



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
REGION I  
2100 RENAISSANCE BLVD.  
KING OF PRUSSIA, PA 19406-2713

May 6, 2016

EA-16-101

Mr. Dean Curtland  
Vice President, Seabrook Station  
c/o Mr. Michael Ossing  
NextEra Energy Seabrook, LLC  
626 Lafayette Rd.  
Seabrook, NH 03874

SUBJECT: SEABROOK STATION - INSPECTION REPORT 05000443/2016008  
RELATED TO ALKALI-SILICA REACTION AFFECTS ON SAFETY-RELATED  
CONCRETE STRUCTURES AND NOTICE OF VIOLATION

Dear Mr. Curtland:

On March 24, 2016, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at Seabrook Station. The enclosed inspection report documents the inspection results, which were discussed at the exit meeting, with you and other members of your staff.

The inspection examined activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your license. The inspectors reviewed selected procedures and records, examined structures in the field, and interviewed personnel related to your actions to address the effects of Alkali-Silica Reaction (ASR) on safety-related concrete structures at the Seabrook Station. Specifically, a team of inspectors assessed NextEra's performance to identify, evaluate and resolve ASR effects involving discrete wide cracking and deformation (which is different than the micro-cracking typically associated with ASR). These conditions were previously described in NRC findings over the past two years involving the Containment Enclosure Building, Residual Heat Removal Equipment Vault and Fuel Storage Building. The inspection focused on the adequacy of NextEra's reviews and evaluations to ensure ASR-affected structures remain capable of performing their intended safety functions.

During the exit meeting, the inspection team conclusions and observations were summarized regarding NextEra's corrective actions to resolve the ASR non-conforming condition. The team concluded, based on review of NextEra recently completed operability determination documents, that ASR-affected structures are capable of performing their safety-related functions considering the observed cracking and deformation. The team further indicated that additional attention by NextEra staff is warranted to implement Seabrook's structures monitoring and operability screening processes to ensure conclusions regarding structural capability are updated and technically supported.

One violation of very low safety significance (Green) is cited in a Notice of Violation (Notice) and the circumstances surrounding it are described in the enclosed inspection report. The violation describes two examples where initial and prompt operability determinations were not completed by NextEra staff when additional information regarding the effects of ASR on safety-related concrete structures was identified. Prompt operability determinations have since been developed and were reviewed during this inspection. The violation is similar to several non-cited violations (NCVs) of very low safety significance identified by the NRC within the past two years for which corrective actions have not been fully effective. The violation was evaluated in accordance with the NRC's Enforcement Policy. The current Enforcement Policy is available for review on the NRC's Website <http://www.nrc.gov/about-nrc/regulatory/enforcement/enforce-pol.html>. This violation meets the criteria in Section 2.3.2a of the Enforcement Policy to disposition it as an NCV. However the NRC is issuing a Notice of Violation because corrective actions have not been effective in addressing ASR-related structural issues. Specifically, corrective actions to address NRC findings involving identification and evaluation of ASR effects on structures over the past two years were not effective to ensure prompt operability determinations were maintained with the latest information. Accordingly, the NRC is issuing the Notice of Violation and requiring a response regarding your plans to address this concern.

You are required to respond to this letter and follow the instructions specified in the enclosed Notice when preparing your response. Your response in accordance with the instructions should describe your actions to address the violation and your plans and milestones to resolve the non-conforming condition involving ASR-affected Seabrook structures. If you have additional information that you believe the NRC should consider, you may provide it in your response to the Notice. The NRC's review of your response to the Notice will determine whether additional enforcement action is necessary to ensure compliance with regulatory requirements.

In accordance with Title 10 of the *Code of Federal Regulations* (10 CFR) 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response, will be available electronically, for public inspection, in the NRC's Public Document Room or from the Publicly Available Records component of the NRC's document system, Agencywide Documents Access and Management System (ADAMS). ADAMS is accessible from the NRC's Website at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

Sincerely,

**/RA/**

Mel Gray, Chief  
Engineering Branch 1  
Division of Reactor Safety

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

Enclosure:

