



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**

REGION I
2100 RENAISSANCE BLVD., SUITE 100
KING OF PRUSSIA, PA 19406-2713

November 14, 2016

Mr. Eric McCartney
Site Vice President
Seabrook Nuclear Power Plant
NextEra Energy Seabrook, LLC
c/o Mr. Kenneth Browne
P.O. Box 300
Seabrook, NH 03874

SUBJECT: SEABROOK STATION, UNIT NO. 1 – INTEGRATED INSPECTION REPORT
05000443/2016003

Dear Mr. McCartney:

On September 30, 2016, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at Seabrook Station, Unit No. 1. On October 13, 2016, NRC inspectors discussed the results of this inspection with you and other members of your staff. The results of this inspection are documented in the enclosed report.

The NRC inspectors did not identify any finding or violation of more than minor significance.

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 the NRC Public Document Room in accordance with Title 10 of the *Code of Federal Regulations* (CFR) 2.390, "Public Inspections, Exemptions, Requests for Withholding."

Sincerely,

/RA/

Fred L. Bower, Chief
Reactor Projects Branch 3
Division of Reactor Projects

Docket No. 50-443
License No. NPF-86

Enclosure:
Inspection Report 05000443/2016003
w/Attachment: Supplementary Information

cc w/encl: Distribution via ListServ

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U.S. NUCLEAR REGULATORY COMMISSION

REGION I

Docket No.: 50-443

License No.: NPF-86

Report No.: 05000443/2016003

Licensee: NextEra Energy Seabrook, LLC

Facility: Seabrook Station, Unit No.1

Location: Seabrook, New Hampshire 03874

Dates: July 1, 2016 through September 30, 2016

Inspectors: P. Cataldo, Senior Resident Inspector
C. Newport, Resident Inspector
P. Meier, Resident Inspector
R. Vadella, Project Engineer
R. Barkley, Senior Project Engineer
J. Furia, Senior Health Physicist
C. Lally, Project Engineer
B. Dionne, Health Physicist

Approved by: Fred L. Bower, Chief
Reactor Projects Branch 3
Division of Reactor Projects

Enclosure

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SUMMARY

IR 05000443/2016003; 07/01/2016-09/30/2016; Seabrook Station, Unit No. 1; Routine Integrated Inspection Report.

This report covered a three-month period of inspection by resident inspectors and announced inspections performed by regional inspectors. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 6.

No findings were identified.

REPORT DETAILS

Summary of Plant Status

Seabrook operated at full power for the entire assessment period, with the exception of a minor down-power on September 16, 2016, to perform scheduled main turbine control valve testing.

Documents reviewed for each section of this inspection report are listed in the Attachment.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

1R01 Adverse Weather Protection (71111.01 – 1 sample)

External Flooding

a. Inspection Scope

During the period of July 25 to 27, 2016, the inspectors performed an inspection of the external flood protection measures for Seabrook. The inspectors reviewed the Updated Final Safety Analysis Report (UFSAR), Chapters 2.4.2.2 and 3.4.1, which depicts the design flood levels and areas containing safety-related equipment to identify areas that may be affected by external flooding. The inspectors conducted a general site walkdown of outside areas, the fuel storage building (FSB), the control building, and the emergency diesel generator (EDG) building, to ensure that NextEra erected flood protection measures in accordance with design specifications. The inspectors also reviewed operating experience for mitigating external flooding during severe weather to determine if NextEra planned or established adequate measures to protect against external flooding events and, more specifically, that credited operator actions were adequate.

b. Findings

No findings were identified.

1R04 Equipment Alignment

Partial System Walkdowns (71111.04 – 3 samples)

a. Inspection Scope

The inspectors performed partial walkdowns of the following systems:

- 'A' containment building spray return to service on July 14
- 'B' EDG during 'A' EDG maintenance on August 17
- 'A' residual heat removal (RHR) system while 'B' train out-of-service on August 30

The inspectors selected these systems based on their risk-significance relative to the reactor safety cornerstones at the time they were inspected. The inspectors reviewed applicable operating procedures, system diagrams, the UFSAR, technical specifications

(TSs), work orders (WOs), condition reports, and the impact of ongoing work activities on redundant trains of equipment to identify conditions that could have impacted the system's performance of its intended safety functions. The inspectors also performed field walkdowns of accessible portions of the systems to verify system components and support equipment were aligned correctly and were operable. The inspectors examined the material condition of the components and observed operating parameters of equipment to verify that there were no deficiencies. The inspectors also reviewed whether NextEra staff had properly identified equipment issues and entered them into the corrective action program (CAP) for resolution with the appropriate significance characterization.

b. Findings

No findings were identified.

1R05 Fire Protection

Resident Inspector Quarterly Walkdowns (71111.05Q – 5 samples)

a. Inspection Scope

The inspectors conducted tours of the areas listed below to assess the material condition and operational status of fire protection features. The inspectors verified that NextEra controlled combustible materials and ignition sources in accordance with administrative procedures. The inspectors verified that fire protection and suppression equipment was available for use as specified in the area pre-fire plan, and passive fire barriers were maintained in good material condition. The inspectors also verified that station personnel implemented compensatory measures for out-of-service, degraded, or inoperable fire protection equipment, as applicable, in accordance with procedures.

