results of this inspection with Mr. Eric McCartney, 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.

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 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,

X /RA/

Signed by: NRC-PIV

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

Docket No. 05000443
License No. NPF-86

Enclosure:
As stated

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SUBJECT: SEABROOK STATION, UNIT NO. 1 – INTEGRATED INSPECTION REPORT 05000443/2020002 DATED AUGUST 6, 2020

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U.S. NUCLEAR REGULATORY COMMISSION
Inspection Report

Docket Number:	05000443
License Number:	NPF-86
Report Number:	05000443/2020002
Enterprise Identifier:	I-2020-002-0016
Licensee:	NextEra Energy Seabrook, LLC
Facility:	Seabrook Station, Unit No. 1
Location:	Seabrook, NH
Inspection Dates:	April 01, 2020 to June 30, 2020
Inspectors:	P. Cataldo, Senior Resident Inspector T. Daun, Resident Inspector N. Floyd, Senior Reactor Inspector S. Wilson, Senior Health Physicist
Approved By:	Brice A. Bickett, Chief Reactor Projects Branch 3 Division of Reactor Projects

Enclosure

SUMMARY

The U.S. Nuclear Regulatory Commission (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.

List of Findings and Violations

Inadequate Implementation of Procedural Guidance During a Multiple Dropped Rods Event			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Barrier Integrity	Green NCV 05000443/2020002-01 Open/Closed	[H.8] - Procedure Adherence	71153
The inspectors identified a Green (very low safety significance) non-cited violation (NCV) of Seabrook Power Station Unit No. 1 Technical Specifications (TS) 6.7.1, "Procedures," because control room operators did not adequately implement procedural guidance when prompted by plant conditions during response to an unexpected transient condition. Specifically, on June 6, when four control rods dropped into the core, control room operators did not adequately implement procedural guidance contained in alarm response and conduct of operations procedures which delayed entry into abnormal operating procedure (AOP) OS1210.05, "Dropped Rod" for approximately four minutes.			

Additional Tracking Items

None.

PLANT STATUS

Seabrook Station began the inspection period in planned Refueling Outage No. 20 (RFO20) that commenced on April 1, 2020, and returned to 100 percent power on May 1. On May 29, the plant experienced a manual reactor trip due to an unexpected control bank B, group I control rod insertion, and returned to 100 percent power on June 1. On June 6, the plant experienced a second manual reactor trip, following the unexpected insertion of the same group of four control rods as the May 29th event. Additional troubleshooting was performed on the rod control system and on June 11, the plant returned to 100 percent power, where they remained for the duration of 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 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 and 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 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. The inspections documented below met the objectives and requirements for completion of the IP.

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, during the week of May 26, prior to the onset of elevated temperatures experienced during the summer months for the following systems: emergency feedwater and emergency diesel generator systems.

71111.04 - Equipment Alignment

Partial Walkdown Sample (IP Section 03.01) (3 Samples)

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

(1) 'A' cooling tower service water during 'B' cooling tower service water outage activities on April 9
(2) Spent fuel pool cooling system with reactor core off-loaded into spent fuel pool on April 14
(3) 'A' emergency diesel generator during 'B' emergency diesel generator maintenance outage on June 22

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

(1) The inspectors evaluated system configurations during a complete walkdown of the 'A' train safety injection system on April 20

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) Containment 25' (C-F-3-Z) on April 24
(2) Containment 0' (C-F-2-Z) April 24
(3) Containment -26' (C-F-1-Z) on April 24
(4) Service water cooling tower, 'A' and 'B' switchgear rooms, elevation 22' (CT-F-1-C/D-A) on May 13
(5) Service water cooling tower, pump room, elevation 46' (CT-F-2B-A) on May 13

71111.07A - Heat Sink Performance

Annual Review (IP Section 03.01) (1 Sample)

The inspectors evaluated readiness and performance of:

(1) 'B' primary component cooling water heat exchanger

71111.08P - Inservice Inspection Activities (PWR)

PWR Inservice Inspection Activities Sample (IP Section 03.01) (1 Sample)