1. Inspection Report No. 05000443/20160008  
w/Attachment: Supplemental Information
2. Notice of Violation

cc w/encl: Distribution via ListServ

One violation of very low safety significance (Green) is cited in a Notice of Violation (Notice) and the circumstances surrounding it are described in the enclosed inspection report. The violation describes two examples where initial and prompt operability determinations were not completed by NextEra staff when additional information regarding the effects of ASR on safety-related concrete structures was identified. Prompt operability determinations have since been developed and were reviewed during this inspection. The violation is similar to several non-cited violations (NCVs) of very low safety significance identified by the NRC within the past two years for which corrective actions have not been fully effective. The violation was evaluated in accordance with the NRC's Enforcement Policy. The current Enforcement Policy is available for review on the NRC's Website <http://www.nrc.gov/about-nrc/regulatory/enforcement/enforce-pol.html>. This violation meets the criteria in Section 2.3.2.a of the Enforcement Policy to disposition it as an NCV. However the NRC is issuing a Notice of Violation because corrective actions have not been effective in addressing ASR-related structural issues. Specifically, corrective actions to address NRC findings involving identification and evaluation of ASR effects on structures over the past two years were not effective to ensure prompt operability determinations were maintained with the latest information. Accordingly, the NRC is issuing the Notice of Violation and requiring a response regarding your plans to address this concern. Accordingly, the NRC is issuing the Notice of Violation and requiring a response regarding your plans to address this concern.

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Letter to Mr. Dean Curtland from Mr. Mel Gray dated May 6, 2016

**SUBJECT: SEABROOK STATION - INSPECTION REPORT 05000443/2016008  
RELATED TO ALKALI-SILICA REACTION (ASR) AFFECTS ON  
SAFETY-RELATED CONCRETE STRUCTURES**

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**U.S. NUCLEAR REGULATORY COMMISSION**

**REGION I**

Docket No. 50-443

License No. NPF-86

Report No. 05000443/2016008

Licensee: NextEra Energy Seabrook, LLC

Facility: Seabrook Station

Location: Seabrook, NH 03874

On-Site Dates: February 1 – 5 and March 21 – 24, 2016

Inspector: William A. Cook, Senior Reactor Analyst  
Region I

Accompanied by: Angela Buford, Structural Engineer  
Office of Nuclear Reactor Regulation (NRR)  
Bryce Lehman, Structural Engineer, NRR

Approved by: Mel Gray, Chief  
Engineering Branch 1  
Division of Reactor Safety

## NOTICE OF VIOLATION

NextEra Energy Seabrook, LLC  
Seabrook Station

Docket No. 50-443  
License No. NPF-86  
EA-16-101

During an NRC inspection conducted between February 1 and March 24, 2016, a violation of NRC's requirements was identified. In accordance with the NRC Enforcement Policy, the violation is listed below:

10 CFR 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," states, in part, that activities affecting quality shall be prescribed by documented instructions, procedures or drawings, of a type appropriate to the circumstances, and shall be accomplished in accordance with these instructions, procedures or drawings.

NextEra Nuclear Fleet Administrative Procedure, EN-AA-203-1001, "Operability Determinations/Functionality Assessments," identifies the responsibilities and requirements for preparation and approval of Immediate Operability Determinations (IOD) and Prompt Operability Determinations (POD) for establishing the acceptability of continued operation of a plant structure, system, or component that is suspected to be degraded or nonconforming. Per Section 2.0, Terms and Definitions, IODs are performed by the Shift Manager without delay (within 8 hours of discovery), using best available information to make an operability declaration. Upon request of the Shift Manager, a POD is performed as a follow-up to an IOD when additional information is needed to confirm the declaration of operability.

Contrary to the above, on two occasions between March 17, 2015, and January 22, 2016, Energy Seabrook, LLC (NextEra) did not accomplish an activity affecting quality in accordance with its procedure. Specifically, NextEra received information from vendors identifying non-conforming conditions adversely impacting two reinforced concrete structures at Seabrook Station, and did not complete an appropriate IOD or initiate a follow-up POD to evaluate the impact of that non-conforming condition on structural performance. In particular,

- 1) On March 17, 2015, NextEra entered a WJE report, entitled "Condition Assessment of the Cracking in the RHR and CS Equipment Vault," into the station document tracking system and added the report's recommendations into the Corrective Action Program under Action Report (AR) 01977456, without completing an appropriate IOD or initiating a POD. The report identified structural loading (a load not considered by ACI 318-71, the design and construction code of record) due to ASR as the cause for the excessive bulk expansion and cracking of the RHR/CS Vault interior and exterior support walls; and
- 2) On December 2, 2015, NextEra initiated AR 02094762 to track recommendations from SG&H report entitled "Evaluation and Design Confirmation of As-Deformed CEB," without completing an appropriate IOD or initiating a POD. The report also identified structural loading due to ASR as the cause for deformation of the Containment Enclosure Building (CEB), a condition not conforming with ACI 318-71.