- Fuel storage building (FSB-F-1-A, SHT 1 of 3) on July 7
- Fuel storage building (FSB-F-1-A, SHT 3 of 3) on July 13
- Fuel storage building (FSB-F-1-A, SHT 2 of 3) on July 29
- Emergency feedwater (EFW) pump house (EFP-F-1-A) on September 28
- 'B' essential switchgear room (CB-F-1B-A) on September 28

b. Findings

No findings were identified.

1R11 Licensed Operator Regualification Program and Licensed Operator Performance
(71111.11Q – 2 samples)

.1 Quarterly Review of Licensed Operator Regualification Testing and Training

a. Inspection Scope

The inspectors observed licensed operator training during the conduct of a 10 CFR 55.59 required regualification examination during the weeks of September 12 and 19, 2016, which included evaluations of two annual simulator scenarios (two crews), and

one job performance measure. The inspectors evaluated operator performance during the simulated events, which included malfunctions such as an electro-hydraulic control system and rod position indication malfunctions, as well as events, such as a reactor trip, a faulted steam generator, and an anticipated transient without scram. In addition, the inspectors observed a simulated emergency fill of the spent fuel pool. During these observations, the inspectors also verified completion of risk-significant operator actions, including the use of abnormal and emergency operating procedures. The inspectors assessed the clarity and effectiveness of communications, implementation of actions in response to alarms and degrading plant conditions, and the oversight and direction provided by the control room supervisor. The inspectors verified the accuracy and timeliness of the emergency classification made by the shift manager and the TS action statements entered by the shift manager, as applicable. Additionally, the inspectors assessed the fidelity of the plant-reference simulator to the actual in-plant control room, as well as the ability of the crew and training staff to identify and document crew performance problems.

b. Findings

No findings were identified.

.2 Quarterly Review of Licensed Operator Performance in the Main Control Room

a. Inspection Scope

The inspectors observed infrequently performed test or evolution briefings, pre-shift briefings, and reactivity control briefings to verify that the briefings met the criteria specified in NextEra's Administrative Procedure OP-AA-100-1000, "Conduct of Operations," Revisions 17 and 18. The inspectors conducted control room observations and observed implementation of selected alarm response procedures (ARPs), solid-state protection system (SSPS) briefing, and main generator line voltage adjustment on August 4, 2016. On August 31, 2016, the inspectors observed ARPs and fire alarm response, and abnormal operating procedure entry and actions. Additionally, the inspectors observed performance of the 'A' EDG surveillance, control room rounds, and control room staff response to ARPs on September 12, 2016, and observed control room activities during SSPS 'A' train logic testing on September 22, 2016. The inspectors, as applicable, observed operator performance to verify that procedure use, crew communications, and coordination of activities between work groups similarly met established expectations and standards.

b. Findings

No findings were identified.

1R12 Maintenance Effectiveness (71111.12Q – 2 samples)

a. Inspection Scope

The inspectors reviewed the samples listed below to assess the effectiveness of maintenance activities on structure, system, and component (SSC) performance and reliability. The inspectors reviewed system health reports, CAP documents, maintenance WOs, and maintenance rule (MR) basis documents to ensure that NextEra

was identifying and properly evaluating performance problems within the scope of the MR. For each sample selected, the inspectors verified that the SSC was properly scoped into the MR in accordance with 10 CFR 50.65 and verified that the (a)(2) performance criteria established by NextEra staff were reasonable. As applicable, for SSCs classified as (a)(1), the inspectors assessed the adequacy of goals and corrective actions to return these SSCs to (a)(2). Additionally, the inspectors ensured that NextEra staff was identifying and addressing common cause failures that occurred within and across MR system boundaries.

- MR (a)(3) periodic evaluation on July 26
- Motor-operated valve lubrication preventive maintenance and starter inspection for RH-FCV-611 on August 30

b. Findings

No findings were identified.

1R13 Maintenance Risk Assessments and Emergent Work Control (71111.13 – 5 samples)

a. Inspection Scope

The inspectors reviewed station evaluation and management of plant risk for the maintenance and emergent work activities listed below to verify that NextEra performed the appropriate risk assessments prior to removing equipment for work. The inspectors selected these activities based on potential risk significance relative to the reactor safety cornerstones. As applicable for each activity, the inspectors verified that NextEra personnel performed risk assessments as required by 10 CFR 50.65(a)(4) and that the assessments were accurate and complete. When NextEra performed emergent work, the inspectors verified that operations personnel promptly assessed and managed plant risk. The inspectors reviewed the scope of maintenance work and discussed the results of the assessment with the station's probabilistic risk analyst to verify plant conditions were consistent with the risk assessment. The inspectors also reviewed the TS requirements and inspected portions of redundant safety systems, when applicable, to verify risk analysis assumptions were valid, and applicable requirements were met.

- STC-OT029 emergency safeguards feature actuation system (ESFAS) slave relay testing on July 27
- 'C' battery crosstie evolution on August 16
- 'A' EDG maintenance on August 17
- Solid state protection system testing and 'B' cooling tower service water pump maintenance on September 1
- Switchyard activities, off-site grid maintenance, and potential EFW slave relay surveillance on September 7

b. Findings

No findings were identified.