(1) The inspectors verified that the reactor coolant system boundary, steam generator tubes, reactor vessel internals, risk-significant piping system boundaries, and containment boundary are appropriately monitored for degradation and that repairs and replacements were appropriately fabricated, examined and accepted by reviewing the following activities from April 6 to April 24:

03.01.a - Nondestructive Examination and Welding Activities

- Manual ultrasonic testing of the safety injection elbow to pipe weld, SI 0251-07 03 (NDE Report 20-UT-080)
- Manual ultrasonic testing of the 'A' steam generator feedwater elbow to pipe weld, FW 4606-04 19 (NDE Report 20-UT-009)
- Automated ultrasonic testing of the control rod drive mechanism thermal sleeve thicknesses. This was performed in accordance with WCAP-16911-P, "Reactor Vessel Head Thermal Sleeve Wear Evaluation for Westinghouse Domestic Plants"
- Magnetic particle testing of the main steam structural attachment, 1-4002-SV-009A (NDE Report 20-MT-016)
- Liquid penetrant testing of the containment spray heat exchanger welded attachment, CBS E-16B A-1 (NDE Report 20-PT-001)
- Visual examinations of accessible containment surfaces, including the liner, leak chase channels, and moisture barrier (WO 40640012)
- Welding activities associated with the repair of service water pipe SW-1801-004 (WO 40662032 and 40709346)

03.01.b - Pressurized-Water Reactor Vessel Upper Head Penetration Examination Activities

- Detailed review of head penetrations 33, 54, 57, 63, and 71 subjected to volumetric examinations

03.01.c – Pressurized-Water Reactor Boric Acid Corrosion Control Activities

a. Boric acid evaluation for RC-V-87 (AR 2294117)
b. Boric acid evaluation for RC-FT-415 (AR 2351227)
c. Boric acid evaluation for RC-FT-416 (AR 2351228)

03.01.d – Pressurized-Water Reactor Steam Generator Tube Examination Activities

- Eddy current examinations of tubes in all four steam generators (A, B, C, and D)

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 in the Control Room during the following:
    - Reactor pressure vessel head removal and cavity flood-up on April 6
    - Reactor start-up and low power physics testing on April 26

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

(1) The inspectors observed and evaluated a licensed-operator requalification examination conducted in the plant-reference simulator on June 8

71111.12 - Maintenance Effectiveness

Maintenance Effectiveness (IP Section 03.01) (2 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) Maintenance Rule evaluation of station air compressor 137A failure on May 26
(2) MS-V-394 stroke timing trending on June 25

71111.13 - Maintenance Risk Assessments and Emergent Work Control

Risk Assessment and Management Sample (IP Section 03.01) (7 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) Shutdown risk mitigating actions during reactor pressure vessel head removal on April 6
(2) Shutdown safety assessment on April 7
(3) Shutdown risk activities during draindown to mid-loop condition on April 20
(4) Elevated risk during primary component cooling water head tank loop calibration on May 14
(5) Switchyard upgrade and supplemental emergency power system maintenance on May 18
(6) Elevated (Yellow) risk due to the steam-driven emergency feedwater pump surveillance on June 17
(7) 'A' emergency diesel generator outage on June 22

71111.15 - Operability Determinations and Functionality Assessments

Operability Determination or Functionality Assessment (IP Section 03.01) (4 Samples)

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

(1) Reactor coolant system (System 7300 circuit cards) resistance temperature detectors outside cross-calibration tolerance (ARs 2354381, 2354385, 2354388) on April 26
(2) Alkali silica reaction operability on the service water cooling tower and emergency feedwater pump building structural evaluations on April 7
(3) MS-V-393 emergency feedwater turbine seat leakage on May 28
(4) Degraded exhaust silencer on SEPS-DG-2-B on June 22

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) 'A' train service water leak repair during the weeks of April 20 and April 27
(2) Loop 4 cold leg temperature detector replacement during RFO20