This violation is associated with a Green Significance Determination Process finding. Pursuant to the provisions of 10 CFR 2.201, NextEra is hereby required to submit a written statement or explanation to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001 with a copy to the Regional Administrator, Region I, and a copy to the NRC Resident Inspector at Seabrook Station, within 30 days of the date of the letter transmitting this Notice of Violation (Notice). This reply should be clearly marked as a "Reply to a Notice of Violation" EA-16-101 and should include: (1) the reason for the violation, or, if contested, the basis for disputing the violation or severity level; (2) the corrective steps that have been taken and the results achieved; (3) the corrective steps that will be taken including a comprehensive and integrated ASR corrective action plan (ACAP) for resolving ASR-induced non-conformances with the current licensing basis (CLB) and the date when your structures monitoring program will be revised to monitor the progression of ASR degradation related to bulk expansion and deformation; and (4) the date when full compliance will be achieved. Your response may reference or include previous docketed correspondence, if the correspondence adequately addresses the required response. If an adequate reply is not received within the time specified in this Notice, an Order or a Demand for Information may be issued as to why the license should not be modified, suspended, or revoked, or why such other action as may be proper should not be taken. Where good cause is shown, consideration will be given to extending the response time.

If you contest this enforcement action, you should provide a copy of your response, with the basis for your denial, to the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001. Because your response will be made available electronically for public inspection in the NRC Public Document Room or from the NRC's document system (ADAMS), accessible from the NRC's Website at <http://www.nrc.gov/reading-rm/adams.html>, to the extent possible, it should not include any personal privacy, proprietary, or safeguards information so that it can be made available to the public without redaction. If personal privacy or proprietary information is necessary to provide an acceptable response, then please provide a bracketed copy of your response that identifies the information that should be protected and a redacted copy of your response that deletes such information.

If you request withholding of such material, you must specifically identify the portions of your response that you seek to have withheld and provide in detail the bases of your claim of withholding (e.g., explain why the disclosure of information required by 10 CFR 2.390(b) to support a request for withholding confidential commercial or financial information). If Safeguards information is necessary to provide an acceptable response, please provide the level of protection described in 10 CFR 73.21.

In accordance with 10 CFR 19.11, you may be required to post this Notice within two working days of receipt.

Dated this 6th day of May 2016

## SUMMARY

IR 05000443/2016008; 2/01/2016 – 3/24/2016; Seabrook Station (Problem Identification and Resolution; Follow-up on Operability Determinations).

This report covers an inspection by a regional Senior Reactor Analyst, with assistance from Office of Nuclear Reactor Regulation (NRR) structural specialists. One Green finding was identified. The significance of most findings is indicated by their color (Green, White, Yellow, Red) using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process" (SDP). The cross-cutting aspects for the findings were determined using IMC 0310, "Components Within Cross-Cutting Areas." The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 4, dated December 2006.

### **Cornerstone: Mitigating Systems**

Green. The team identified a violation of Appendix B, Criterion V, "Instructions, Procedures, and Drawings," and NextEra Nuclear Fleet Administrative Procedure, EN-AA-203-1001, "Operability Determinations/Functionality Assessments," involving Seabrook Station staff failing to perform operability evaluations for identified non-conforming conditions. Specifically, the team identified that following receipt of a vendor's structural assessment of the RHR/CS Vault on March 17, 2015, the Seabrook staff failed to complete an appropriate immediate operability evaluation or initiate a Prompt Operability Determination (POD) for an identified structural load (ASR induced) not considered by ACI 318-1971, the design and construction code of record. The team also identified that following receipt of another vendor's report, "Structural Evaluation and Design Confirmation of the CEB," on December 2, 2015, that the Seabrook staff failed to complete an immediate and follow-on POD to address ASR induced loads (due to internal expansion and externally applied by ASR-affected concrete backfill) that are causing CEB structural deformation.

The team determined that the two examples of failure to identify structural loading due to ASR expansion as a non-conforming condition and to then promptly evaluate the impact of this condition on the operability of the affected structures is a performance deficiency. This performance deficiency is considered to be more than minor because the non-conforming condition adversely impacts the structural integrity design attribute of the reactor safety barrier integrity and mitigating systems objectives. In addition, the finding is similar to more than minor Example 3.i of Appendix E of IMC 0612. The finding was evaluated in accordance with IMC 0609, Appendix A, "The Significance Determination Process for Findings At-Power," Exhibit 3, "Barrier integrity Screening Questions," and screened as very low safety significance (Green) because the finding only represents a degradation in design margin and did not impact the radiological barrier function of the affected structures. The finding had a cross cutting aspect in the area of problem identification and resolution, P3, timely resolution of issues. Specifically, NextEra did not fully evaluate conditions adverse to quality, including evaluating the effects of the ASR expansion-induced loads on operability of certain structures, in a timely manner following identification by an engineering analysis. (Section 4OA5)



## REPORT DETAILS

### Background

The alkali-silica reaction (ASR) is a chemical reaction in concrete, which occurs over time in the presence of water, between the alkaline cement paste and reactive non-crystalline silica that is found in some common coarse aggregates. In the presence of water, the ASR forms a gel that expands, causing micro-cracks that change the physical structural properties of the concrete, including compressive and tensile strength, modulus of elasticity, and Poisson Ratio. At Seabrook Station, reinforced concrete structures have shown evidence of ASR degradation.