1R15 Operability Determinations and Functionality Assessments (71111.15 – 7 samples)

a. Inspection Scope

The inspectors reviewed operability determinations for the following degraded or non-conforming conditions based on the risk significance of the associated components and systems:

- Review of seismic capability and operability of primary component cooling piping support No. 782-RG-9
- Multiple occurrences of high temperatures in 'A' and 'B' vital battery rooms in July 2016
- Operator workaround (OWA) annual review on July 6
- 'B' EDG sump leakage on July 10
- Boric acid flowpath verification during system anomaly and CS-438 maintenance on July 24
- Increased leakage from 'A' EDG lube oil and keepwarm pump on August 15
- FP-V-214, cable spreading room deluge system #3, pipe obstruction on September 22

The inspectors evaluated the technical adequacy of the operability determinations to assess whether TS operability was properly justified and the subject component or system remained available such that no unrecognized increase in risk occurred. The inspectors compared the operability and design criteria in the appropriate sections of the TSs and UFSAR to NextEra's evaluations to determine whether the components or systems were operable. The inspectors confirmed, where appropriate, compliance with bounding limitations associated with the evaluations. Where compensatory measures were required to maintain operability, such as in the case of OWAs, the inspectors determined whether the measures in place would function as intended and were properly controlled by NextEra. Based on the review of the selected OWAs listed above, the inspectors verified that NextEra identified OWAs at an appropriate threshold and addressed them in a manner that effectively managed OWA-related adverse effects on operators and SSCs.

b. Findings

No findings were identified.

1R19 Post-Maintenance Testing (71111.19 – 6 samples)

a. Inspection Scope

The inspectors reviewed the post-maintenance tests for the maintenance activities listed below to verify that procedures and test activities adequately tested the safety functions that may have been affected by the maintenance activity, that the acceptance criteria in the procedure were consistent with the information in the applicable licensing basis and/or design basis documents, and that the test results were properly reviewed and accepted and problems were appropriately documented. The inspectors also walked down the affected job site, observed the pre-job brief and post-job critique where possible, confirmed work site cleanliness was maintained, and witnessed the test or

reviewed test data to verify quality control hold point were performed and checked, and that results adequately demonstrated restoration of the affected safety functions.

- 'A' RHR flow control valve RH-FCV-618 diaphragm replacement on July 12
- Boric acid system flow anomaly investigation and CS-V-438 disassembly retest conducted on July 15 and July 24
- 'B' charging pump motor inspection on July 27
- Replacement of control switch SWA-CS-5611 on August 2
- 'A' EDG lube oil and keepwarm pump replacement on August 17
- Agastat relay replacement for fan EAH-FN-180A on August 26

b. Findings

No findings were identified.

1R22 Surveillance Testing (71111.22 – 4 samples)

a. Inspection Scope

The inspectors observed performance of surveillance tests and/or reviewed test data of selected risk-significant SSCs to assess whether test results satisfied TSs, the UFSAR, and NextEra procedure requirements. The inspectors verified that test acceptance criteria were clear, tests demonstrated operational readiness and were consistent with design documentation, test instrumentation had current calibrations and the range and accuracy for the application, tests were performed as written, and applicable test prerequisites were satisfied. Upon test completion, the inspectors considered whether the test results supported that equipment was capable of performing the required safety functions. The inspectors reviewed the following surveillance tests:

- 'B' service water comprehensive pump and valve test on July 1 (in-service test)
- Reactor coolant sample for Dose Equivalent Iodine on July 5
- 'C' vital battery performance test on August 26
- ESFAS slave relays on September 19

b. Findings

No findings were identified.

2. **RADIATION SAFETY**

Cornerstone: Public Radiation Safety

2RS8 Radioactive Solid Waste Processing and Radioactive Material Handling, Storage and Transportation (71124.08 – 6 samples)

a. Inspection Scope

The inspectors verified the effectiveness of NextEra's programs for processing, handling, storage, and transportation of radioactive material. The inspectors used the requirements of 49 CFR 170-177, 10 CFR 20, 61, and Part 71, applicable industry

standards, Regulatory Guides (RGs), and procedures required by TSs as criteria for determining compliance.

Inspection Planning

The inspectors conducted an in-office review of the solid radioactive waste system description in the UFSAR, the process control program, and the recent radiological effluent release report for information on the types, amounts, and processing of radioactive waste disposed. The inspectors reviewed the scope of quality assurance audits performed for this area since the last inspection.

Radioactive Material Storage (1 sample)

The inspectors observed radioactive waste container storage areas and verified the postings and controls and that NextEra had established a process for monitoring the impact of long-term storage of the waste.

Radioactive Waste System Walkdown (1 sample)

The inspectors walked down the following:

- Accessible portions of liquid and solid radioactive waste processing systems to verify current system alignment and material condition
- Abandoned-in-place radioactive waste processing equipment to review the controls in place to ensure protection of personnel
- Changes made to the radioactive waste processing systems since the last inspection
- Processes for mixing and transferring radioactive waste resin and/or sludge discharges into shipping/disposal containers
- Current methods and procedures for dewatering waste

Waste Characterization and Classification (1 sample)

The inspectors identified radioactive waste streams and reviewed radiochemical sample analysis results to support radioactive waste characterization. The inspectors reviewed the use of scaling factors and calculations to account for difficult-to-measure radionuclides.