71111.19 - Post-Maintenance Testing

Post-Maintenance Test Sample (IP Section 03.01) (3 Samples)

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

(1) Post-maintenance testing following installation of containment equipment hatch on April 18
(2) Response time and cross calibration following replacement of loop 4 cold leg resistance temperature detector on April 26
(3) 'A' emergency diesel generator return-to-service following maintenance outage the week of June 22

71111.20 - Refueling and Other Outage Activities

Refueling/Other Outage Sample (IP Section 03.01) (1 Sample)

(1) The inspectors evaluated RFO20 activities from April 1 to April 27

71111.22 - Surveillance Testing

The inspectors evaluated the following surveillance tests:

Surveillance Tests (other) (IP Section 03.01) (2 Samples)

(1) Loop 1 and 2 Delta T/Tavg protection channel operational test on April 26
(2) Emergency feedwater slave relay K615/K640B Go Test on May 21

Inservice Testing (IP Section 03.01) (1 Sample)

(1) Turbine-driven emergency feedwater pump surveillance on June 21

Containment Isolation Valve Testing (IP Section 03.01) (1 Sample)

(1) CS-V-150, letdown heat exchanger containment isolation valve local leak rate and stroke-time testing on April 14

71114.06 - Drill Evaluation

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

(1) The emergency planning aspects of a licensed-operator simulator evaluation was conducted in the plant-reference simulator on June 8. This evaluation included 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 Partial)

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:

(1) (Partial)
- Licensee's survey protocols and the current and historical isotopic mix and isotopic percent abundance, including current and historical presence of hard-to-detect radionuclides and potential alpha hazards
- Changes in plant operations
- Personnel contamination events and electronic personnel dosimeter alarms

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

The inspectors evaluated radiological protection-related instructions to plant workers by reviewing ALARA plans, radiation work permits, survey maps and attending pre-job briefings:

(1) (Partial)
- Radiation work permits and ALARA reviews evaluated:
  a. 20-0105, Reactor cavity work, reactor head lift/set, and flange cleaning, Revision 01
  b. 20-0106, Replace reactor head 0-rings to include bead preparation and decontamination work, quality control inspections, and related support activities, Revision 00
  c. 20-0180, Diving and support activities in spent fuel pool transfer canal and reactor cavity, Revision 01
- Pre-job briefings observed remotely (via telephone):
  a. Initial containment entry after shutdown
  b. Demineralizer resin sluice

Contamination and Radioactive Material Control (IP Section 03.03) (1 Partial)

The inspectors evaluated the licensee’s control of radioactive material and prevention of the spread of contamination:

(1) (Partial)

- Licensee's criteria for the survey and release of personal items (e.g., using small article monitors (SAMs))
- Licensee's control of highly activated or contaminated items stored in the spent fuel pool

Radiological Hazards Control and Work Coverage (IP Section 03.04) (1 Partial)

The inspectors evaluated in-plant radiological conditions during facility walkdowns and observation of radiological work activities:

(1) (Partial)

- Radiation work permit's and As Low As Reasonably Achievable reviews evaluated:
  a. 20-0105, Reactor cavity work, reactor head lift/set, and flange cleaning, Revision 01
  b. 20-0106, Replace reactor head 0-rings to include bead prep/decon work, QC inspection, and related support activities, Revision 00
  c. 20-0180, Diving and support activities in spent fuel pool transfer canal and reactor cavity, Revision 01
- Electronic personnel dosimeter alarms and evaluations
- Pre-job briefings observed remotely (via telephone):
  a. Initial containment entry after shutdown
  b. Demineralizer resin sluice

High Radiation Area and Very High Radiation Area Controls (IP Section 03.05) (1 Partial)

The inspectors evaluated licensee controls of the following High Radiation Areas and Very High Radiation Area controls:

(1) (Partial)

- Circumstances of Technical Specification High Radiation Area Occurrences, as defined by Nuclear Energy Institute 99-02
- Procedural changes since the last inspection

OTHER ACTIVITIES – BASELINE

71151 - Performance Indicator Verification

The inspectors verified licensee performance indicators submittals listed below:

BI01: Reactor Coolant System (RCS) Specific Activity Sample (IP Section 02.10) (1 Sample)

(1) For the period April 1, 2019 through March 31, 2020

BI02: RCS Leak Rate Sample (IP Section 02.11) (1 Sample)

(1) For the period April 1, 2019 through March 31, 2020

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) (2 Samples)

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

(1) Recurrent 'C' safety injection accumulator nitrogen leaks
(2) Recurrent 'A' steam supply to emergency feedwater turbine seat leakage (MS-V-393)

71153 - Followup of Events and Notices of Enforcement Discretion

Personnel Performance (IP Section 03.03) (2 Samples)

(1) The inspectors evaluated equipment and operator response following the manual reactor trip due to the unexpected control bank 'B' group 1 rod insertion that occurred on May 29
(2) The inspectors evaluated equipment and operator response following the manual reactor trip due to the unexpected control bank 'B' group 1 rod insertion that occurred on June 6

INSPECTION RESULTS

Observation: Semi-Annual Trend Review	71152
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 condition reports generated during the first half of 2020, including those generated during RFO20, which occurred in April 2020, to identify any negative trends in equipment and human performance, as well as problem identification and resolution. The inspectors focused primarily on the overall identification of potential adverse trends identified through (1) initial screening performed by the corrective action program coordinators for the applicable departments, and (2) the identification of potential trends or cognitive trends, which reveal potential performance declines in particular areas, and is conducted by the management review committee. The inspectors focused on this initial screening and follow-up reviews, because these responsibilities were revised in January 2019, following the formal removal of the previously-mandated quarterly trend analysis and reporting, and conducted under PI-AA-207-1000, Revision 12, "Station Self-Evaluation and Trending Analysis." The inspectors contrasted the issues identified during their review of condition reports for the first half of 2020, with those equipment reliability issues tracked via the engineering system health reporting program, as well as human performance and problem identification and resolution issues addressed as potential adverse or cognitive trends identified by NextEra	

staff, and subsequent level one assessments for other aspects of station performance. The inspectors verified actions were consistent with the corrective action program requirements, as well as the trending procedure previously discussed.

For example, the inspectors reviewed action requests and assessments performed following the upgrade to the main plant computer system (MPCS). Numerous conditions associated with the upgrade were identified by the staff, and while some were identified proactively, others were identified through self-revealing events and circumstances. Although the MPCS issues were considered for adverse trending, the issues associated with the MPCS were more consistent with design interface issues and design control program implementation aspects. For example, numerous alarm response procedures and surveillance procedures had to be revised to account for the new MPCS, especially surveillance procedures that removed certain MPCS points from active reporting during the performance of testing.

Based on the overall results of the semi-annual trend review, the inspectors determined that issues were appropriately evaluated by NextEra staff for potential trends and resolved within the scope of the corrective action program and other requisite procedures.

Observation: Recurrent 'C' Safety Injection Accumulator Nitrogen Leaks	71152

The inspectors performed a review of recurrent loss of nitrogen pressure associated with the 'C' safety injection accumulator. The nitrogen leaks were identified by NextEra due to the frequent re-pressurization rate of the 'C' accumulator, versus the other three, and the identified leak associated with the nitrogen fill valve, NG-V-21. The inspectors reviewed (1) refueling outage maintenance activities associated with the testing and walkdowns to determine the source of nitrogen loss, (2) several action request/condition reports and associated corrective actions associated with identification of the leak source, including check valve back-leakage validation, and (3) multiple attempts at packing gland adjustments and torque checks to slow the leak.

The inspectors determined NextEra's actions to address the significance of the accumulator nitrogen leaks inside containment, and their subsequent evaluations and actions to address those leaks have been appropriate. The inspectors also noted that although the leaks have not been resolved, NextEra continues to make reasonable effort with corrective actions currently in place to mitigate the small leaks identified at the nitrogen isolation valve, and therefore, their actions have been determined to be appropriate for the circumstances and reasonable.