In the summer 2010, NextEra performed an Immediate and Prompt Operability Determination (POD) for the control building "B" electrical tunnel structure based on core samples taken from the building. NRC inspection Report 05000443/2010004, issued November 1, 2010, ADAMS Accession No. (ML103050447) documented the NRC review of the POD with no findings. From 2010-2012, the NRC completed further inspections (ML111330689; ML112241543; ML120480066) of NextEra's activities to investigate, evaluate and monitor Seabrook structures affected by ASR. These inspections resulted in the NRC issuing Confirmatory Action Letter No. 1-2012-002 dated May 16, 2012, to document NextEra's commitments to address ASR-affected Seabrook structures (ML12125A172). The commitments involved NextEra establishing a bounding prompt operability determination for all ASR-affected buildings as well as interim monitoring actions to ensure ASR related degradation is effectively managed. Additional commitments included the commencement of test programs at the Ferguson Structural Engineering Laboratory (FSEL), University of Texas at Austin to validate monitoring methods, to assess structural performance, and to enhance the Seabrook Structures Monitoring Program (SMP) to manage ASR.

NextEra concluded that ASR-affected structures remained operable, but were non-conforming with the site design and licensing basis. The NRC completed team inspections to verify NextEra staff completed their commitments and documented the results in inspection reports dated December 3, 2012, and August 9, 2013 (M112338A283 and ML13221A172). The NRC documented how each commitment was determined to be met and closed the CAL via NRC letter dated October 9, 2013 (ML13274A670).

The NRC continued to conduct inspections approximately every six months to evaluate NextEra's activities to investigate, monitor and affirm the structural capability of Seabrook structures affected by ASR.

NextEra's testing of large scale ASR-affected test specimens at FSEL commenced in late 2013 and was planned to be completed under NextEra's direction by February 2016. In 2014-2015, the inspectors documented findings of very low safety significance associated with discrete, large horizontal cracks in an internal wall of the residual heat removal and containment spray (RHR/CS) Vault (ML14212A458); cracks associated with the fuel storage building (ML15037A172); and global relative deformation of the containment enclosure building (CEB) (ML15217A256). The staff concluded these findings were of very low safety significance because the safety function of these structures was not affected.

Based on FSEL's large scale testing program developments in 2015, NextEra revised their structures monitoring/ASR monitoring aging management program to include through-wall expansion monitoring. This expansion will be monitored by devices installed in 2016 in several dozen representative locations.

In the fall 2015, the inspectors completed an inspection to follow-up on the results of NextEra's evaluations and monitoring of the CEB and RHR/CS Vault. In an NRC inspection report dated February 12, 2016, (ML16043A391) the inspectors documented unresolved item (URI) 05000443/2015-01, regarding NextEra's implementation of the Seabrook SMP. The inspectors determined that structural evaluations, performed by contractors and accepted by NextEra staff via their "foreign print" document control process, included discussions that identified the potential to exceed limits in the applicable design and construction code (ACI 318-71) for specific locations in the CEB and RHR/CS Vault walls. The evaluations further recommended actions to determine whether this was the case. The inspectors noted that the Seabrook staff screened or reviewed these evaluations without documenting a justification in a revision or update to the open prompt operability determination (PODs) for these structures. The inspectors requested additional information (ML15357A326) and identified that follow-up inspection was necessary to determine whether there was a performance deficiency. This report documents a follow-up inspection conducted to close this unresolved item 05000443/2015004-01 utilizing NRC Inspection Procedure 71152, "Problem Identification and Resolution."

#### 4. OTHER ACTIVITIES

##### 4OA2 Problem Identification and Resolution (71152)

###### .1 Annual Sample: Review of Corrective Actions for Alkali-Silica Reaction Affected Structures

###### a. Inspection Scope

A Senior Risk Analyst from the NRC Region I Office and two structural engineers from the NRC Office of Nuclear Reactor Regulation (NRR) conducted in-office reviews and two onsite inspections (weeks of February 1 – 5, 2016 and March 21 – 24, 2016) at the Seabrook Station to review NextEra's root cause evaluation and corrective actions related to the identification of differential movement, or deformation, of the containment enclosure building (CEB). This condition was previously described in an NRC inspection report dated August 25, 2015 (ML15217A256). NRC inspectors also reviewed evaluations related to discrete cracks identified in below grade, internal walls in the residual heat removal and containment spray (RHR/CS) equipment vault. This condition was previously described in an NRC inspection report dated August 5, 2014, (ML14212A458).