Shipment Preparation (1 sample)

The inspectors reviewed the records of shipment packaging, surveying, labeling, marking, placarding, vehicle checks, emergency instructions, disposal manifest, shipping papers provided to the driver, and licensee verification of shipment readiness.

Shipping Records (1 sample)

The inspectors reviewed selected non-excepted package shipment records.

Problem Identification and Resolution (1 sample)

The inspectors assessed whether problems associated with radioactive waste processing, handling, storage, and transportation, were identified at an appropriate threshold, and properly addressed in NextEra's CAP.

b. Findings

No findings were identified.

4. OTHER ACTIVITIES

4OA1 Performance Indicator Verification (71151)

Mitigating Systems Performance Index (3 samples)

a. Inspection Scope

The inspectors reviewed NextEra's submittal of the Mitigating Systems Performance Index for the following systems for the period of July 1, 2015 through June 30, 2016:

- Emergency alternating current power system (MS06)
- High pressure injection system (MS07)
- Heat removal system (MS08)

To determine the accuracy of the performance indicator data reported during those periods, the inspectors used definitions and guidance contained in Nuclear Energy Institute Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 7. The inspectors also reviewed NextEra's operator narrative logs, CRs, mitigating systems performance index derivation reports, event reports, and NRC integrated inspection reports to validate the accuracy of the submittals.

b. Findings

No findings were identified.

4OA2 Problem Identification and Resolution (71152 – 2 samples)

.1 Routine Review of Problem Identification and Resolution Activities

a. Inspection Scope

As required by Inspection Procedure 71152, "Problem Identification and Resolution," the inspectors routinely reviewed issues during baseline inspection activities and plant status reviews to verify NextEra entered issues into the CAP at an appropriate threshold, gave adequate attention to timely corrective actions, and identified and addressed adverse trends. In order to assist with the identification of repetitive equipment failures and specific human performance issues for follow-up, the inspectors performed a daily screening of items entered into the CAP and periodically attended condition report screening meetings.

b. Findings

No findings were identified.

.2 Annual Sample: Boric Acid Corrosion Control Program

a. Inspection Scope

The inspectors performed an in-depth review of the implementation and corrective actions associated with the Boric Acid Corrosion Control (BACC) Program. The inspectors assessed NextEra's problem identification threshold, problem analysis, extent of condition reviews, compensatory actions, and the prioritization and timeliness of corrective actions to determine whether NextEra was appropriately identifying, characterizing, and correcting problems associated with boric acid leaks and corrosion control and whether the planned or completed corrective actions were appropriate. The inspectors compared the actions taken to the requirements of NextEra's BACC Program procedure, MA 10.3, "Boric Acid Corrosion Control Program," Revision 16. The inspectors interviewed the program owner and other personnel associated with the program, reviewed associated corrective actions, program documents, and a routine self-assessment to assess the effectiveness of the implemented corrective actions, the reasonableness of the planned corrective actions, and to evaluate the extent of any on-going problems.

b. Findings and Observations

No findings of significance were identified.

Boric acid corrosion control is essential to prevent the development of excessive corrosion of carbon steel caused by borated water leaks through gasketed joints, valve packing, and mechanical seals at pressurized water reactors. This is implemented at Seabrook primarily through the guidance of MA 10.3. The inspectors reviewed a sample of CRs identifying active and passive boric acid leaks at Seabrook for compliance with the BACC Program. Additionally, the inspectors performed plant walkdowns to verify that passive boric acid buildup on valves and other components had been previously identified by the licensee and entered into the program. At the time of the inspection, there were three active boric acid leaks that had existed for more than one refueling outage (RFO), a condition that is not in compliance with the guidance of MA 10.3. Additionally, in the past an on-site BACC point of contact had not been assigned as required by the BACC program. The inspectors noted that a recent self-assessment of the program identified these issues and initiated appropriate corrective actions. The inspectors met with the NextEra fleet boric acid program owner, as well as on-site management to discuss the results of the self-assessment and the actions initiated to correct the deficiencies. The inspectors determined that the corrective actions appeared reasonable and timely.

.3 Annual Sample: Leak from Cask Loading Pool and Transfer Canal Non-metallic Liner

a. Inspection Scope

The inspectors performed a review of the effectiveness of NextEra's CAP in response to previously-identified leaks into on-site groundwater through the wall liner of the cask

loading pool and transfer canal in the FSB. This problem was identified by NextEra in action request (AR) 01902166, in September 2013. In November 2015, a similar leak was identified in AR 02090903, documenting increased leakage into a leak-off line from the spent fuel pool (SFP) and elevated tritium in the dewatering groundwater monitoring well samples for the EFW french drain and containment enclosure ventilation area. The inspectors assessed NextEra's problem identification threshold, problem analysis, and the prioritization and timeliness of corrective actions, to determine whether NextEra was appropriately identifying, characterizing, and correcting problems associated with leaks from the cask loading pool and transfer canal and whether the planned or completed corrective actions were appropriate. The inspectors compared the actions taken to the requirements of NextEra's CAP and other requirements. The inspectors evaluated ten ARs: 01902166, 02090903, 01824331, 02065658, 02069919, 02079453, 02092518, 02155767, 02154976, and 02144355.

b. Findings and Observations

No findings were identified.