Observation: Recurrent 'A' Steam Supply to Emergency Feedwater Turbine Seat Leaks (MS-V-393)	71152

The inspectors performed a review of recurrent seat leakage exhibited by MS-V-393 over the past few operating cycles. The inspectors reviewed NextEra's evaluations related to the seat leakage of MS-V-393, implemented corrective actions, adverse condition monitoring plan, and long-term corrective actions to address the design deficiency resulting in the recurrent nature of the seat leakage. The inspectors determined that NextEra's actions to address the significance of the seat leakage have been appropriate for the circumstances and reasonable.

Inadequate Implementation of Procedural Guidance During a Multiple Dropped Rods Event			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Barrier Integrity	Green NCV 05000443/2020002-01 Open/Closed	[H.8] - Procedure Adherence	71153

The inspectors identified a Green (very low safety significance) non-cited violation (NCV) of Seabrook Power Station Unit No. 1 Technical Specifications (TS) 6.7.1, "Procedures," because control room operators did not adequately implement procedural guidance when prompted by plant conditions during response to an unexpected transient condition. Specifically, on June 6, when four control rods dropped into the core, control room operators did not adequately implement procedural guidance contained in alarm response and conduct of operations procedures which delayed entry into abnormal operating procedure (AOP) OS1210.05, "Dropped Rod" for approximately four minutes.

Description: On June 6, 2020, at 9:16 AM a fault in the rod control system resulted in the four control bank B, group 1 control rods unlatching and inserting into the core resulting in multiple control room alarms. At the time of the event, there was one senior reactor operator and one reactor operator present in the control room. The reactor operator was designated as the balance of plant (BOP) operator and the senior reactor operator was the unit supervisor (US).

When the four control rods dropped into the core, numerous video alarm system (VAS) alarms and one hardwired annunciator alarm were initially received and displayed. The two control room operators responded and focused on the hardwired annunciator alarm involving the master pressure controller and control board indications of lowering pressurizer pressure, as evidenced by the US's direction to the BOP operator to take manual control of the master pressure controller to stabilize pressurizer pressure. A second senior reactor operator, the assigned work control supervisor, arrived at the control boards to assist with the transient and noted the associated hardwired deviation alarm. Subsequently, the shift manager arrived to assist in the diagnosis of the transient plant conditions.

Approximately three to four minutes into the transient, the designated primary systems operator (PSO), a licensed reactor operator, returned to the control room at which time the shift manager identified that the group 1 control rods of control bank B had dropped into the core as indicated on the digital rod position indication (DRPI) panel. The US subsequently entered abnormal operating procedure OS1210.05, "Dropped Rod" at approximately 9:20 AM and directed the PSO to manually trip the reactor, as required by the abnormal operating procedure. The plant and associated safety-related equipment responded to the manual trip, as expected. The control room operators sequenced through emergency operating procedures and placed the plant in a stable condition without complications.

The NRC resident inspectors responded to the site to assess the status of the reactor plant. The inspectors reviewed the alarm sequence log report and questioned the timeliness of the diagnosis of multiple dropped control rods, as was initially discussed by the shift manager during the notification call and during onsite event follow-up by the inspectors. The inspectors' review of the alarm report identified the VAS indicated main plant computer system alarms, including the "TWO OR MORE RODS ON BOTTOM" alarm, were received at the onset of the transient, but the reactor was not tripped for approximately four minutes. Inspectors also questioned operator response to numerous alarms of different priorities that were received during this four-minute period.

In particular, the inspectors questioned if the implementing guidance in OP-AA-100-1000, “Conduct of Operations,” and the associated alarm response procedures for the alarms received were appropriately implemented by control room personnel. The inspectors noted that OP-AA-100-1000, “Conduct of Operations,” Attachment 1, “Alarm Response,” provides guidance on control room actions for “unexpected” alarms and abnormal and emergency operations. Specifically, the procedure states, in part, that “Unexpected alarms SHALL be announced to the control room supervisor….” and “the annunciator response procedure (ARP) SHALL be pulled and actions taken, as required.” Additionally, OP-AA-100-1000 provides details for control room operators to announce only those significant alarms needed to implement procedures, but only after the control room supervisor has announced entry into abnormal or emergency operating procedures. The inspectors determined, based on interviews and NextEra's fact-finding, that these protocols were not adequately implemented by the control room crew.