The inspectors performed an in-depth review of NextEra's Prompt Operability Determinations (PODs) and associated evaluations and corrective actions to these non-conforming conditions and NextEra's response (ML16117A312) dated April 14, 2016, to related questions communicated by the NRC staff on December 23, 2015 (ML15357A326).

The inspectors also assessed the problem identification threshold, extent of condition reviews, and the prioritization and timeliness of corrective actions to determine whether NextEra personnel were appropriately identifying, evaluating ASR-related problems associated with the CEB, RHR/CS Vault and other ASR-affected structures at Seabrook Station. The inspectors compared actions taken by the Seabrook staff to NextEra's Corrective Action Program (CAP) implementing procedures and 10 CFR 50, Appendix B.

b. Findings

Residual Heat Removal and Containment Spray (RHR/CS) Vault

Introduction. The team identified a violation of Appendix B, Criterion V, “Instructions, Procedures, and Drawings” involving Seabrook Station staff failing to perform an operability evaluation for an identified non-conforming condition. Specifically, the team identified that NextEra staff accepted their vendor’s structural assessment report of the RHR/CS Vault on March 17, 2015, which identified an ASR induced structural load not considered in the design code of record. However, Seabrook staff did not complete an appropriate immediate operability evaluation, initiate a new Prompt Operability Determination or revise their POD for the RHR/CS Vault to evaluate this information.

Description. The team reviewed the following Action Reports (ARs) and corrective action program documents to assess NextEra’s response to observed ASR-related structural deformation and bulk expansion and cracking of the RHR/CS Vault:

- ARs 01664399 and 01757861 – These two ARs address a Prompt Operability Determination, dated June 25, 2012, that concluded the RHR/CS Vault, along with a number of other ASR-affected structures at Seabrook Station, were operable but degraded. NextEra staff identified that the presence of ASR adversely affected the mechanical properties of concrete. The basis for concluding that the ASR-affected structures remained operable was the result of re-evaluating design basis calculations for these structures assuming a bounding value for critical limit state degradation and confirming sufficient margin remained between design capacity and design demand/loads to account for the assumed worst-case ASR degradation. The inspectors determined that Revision 2 to this POD has remained in effect and valid since mid-2012, but did not address the bulk expansion associated with ASR and the consequential impact of structural cracking and deformation.
- AR 01929460 – Initiated on December 23, 2013, to address concerns expressed by the NRC resident inspectors that the observed macro-crack at the minus 26-foot elevation of the RHR/CS Vault may have adverse structural implications and may degrade the fire barrier rating of the wall separating the RHR and CS equipment trains. The Operability Notes stated that NextEra engineering staff’s review concluded the cracks do not cause an unacceptable condition for either a fire barrier or structural consideration. This immediate operability evaluation was later supplemented by a Condition Evaluation, dated December 23, 2013, and then revised on January 13, 2014.

Assignment 03 was initiated to have a vendor complete a condition assessment of the RHR/CS Vault using ACI 349.3R guidelines. The “Completion Notes” for Assignment 03 stated that the follow-up actions (recommendations) from the Wiss, Janney, Elstner Associates (WJE) Condition Assessment (FP100903) have been added to AR 01977456.

- AR 01977456 – Initiated on July 10, 2014, to address the NRC resident inspectors having identified a Green finding involving the failure to have appropriately addressed the RHR/CS Vault macro crack in accordance with Seabrook Station Structures Monitoring Program (SMP).

Specifically, the observed macro crack exceeded the SMP Tier 2 criteria (reference ACI 349.3R) and warranted a structural evaluation, but NextEra staff had failed to complete the structural evaluation. The inspectors determined the Operability Notes used a “template” operability assessment statement that identified that the issue (failure to adhere to the SMP) did not directly relate to the functionality of system, structure or component.

The inspectors determined NextEra staff processed and accepted the WJE “Condition Assessment of the Cracking in RHR and CS Equipment Vault,” dated March 5, 2015, into the Seabrook documentation tracking system under Foreign Print (FP) 100903 on March 17, 2015. Included in this document was a limited structural analysis (Section 5.2) which described the cracks as likely resulting from an ASR-related load not previously accounted for in the design basis structural calculation. The inspectors determined that this statement represented a non-conforming structural loading condition and was not identified by NextEra staff as new information which impacted their RHR/CS Vault prompt operability determination (POD). The inspectors observed the FP100903 recommendations (Section 7) were added to this AR (01977456) under Assignments 13, 17 and 18, for tracking purposes.