In September 1999, elevated tritium concentrations were identified in groundwater that was seeping into the containment annulus at Seabrook. Subsequently, NextEra determined that the cask loading pool/transfer canal, adjacent to the SFP, was leaking into the SFP tell-tale drain collection lines and into the SFP leak detection bottles. Overflow from the collection bottles poured down into the sump for the spent fuel pool liner leak detection system. Previously, this concrete sump was unlined and water leaked into the surrounding concrete, which resulted in leakage of water containing tritium into groundwater beneath and adjacent to the FSB. The sump now contains a stainless steel tank that does not communicate with the concrete foundation, and has effectively isolated the leak path to the environment.

Corrective actions taken by Seabrook to mitigate this leak included flushing the tell-tale drains from the SFP and cask area during each RFO to clear any boron/calcium carbonate from potentially blocking these leak-off lines. In addition, a non-metallic coating was first applied to the cask loading pool and transfer canal surfaces during the 2004 RFO. A second coating was applied to the cask loading pool and transfer canal surfaces during the 2010 RFO. While these corrective actions reduced the tritium leakage, a small amount of tritium was identified when the cask loading pool and transfer canal were refilled following dry fuel transfer inspections in October 2012. Two corrective action reports (AR 01824331, dated November 16, 2012 and AR 02065658, dated August 8, 2015) were written to repair the leak from the catch basin surrounding the skimmer housing for the cask loading pool. Also, following an engineering inspection of the transfer canal non-metallic lining in August 2015, several corrective action reports were written to repair a large area of the non-metallic liner that had become delaminated on the wall near the gate valve in the transfer canal (AR 02069919, dated August 27, 2015, AR 02079453, dated October 6, 2015, AR 02090903, dated November 12, 2015, and AR 02092518, dated November 19, 2015). WO 01207232 was initiated in September 2015 to repair both the skimmer box leak and the delamination of the non-metallic liner on a portion of the transfer canal wall. In September 2015, the skimmer box leak was repaired by an engineered coating applied to the skimmer box internals. This coating effectively sealed the box and associated pipe penetrations from further water leakage. In June 2016, a re-application of the non-metallic coating was applied to the transfer canal walls.

To evaluate the effectiveness of these corrective actions, the results from several groundwater monitoring wells in the vicinity of the FSB were reviewed, which provide indications of leak detection and establish trends of the tritium concentrations and its migration in the surrounding groundwater table and marshland. The three monitoring wells in the vicinity of the FSB are monitoring wells SW-1, SD-1 and BD-2, which are being sampled and analyzed quarterly. Tritium is the only radioisotope identified in water samples taken from these three monitoring wells. In September 2016, a water sample from well SW-1, showed a decreasing concentration of tritium of 1,820 pico-Curies per liter (pCi/l) and the other two monitoring wells also show a decreasing trend (SD-1 tritium concentration is currently 652 pCi/l and BD-2 is not detectable) which indicates NextEra's corrective actions for isolating the leak have been effective.

Currently, isolating the tritium leak in the skimmer housing for the cask loading pool has been completed. The repair of the non-metallic liner in the transfer canal has largely isolated the tritium leak in the transfer canal. Monitoring of the tritium concentrations in the dewatering wells and in the groundwater monitoring wells will continue. To date, the tritium monitoring results have indicated that the leakage has been greatly reduced, but small amounts of tritium leakage/leaching continues. The inspectors determined that NextEra's overall response to identifying the on-site groundwater tritium condition, analyzing the causes of the condition, and initiating corrective actions met the standards of NextEra's CAP. The prioritization and timeliness of the corrective actions was determined to be commensurate with the low safety significance of the problem.

4OA3 Follow-Up of Events and Notices of Enforcement Discretion (71153 – 1 sample)

(Closed) Licensee Event Report (LER) 05000443/2016-001-00: Automatic Reactor Trip Due to Turbine Trip

On March 2, 2016, Seabrook experienced an automatic reactor trip due to an unexpected turbine trip. Seabrook personnel later determined the cause of the turbine trip was a voltage transient from the loss of the ED-I-11 inverter, which supplies power to the turbine control system (TCS). As a result of this voltage transient, power supplies in the TCS momentarily shutdown as designed, and satisfied the necessary logic to initiate a turbine trip signal that resulted in the automatic reactor trip. The inspectors reviewed the adequacy of both the root cause evaluation and corrective actions implemented to address the inverter loss and unexpected voltage transient, as documented in AR 2114330. The inspectors did not identify any new issues during the review of the LER. No findings or violations of NRC requirements were identified. This LER is closed.

4OA5 Other Activities

.1 (Closed) Temporary Instruction 2515/190: Inspection of the Proposed Interim Actions Associated with Near-Term Task Force Recommendation 2.1 Flooding Hazard Evaluations

a. Inspection Scope

The inspectors performed activities to verify NextEra's conclusion that interim actions were required. The activities performed were based on questions provided by the NRC staff that reviewed NextEra's near-term task force recommendation 2.1 flood hazard

re-evaluation submittal, as well as the inspector's assessment of the hazard posed to safety-related equipment by the predicted flood levels. The results of the inspection were provided to the associated NRC staff in separate correspondence.