The inspectors reviewed and noted that abnormal operating procedure OS1210.05, “Dropped Rod,” step 1, directs operators to determine if more than one control rod had dropped, and if true, they are directed to trip the reactor. The inspectors determined that at least four conditions occurred that required entry into this abnormal operating procedure and existed within the first ten seconds of the transient, but were not initially identified by the operators and therefore, delayed implementation of this procedure.

The inspectors reviewed ARP HWAS-MCB, “Hard Wire Alarm System (HWAS) Alarm Response Main Control Board,” for the master pressure controller output low annunciator that was initially indicated on the control boards at the onset of the transient. The inspectors determined that the ARP directs operators to take manual control of the master pressure controller if an instrument/component failure is indicated. The inspectors determined that operators should have reasonably identified that the low pressurizer pressure condition was not due to a component failure during the June 6 transient, and should not have initially taken actions to place the controller in manual. The inspectors noted the pressurizer pressure low VAS ARP and the master pressure controller output low ARP, contained a note indicating “an ongoing transient may induce a temporary low pressure condition.” Since the inadvertent insertion of four control rods into the core resulted in a transient that would be expected to result in the actual lowering of pressurizer level and pressure, the inspectors determined that control room operators had sufficient information available from control room indications to better understand the lowering pressure condition, prior to taking manual control of the master pressure controller. The inspectors' review determined that the operators' focus on this indication/condition was a primary contributor that delayed prompt identification of the dropped rods and entry into OS1210.05.

The inspectors reviewed the individual ARPs for the VAS indicated alarms, and identified that 14 of the 16 VAS alarms received within the first ten seconds of the transient would have directed operators to either verify digital rod position indication (DRPI) or enter the appropriate abnormal operating procedure. Further, the inspectors also identified that several VAS alarms were not acknowledged or reviewed by operators, which had associated alarm response procedural steps that would have directed operators to appropriate mitigative actions that likely would have caused a more prompt identification of the dropped rods, for example:

- VAS alarm D7753, Control Rod Deviation (Verify Actual Rod Position on DRPI Display, Refer to OS1210.05, Dropped Rod Abnormal)
- VAS alarm D7751, DRPI Urgent Alarm (Refer to OS1210.07, RPI Malfunction Abnormal)
- VAS alarm D7730, One Rod on Bottom (Verify using DRPI, Refer to OS1210.05, Dropped Rod Abnormal)
- VAS alarm D7749, Two or More Rods on Bottom (Verify using DRPI, Refer to OS1210.05, Dropped Rod Abnormal)
- VAS alarm D4421, Tavg-Tref Deviation (Verify rod position, Refer to OS1210.05, Dropped Rod Abnormal)
- VAS alarm B6743, DRPI/Demand Deviation > 12 Steps
- HWA-MCB MM-UA-52 D-8, Master Pressure Controller Output Lo (Note: An ongoing transient may induce a temporary low pressure condition)

Overall, the inspectors concluded that it was reasonable for the operators to identify and respond to the dropped control rods in a more timely manner given the indications and procedures available. However, the approximately four-minute delay in tripping the reactor did not result in an unanalyzed condition since these rods were peripheral and lacked the rod worth to exceed the bounding analysis for the current fuel loading analysis.

The inspectors also noted the repeat nature of this dropped rod event, since the same four control rods were affected during the May 29 event that resulted in a manual reactor trip. The immediate troubleshooting, vendor involvement, and corrective actions taken following the May 29th event appeared reasonable for the circumstances since no safety-related components were impacted nor were concerns identified with operator performance for that event. Following the June 6th transient, a more detailed and appropriate troubleshooting plan was implemented by NextEra with significant involvement by the rod control system vendor to correct the condition. NextEra is finalizing a root cause evaluation related to the material failures/fault conditions associated with the rod control system. That evaluation will be inspected to determine if there are underlying performance deficiencies associated with actions taken to troubleshoot and correct the fault conditions. NextEra has submitted a licensee event report (LER) (ML20209A542) in accordance with 10CFR50.73, which will be subject to further review by NRC inspectors.