In response to NRC inspectors’ questions, NextEra staff issued a POD (Action 20) under AR01977456 on February 12, 2016, for the RHR/CS Vault to address the non-conforming condition identified in FP100903. The POD concluded the RHR/CS Vault was “operable, but nonconforming.” Based upon NRC inspector review, the more correct characterization, per EN-AA-203-1001, should be “operable, but degraded.” This non-compliance with EN-AA-203-1001 is considered a minor issue, but is documented for assessment purposes (reference AR 02120109, Assignment 04). The team’s technical review of the RHR/CS Vault POD is documented in Section 4OA2.2 of this report.

- AR 02085029 – Initiated on October 23, 2015, following an NRC resident inspector briefing of plant management. The inspectors questioned the timeliness of implementation of recommendations NextEra staff accepted as outlined in the WJE Condition Assessment. The inspectors identified that implementation dates of June 2015 were revised to December 2015, without NextEra staff receiving approval from their internal management review committee (MRC). The Operability Notes for this AR was a “template” operability statement (same as used for AR01929460 above). See Section 4OA2.3 below for disposition of this observation.

#### Containment Enclosure Building (CEB)

Introduction. The team identified a violation of Appendix B, Criterion V, “Instructions, Procedures, and Drawings involving NextEra staff at the Seabrook Station failing to perform an operability evaluation for an identified non-conforming condition. Specifically, the team identified that NextEra’s staff accepted their vendor’s report related to the CEB which described ASR induced loads from internal expansion not considered in the design code of record (ACI 318-71). Further, Seabrook staff did not complete an appropriate immediate operability evaluation, initiate a new POD or revise their current POD for the CEB to evaluate this information.

Description. The team reviewed the following ARs and corrective action program documents to assess NextEra's response to observed ASR-related structural deformation of the CEB:

- ARs 01664399 and 01757861 – These two ARs address a Prompt Operability Determination, dated June 25, 2012, that concluded the CEB, along with a number of other ASR-affected structures at Seabrook Station, were operable, but degraded. The inspectors observed Revision 2 to this POD remained in effect and valid since mid-2012, but does not address the bulk expansion associated with ASR or the consequential CEB deformation.
- AR 02004748 – Initiated on November 4, 2014, as a result of the NRC resident inspectors identifying a degraded mechanical seal in the mechanical penetration area of the Containment Enclosure Ventilation Area (CEVA) building. Follow-up examination by NextEra staff identified that the fire seal and associated seismic gap was degraded due to differential movement or deformation of the CEB wall relative to the CEVA building walls. This AR resulted in the Seabrook staff initiating a POD (AR 02044627) to ensure the CEB seismic gaps were being maintained. In addition, NextEra staff initiated an Apparent Cause Evaluation (ACE) to evaluate the causes and effect of the CEB deformation.
- AR 02014325 – Initiated on December 19, 2014, as a result of the findings from the engineering staff's preliminary CEB walkdowns (required or initiated per AR 02004748). The title of AR 02014325 is "Assess potential aggregate impact of CEB movement," and listed seven separate ARs identifying impacted systems or components. The Operability Notes for this AR stated that "This AR is written to evaluate the overall impact of an observed plant condition. The results will need to be evaluated for operability as they come up. This AR by itself has no impact on operability of TS or SSCs." Per Assignment 02 of this AR, the Seabrook Management Review Committee (MRC) approved a charter to complete a root cause evaluation (RCE) of the observed CEB deformation and canceled the ACE assigned via AR 02004748. The inspectors noted that a CEB structural evaluation was integral to the RCE efforts.
- AR 02044627 – Initiated on April 30, 2015, following the completion of 93 measurements completed by NextEra's contractor Simpson, Gumpertz & Heger Associates (SG&H) of the CEB seismic gaps. During MRC review of this AR on May 5, 2015, a POD was assigned (02) due by May 7, 2015, and completed on June 11, 2015. In addition, assignments were initiated to revise the SMP (04), perform periodic (six month frequency) seismic gap measurements (07), and complete a revision to the Updated Final Safety Report (UFSAR) (08).
- CEB RCE Report entitled "Containment Enclosure Building Local Deformation," was issued August 5, 2015, and approved August 31, 2015. The RCE used the following Problem Statement: "Structural movement of the seismic Category 1 CEB structure, which has resulted in damage to fire seals and movement in flexible conduit connections, could result in future adverse impact to the CEB ventilation function and adjacent structures and components."

NextEra identified two major causal factors, as follows:

RC1 – “Internal expansion (strain) in the CEB concrete produced by ASR in the in-plane direction of the CEB shell and ASR expansion in the backfill concrete, coincident with a unique building configuration.”