The specific activities performed included:

- 1) The inspectors reviewed the Seabrook Nuclear Power Plant Flooding Hazard Re-Evaluation Report to identify the flooding mechanisms, pathways of concern, and consequences of the postulated, worst-case flooding events;
- 2) The inspectors evaluated the impact of the postulated flooding on the safety-related equipment that would be potentially at risk;
- 3) The inspectors examined the exterior doors that would prevent water infiltration to assess the material condition of the doors and the door seals;
- 4) The inspectors reviewed the proposed interim actions, materials, and procedures for a probable maximum flood event;
- 5) The inspectors discussed the NRC staff reviewer's questions with NextEra engineering personnel to directly obtain their responses.

The inspectors verified that issues identified were entered into NextEra's corrective action program

b. Findings

No findings were identified.

.2 World Association of Nuclear Operators (WANO) Report Review

a. Inspection Scope

The inspectors reviewed the final report for the WANO plant assessment of Seabrook conducted in April and May 2015. The inspectors evaluated this report to ensure that NRC perspectives of Seabrook performance were consistent with any issues identified during the assessment. The inspectors also reviewed this report to determine whether WANO identified any significant safety issues that required further NRC follow-up.

b. Findings

No findings were identified.

4OA6 Meetings, Including Exit

On October 13, 2016, the inspectors presented the inspection results to Mr. Eric McCartney, Site Vice President, and other members of the Seabrook staff. The inspectors verified that no proprietary information was retained by the inspectors or documented in this report.

ATTACHMENT: SUPPLEMENTARY INFORMATION

SUPPLEMENTARY INFORMATION

KEY POINTS OF CONTACT

Licensee Personnel

E. McCartney, Site Vice President
R. Dodds, Plant General Manager
C. Adams, General Supervisor, Operations Training
K. Axelson, Project Manager
V. Brown, Senior Licensing Analyst
K. Browne, Licensing Manager
A. Chesno, Performance Improvement Manager
G. Desrochers, Electrical Maintenance Technician
S. Folsom, Acting Maintenance Director
M. Haidul, Fire Protection Engineer
F. Haniffy, Radiation Protection Senior Analyst
J. Hoffman, Contractor
T. Knott, Design Engineer – Civil/Mechanical
R. Law, Fire Protection Coordinator
B. McMann, Electrician
D. Ritter, Site Operations Director
D. Robinson, Chemistry Manager
D. Strand, Radiation Protection Manager
P. Wasil, Engineer

LIST OF ITEMS OPENED, CLOSED, DISCUSSED, AND UPDATED

Closed

05000443/2016-001-00	LER	Automatic Reactor Trip Due to Turbine Trip (Section 4OA3)
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LIST OF DOCUMENTS REVIEWED

Section 1R01: Adverse Weather Protection

Procedures

OS1200.03, Severe Weather Conditions, Revision 27

Miscellaneous

UFSAR Chapter 2
UFSAR Chapter 3

Section 1R04: Equipment Alignment

Procedures

OS1006.04, Operation of the Containment Spray System, Revision 25
OX1426.19, Aligning DG 1B Controls for Auto Start, Revision 6

Condition Reports

00179044 02027947 02082867

Maintenance Orders/Work Orders

40444718 94128777

Drawings

PID-1-DG-B20466, Diesel Generator Cooling Water System Train 'B' Detail, Revision 22

Section 1R05: Fire Protection

Procedures

OS1200.00, Response to Fire or Fire Alarm, Revision 23

Condition Reports

2155096

Miscellaneous

Seabrook Station Fire Protection Pre-Fire Strategies, Volume I, EFW Pump House, EFP-F-1-A
Seabrook Station Fire Protection Pre-Fire Strategies, Volume I, Essential Switchgear 'B',
CB-F-1B-A
Seabrook Station Fire Protection Pre-Fire Strategies, Volume I, Fuel Storage Building,
FSB-F-1-A, Sheets 1, 2 and 3
SSFP, Fire Protection Manual, Revision 38

Section 1R11: Licensed Operator Requalification Program

Procedures

OS1200.00, Response to Fire or Fire Alarm Actuation, Revision 23

Condition Reports

2157178 2161922 2166663

Miscellaneous

Individual Simulator Evaluation Forms for: SM, WCS, RO (2), US
Operations Crew 'A' Simulator Evaluation Form, conducted on 9/13/16
Operations Crew 'B' Simulator Evaluation Form, conducted on 9/20/16
Simulator Exercise Guide, Demonstrative Examination #01, Revision 18
Seabrook Control Room vs. Seabrook Simulator – SRC Approved Differences, dated
12/17/2015

Section 1R12: Maintenance EffectivenessProcedures

LS0569.20, "Lubrication PM and Starter Inspection for Motor Operated Valve Actuators,"
Revision 10

OS1013.03, "Residual Heat Removal Train A Startup and Operation," Revision 32

OX1413.03, "B Train RHR Quarterly Flow and Valve Stroke Test and 18 Month Valve Stroke
Observation," Revision 13