Corrective Actions: Corrective actions addressing operator performance were implemented prior to restart of the plant, which included selected crew members being removed from watch-standing duties pending remediation. A shift order setting new expectations for control room staffing was issued that directs staffing requirements exceeding the regulatory-required levels when one of the licensed-operators need to leave the control room. The licensed-operator requalification cycle was also modified for the current training cycle to focus control room operators on diagnosis, alarm protocol, as well as command and control.

Corrective Action References: CR2359210, CR2359210

Performance Assessment:

Performance Deficiency: Control room operators did not adequately implement procedural guidance to address unexpected control room alarms and indications, and was determined to be a performance deficiency that was within NextEra's ability to foresee and correct and should have been prevented.

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, the control room operators focused their efforts on one indication in the control room, pressurizer pressure, and did not initially identify several alarms and indications that indicated a dropped rod transient that required entry into an abnormal operating procedure. In this case, the dropped rods were in the periphery of the core and did not significantly impact thermal power or challenge fuel cladding.

Significance: The inspectors assessed the significance of the finding using Manual Chapter 0609, Appendix A, "The Significance Determination Process (SDP) for Findings At-Power," Exhibit 3 - Barrier Integrity Screening Questions. The finding did not involve control manipulations that unintentionally added positive reactivity, did not result in a mismanagement of reactivity by operators that challenged fuel cladding integrity, and did not involve the mismanagement of foreign material exclusion. As a result, the finding was determined to be of very low risk significance and screened to Green. Specifically, the licensee's actions, albeit delayed, recognized the multiple dropped rods and tripped the reactor, thereby avoiding the plant being in an unanalyzed condition.

Cross-Cutting Aspect: H.8 - Procedure Adherence: Individuals follow processes, procedures, and work instructions. This finding had a cross-cutting aspect in the area of Human Performance, Procedure Adherence, in that licensed operators were expected to implement processes, procedures, and work instructions. Specifically, NextEra operators did not implement procedural guidance when prompted by plant conditions immediately after the inadvertent insertion of four control rods into the reactor core. [H.8]

Enforcement:

Violation: Seabrook Unit 1 TS 6.7.1 requires, in part, that "Written procedures shall be established, implemented, and maintained covering the activities referenced in Appendix A of Regulatory Guide (RG) 1.33, Revision 2, February 1978." Appendix A, paragraph 5 and 6.l of RG 1.33 requires procedures for responding to alarm annunciators and for mispositioned control rods (and rod drops), respectively. Contrary to the above, on June 6, 2020, NextEra control room operators did not adequately implement annunciator response procedures to diagnose and enter abnormal operating procedure OS1210.05, when prompted by plant conditions.

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

EXIT MEETINGS AND DEBRIEFS

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

- On April 9, 2020, the inspectors presented the remote radiation protection procedure inspection results to Mr. Eric McCartney, Site Vice President and other members of the licensee staff.
- On April 24, 2020, the inspectors presented the remote in-service inspection results to Eric McCartney, Site Vice President and other members of the licensee staff.
- On July 16, 2020, the inspectors presented the integrated inspection results to Mr. Eric McCartney, Site Vice President and other members of the licensee staff.

DOCUMENTS REVIEWED

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
71111.08P	Corrective Action Documents	02351189		
		02351311		
		02353758		
	Corrective Action Documents Resulting from Inspection	02354228		
71124.01	ALARA Plans	ALARA Package No. 20-01	RV Disassembly & Reassembly	Revision 00
		ALARA Package No. 20-02	Steam generator eddy-current testing and tube plugging	Revision 00
	Corrective Action Documents	02351369	Dose alarm received	April 5, 2020