RC2 – “Due to an organizational mindset that conditions such as concrete cracks, water infiltration and misalignment issues were acceptable and inconsequential, the Organization failed to formally perform and document comprehensive evaluations of building conditions. These building conditions could have potentially revealed more significant underlying conditions affecting other structures, such as localized deformation of the CEB.”

Multiple corrective actions were initiated by NextEra staff, including several PODs for systems impacted by the CEB deformation. However, NextEra staff did not initiate a POD or re-evaluate the current open PODs (AR 01664399/AR 1757861) to assess CEB structural performance with the newly identified ASR deformation mechanism. Further, the assignment to complete a structural evaluation per AR 02014325 was not implemented. The team viewed this as a missed opportunity by the NextEra staff to have assessed CEB structural performance, following the identification of a new and different ASR impact (load) on affected structures.

- AR 02094762 – Initiated on December 2, 2015, as a result of NextEra receipt of SG&H report (FP100985) titled “Evaluation and Design Confirmation of As-Deformed CEB.” This evaluation was completed coincident with the CEB RCE. The AR was initiated to track the implementation of recommendations from the SG&H structural evaluation involving the performance of additional engineering reviews and monitoring. The team identified that the Operability Notes documented a “template” operability paragraph, stating that an operability determination was not required. The team’s review of FP100985 identified that the vendor had concluded that the CEB deformation was a result of structural response to both internal loading due to ASR expansion and external loading due to expansion of ASR-affected concrete backfill. Review of CAP records by the team identified that the MRC reviewed this AR on December 8, 2015, and assigned an action to complete a Condition Evaluation by December 30, 2015. The Condition Evaluation was entered into the CAP on December 30, 2015, and provided a qualitative basis for the continued operability of the CEB. Per the December 30, 2015, Condition Evaluation, AR 02094762 Assignment 02 was initiated to update the current CEB POD (AR 01664399) by February 29, 2016. These assignments were made in the timeframe when NRC inspectors were questioning NextEra staff regarding the POD process and the information in FP100985.

On February 19, 2016, NextEra approved a POD (under AR 02094762) that addressed the CEB nonconforming conditions identified in FP100985 involving ASR bulk expansion loading of the structure resulting in building deformation. The POD concluded the CEB was “operable, but degraded.” The team’s detailed technical review of the CEB POD is documented in Section 4OA2.2 of this report.

- AR 02109229 – Initiated on February 10, 2016, as a result of an onsite NRC PI&R inspection debrief with station management. The inspectors questioned whether NextEra staff had defined ASR induced deformation in the context of the current licensing basis and ACI 318-71. The team’s review concluded that the results of the SG&H structural evaluation of the CEB and WJE condition assessment of the RHR/CS Vault independently identified that the deformation (and macro-cracking) caused by ASR expansion represented a structural load not considered by ACI 318-71. Accordingly, this ASR-induced structural loading is a non-conforming condition.

#### Summary – NRC Team Reviews of the RHR/CS Vault and CEB

The team determined that NextEra staff did not complete an appropriate review of the WJE report (FP100903) for the purpose of assessing the implications of the report conclusions on current RHR/CS Vault structural performance and operability. The team’s review of the WJE Condition Assessment identified that the report contained sufficient information to conclude that ASR generated loads (internally generated by the structure) were causing the RHR/CS Vault wall displacement and cracking, and that no design basis loads could have conceivably caused the observed condition. Consequently, it was reasonable to conclude that the ASR imparted structural loading constitutes a non-conformance with ACI 318-71, the building and construction code of record, which does not consider ASR-induced loads.

The team also concluded, based upon their review of the SG&H structural evaluation (FP100985), that sufficient information was documented in the evaluation for NextEra to have concluded that a new or updated operability determination for the CEB was warranted. Specifically, the ASR-induced loads resulting in the deformation of the CEB were not considered in the original design loading calculations (non-conforming condition), and based upon the preliminary finite element analysis (FEA) results, design margins were potentially impacted due to ASR expansion induced loading.

From review of the above ARs and follow-up interviews with Seabrook staff, the team determined that NextEra did not consider the results of either the WJE condition assessment (FP100903) or SG&H structural evaluation (FP100985) as representing significantly new or different information that would change their engineering judgment (albeit undocumented) regarding the continued operability of either the RHR/CS Vault or CEB. However, the inspectors concluded NextEra staff did not adhere to their Fleet Procedure EN-AA-203-1001 in documenting this operability determination until identified by the NRC.