Condition Reports

02034392 02106537 02113394

Maintenance Orders/Work Orders

40423784

Miscellaneous

Maintenance Rule (a)(3) Periodic Assessment dated December 1-4, 2015

OX1413.03, "PM Number RH-OT005 Test Data Sheet," Revision 13

UFSAR Section 6.3, "Emergency Core Cooling," Revision 15

Section 1R13: Maintenance Risk Assessments and Emergent Work ControlProcedures

OP-AA-102-1003, Guarded Equipment, Revision 14

WM-AA-100, Risk Management Program, Revision 0

WM-AA-1000, Work Activity Risk Management, Revision 8

Condition Reports

02154352

Maintenance Orders/Work Orders

40346272 40422925

Miscellaneous

Maintenance Rule a(4) Risk Profile for Work Week 1633-11

Maintenance Rule a(4) Risk Profile for Work Week 1635-01

Section 1R15: Operability Determinations and Functionality AssessmentsProcedures

OP-AA-108-1000, Operator Challenges Program Management, Revision 2

OX0443.06, Deluge and Preaction Sprinkler Valve 18 Month Actuation Test, Revision 11

Condition Reports

01977965	01980120	02111600	02125217	02134682	02138457
02138646	02138913	02142376	02142547	02142746	02142754
02144080	02144144	02145459	02145503	02145545	02145556
02145758	02147116	02148673	02148674	02148675	02149618
02150378	02150873				

Maintenance Orders/Work Orders

4059109 40376258 94141093

Miscellaneous

Calculation C-S-1-E-0161, Fuel Oil Consumption Rate Calculation, Revision 18

FP-V-214 Apparent Cause Evaluation, dated 8/9/16

FP-V-214 Past Operability Review, dated 8/9/16

FP-V-214 Maintenance Rule Functional Failure Evaluation, dated 7/27/16

National Fire Protection Association (NFPA) 15, Water Spray Fixed Systems, 1982 Edition

NUREG-0896, NRC Safety Evaluation Report Section 9.5.1.5, Fire Detection and Suppression,
dated 3/83Drawings

1-DG-B20196, Plant Drainage Oil/Water Separation System 2, Revision 7

1-DG-D20464, Diesel Generator Fuel Oil System Train B, Revision 17

Section 1R19: Post-Maintenance TestingProcedures

LS0558.03, 4.16 KV Motor – Routine testing, Inspection and PM, Revision 12

LS0563.22, Testing of Agastat 120 VAC (7000 Series) TDPU Timing Relay, Revision 11

LS0564.01, Insulation Resistance/Polarization Index Testing, Revision 7

MA-AA-203-1000, Maintenance Functional Testing, Revision 1

MS0539.11, Emergency Diesel Generator Pre-Lube Pump Maintenance, Revision 13

MS0539.51, DG 1A Engine Lube Oil System Draining, Filling, and Venting, Revision 3

OX1413.01, 'A' Train RHR Quarterly Flow and Valve Stroke Test, Revision 22

OX1426.01, DG 1A Monthly Operability Surveillance, Revision 42

OX1456.01, Charging Pump A & B Quarterly Flow and Valve Stroke Test and 18 Month Remote
Position Indication Verification, Revision 22

OX1456.81, Operability Testing of IST Valves, Revision 25

Condition Reports

02136137	02142737	02143384	02144492	02144607	02145629
02147497	02149618	02149771	02153246		

Maintenance Orders/Work Orders

40214094	40355763	40376258	40398695	40398696	40412478
40412493	40416404	40416420	40418153	40421416	40422208
40480247					

Miscellaneous

Calculation C-S-1-E-0161, Fuel Oil Consumption Rate Calculation, Revision 18

Clearance Online-Cycle 18-1-EAH-FN-180-A

ES1807.025, Form B, VT-2 Visual Exam Form, Revision 6

Drawings

1-CS-B20729, Chemical & Volume Control System Boric Acid Detail, Revision 20

1-NHY-301115, Sh. CR9b, SW-PP. Hse. Exh. Fan 1-FN-38B & Intake Damper 1-DP-39B,
Legend & Sw Development, Revision 7

1-NHY-301115, Sh. Cr9e, Control Wiring Diagram SW-PP. Hse. Exh. Fan 1-FN-38B & Intake
 Damper 1-DP-39B, Revision 0
 FP51998, 3" Grinnell Nuclear Diaphragm Valve, Revision 0

Section 1R22: Surveillance Testing

Procedures

CX0901.02, Determination of Dose Equivalent I-131, Revision 12
 CS0910.01, Primary Systems Sampling At SS-CP-166A, Revision 24
 LX0556.97, 1-EDE-B-1-C, Battery Performance Test, Revision 7
 OP-AA-200, Surveillance Frequency Change Process, Revision 1
 OP-AA-200-1001, Evaluation of Proposed Changes to Surveillance Test Intervals, Revision 3
 OP-AA-200-1002, Implementation and Monitoring of Surveillance Test, Revision 2
 OX1416.04, Service Water Quarterly Pump and Discharge Valve Test and Comprehensive
 Pump Test, Revision 20

Condition Reports

01647036	01832016	02072480	02137888	02141455	02141601
02141753	02148430				

Maintenance Orders/Work Orders

40407323	40410482	40410530
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Miscellaneous

CH-L121, Seabrook Station Primary Chemistry Report dated 7/5/16
 NEI 04-10, Revision 1
 SB Gamma Spectrum and Peak Analysis and I-131 Equivalence Report, dated 7/5/16
 SBK-PRAE-16-004
 UFSAR, Revision 17

Section 2RS8: Radioactive Solid Waste Processing and Radioactive Material Handling, Storage, and Transportation

Procedures

CS0918.02, 10 CFR Part 50 and Part 61 Sample Analysis Methods, Revision 9
 HD0958.38, Evaluation of Isotopic Mix, Revision 32
 RP18.4, Isotopic Characterization of Radwaste, Revision 2
 RP-AA-108-1002, Shipment of Radioactive Material, Revision 6
 RP-AA-108-1003, Radioactive Materials Surveys for Shipments, Revision 4
 RP-AA-108-1004, Packaging Radioactive Materials for Shipment, Revision 1
 WD0598.079, Screening and Validation of Part 61 Data, Revision 4
 WD0598.092, Inputs to Characterizing Radioactive Materials and Waste for Shipment, Revision 1

Condition Reports

010985765	01985770	02037569	02044683	02086002	02087858
02099667	02122268				

Miscellaneous

Seabrook Station Process Control Program, dated 9/23/14

Quality Assurance

3931 for Energy Solutions, dated 6/15/15

NUPIC Audit 2k Hit/Department Assessment Report 2140775, dated 6/29/16

NUPIC Audit 24202 for WMG Inc., dated 3/18/16

Seabrook Nuclear Oversight Report SBK 16-001, dated 4/7/16

10 CFR Part 61 Scaling FactorsTeledyne Brown Engineering, Inc. Reports of Analysis for: RCS Filter; SFP Filter; WL Filter;
Fuel Cleaning Filter; RCS Filter, Cycle 17-18 DAWTrainingRW1010C, NextEra Energy Management of Radioactive Materials – DOT Shipping
RW1022I, NextEra Energy Packaging and Inspecting Radioactive Material Shipping
Containers

WMG Course RC-102, Use of WMG Programs and Regulatory Interfaces

WMG Course RC-300, Transportation of Radioactive Material by Air

Shipments

15-005 16-005 16-016 16-017 16-018

Section 40A1: Performance Indicator VerificationProcedures

EN-AA-105-1005, Mitigating Performance Index, Revision 2

LI-AA-100-10003, NRC Performance Indicator, Revision 0

OX1426.35, Emergency Diesel 1A Interlock Test & Startup/Stby Surv, Revision 11

Condition Reports

02159224 02069228 02017707

Miscellaneous

LIC-15032, 16002, 16006, 16011

MSPI Derivation Report, Seabrook Unit 1, June 2016

PEG-29, Revision 11

SBK-PRAE-15-001, Revision 0

Section 40A2: Problem Identification and ResolutionProcedures

MA 10.3, Boric Acid Corrosion Control Program, Revision 16

Condition Reports

01792134	01824331	01902166	01904526	01955327	01958609
01959151	01960191	01969480	02019343	02025166	02029379
02048340	02065658	02069919	02079208	02079299	02079313
02079453	02085126	02089267	02089272	02089710	02090903
02092518	02111096	02131874	02136957	02137106	02144355
02144642	02145627	02154976	02155767		

Maintenance Orders/Work Orders

01207232

Miscellaneous

Boric Acid Corrosion System Health Report

Boric Acid Corrosion Control Program Quick hit Department Assessment dated 6/29/16

EPRI Boric Acid Corrosion Guidebook, Revision 1

SealPRO Boric Acid WR/WO Status Report dated 7/15/2016

Section 40A3: Follow-up of Events and Notices of Enforcement DiscretionCondition Reports

1936181 1969652

MiscellaneousPlant Health Committee Meeting Minutes, May 11, 2016, Issue No. SEA-16-0025, Turbine
Control System Power Supply Reliability**Section 40A5: Other Activities**Procedures

ON1090.13, Response to Natural Phenomena Affecting Plant Operations, Revision 11

OS1200.03, Severe Weather Conditions, Revision 27

OP-AA-102-1002, Seasonal Readiness, Revision 13

Condition Reports

02076178	02125504	02126466	02126467	02126472	02126478
02126479	02126480	02126482	02127057	02133985	02148431
02149225	02149308	02149317	02149589	02155159	

Maintenance Orders/Work Orders

40441180	94138471	94138725	94138726	94138728	94138729
94138730	94138731	94138877	94130561		

Miscellaneous

Flood Hazard Reevaluation Report (ML15274A245)

UFSAR, Revision 17

WANO Peer Review of NextEra Energy Seabrook, May 2015 Report

LIST OF ACRONYMS

ADAMS	Agencywide Document Access and Management System
AR	action request
ARP	alarm response procedure
BACC	boric acid corrosion control
CAP	corrective action program
CFR	<i>Code of Federal Regulations</i>
EDG	emergency diesel generator
EFW	emergency feedwater
ESFAS	engineered safety features actuation system
FSB	fuel storage building
MR	maintenance rule
NRC	Nuclear Regulatory Commission
OWA	operator workaround
pCi/l	pico-Curies per liter
RFO	refueling outage
RG	Regulatory Guide
RHR	residual heat removal
SFP	spent fuel pump
SSC	structure, system, and component
SSPS	solid-state protection system
TCS	turbine control system
TS	technical specification
UFSAR	Updated Final Safety Analysis Report
WANO	World Association of Nuclear Operators
WO	work order