Analysis. The team determined that the two examples of failure to identify structural loading due to ASR expansion as a non-conforming condition and to promptly evaluate the impact of this condition on the operability of the affected structures is a performance deficiency. This performance deficiency is considered to be more than minor because the non-conforming condition adversely impacts the structural integrity design attribute of the reactor safety barrier integrity and mitigating systems objectives. In addition the finding is similar to more than minor Example 3.i of Appendix E of IMC 0612. The finding was evaluated in accordance with IMC 0609, Appendix A, “The Significance Determination Process for Findings At-Power,” Exhibit 3, “Barrier Integrity Screening Questions,” and screened as very low safety significance (Green) because the finding only represents a degradation in design margin and did not impact the radiological barrier function of the affected structures. The finding had a cross cutting aspect in the area of problem identification and resolution, P3, timely resolution of issues.

Specifically, NextEra did not fully evaluate conditions adverse to quality, including evaluating the effects of the ASR expansion-induced loads on operability of certain structures, in a timely manner following identification by a vendor provided engineering analysis.

Enforcement. 10 CFR 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," states that activities affecting quality shall be prescribed by documented instructions, procedures and drawings, and shall be accomplished in accordance with these instructions, procedures or drawings. NextEra Nuclear Fleet Administrative Procedure, EN-AA-203-1001, "Operability Determinations/Functionality Assessments," Sections 4.2 thru 4.4 identify the responsibilities and requirements for preparation and approval of Immediate Operability Determinations (IOD) and Prompt Operability Determinations (POD) for establishing the acceptability of continued operation of a plant structure, system, or component that is suspected to be degraded or nonconforming. Contrary to the above: (1) no immediate operability determination (IOD) was performed on March 17, 2015, (or Prompt Operability assigned) when NextEra entered the WJE condition assessment recommendations into Assignment 03 of AR 01977456; and (2) no IOD was performed on December 2, 2016, (or Prompt Operability assigned) when the NextEra staff entered the SG&H structural evaluation recommendations in to the CAP per Assignment 01 of AR 02094762. Operability determinations were not initiated for the RHR/CS Vault or CEB until prompted by the NRC staff (on or about December 23, 2015) following a conference call between the NRC and NextEra staffs to convey questions regarding the NRC's review of the CEB RCE and FPs 100895 and 100903.

Because this performance deficiency is a repeat problem and representative of an organizational insensitivity to the need for prompt identification and evaluation of an ongoing ASR degradation mechanism (a unique structural performance challenge), this violation is being cited and warrants a docketed response to address the corrective actions taken or planned to prevent recurrence. **(NOV 5000443/2016008-01 Failure to Complete Operability Determinations for ASR-Affected Structures)**

c. Observations

The team conducted in-office reviews and follow-up discussions with the Seabrook staff and contractors regarding NextEra's response to the questions posed during a December 23, 2015 conference call (ML14014A378). The team considered the responses to better understand the technical bases for NextEra's engineering evaluations and operability assessments of the CEB and RHR/CS Vault. NextEra's revised response was provided to the NRC on April 14, 2016 and is publicly available in (ML16117A312).

- 1) The team re-examined the Containment POD (AR 1804477), Revision 00, dated November 1, 2012, to re-assess the validity of the operability evaluation based upon the recent identification of ASR induced bulk expansion and deformation of other safety related ASR-affected structures. Based upon NRC staff and licensee walkdowns, no evidence of ASR-related bulk expansion has been identified on the containment structure. As documented in the POD, the accessible outer surface of containment (the inner surface is inaccessible due to the stainless steel liner/fission product barrier) exhibits evidence of localized ASR micro-cracking in three areas in the annulus region and one location in the mechanical penetration area. The micro-cracking in the mechanical penetration area exceeded the ACI 349.3R Tier 2 criteria and prompted the structural evaluation accompanying the POD. Team review of the containment POD concluded that the operability evaluation remains valid and that the ASR-affected



concrete remains non-conforming with ASME Section III, Division 2, (the design and construction code of record for the containment). The team noted that the five-year ASME Section XI, IWL-2410 in-service inspection of the entire outer containment surface is scheduled by NextEra to be completed later in 2016.

Based upon the team's review of the POD, Revision 00, it was unclear how NextEra's staff classified the ASR-affected concrete of containment. Specifically, the POD used Revision 1 of Form EN-AA-203-1001-F01 of the NextEra Fleet Procedure EN-AA-203-1001, and classified the ASR impact on containment as "Operable and above Full Qualification." This classification also considered that "the degraded SSC meets Full Qualification as described in the Current Licensing Basis." The inspector's review of the current revision to EN-AA-203-1001-F01, Revision 09, identified that the comparable POD classification would be "Operable and Fully Qualified with Reduced Margin." The Revision 09 classification implied that the subject SSC meets all CLB and qualification requirements. However, the team's review of the Seabrook Updated Final Safety Analysis Report (UFSAR), Sections 3.8.1.6.a (page 45) and 3.8.4.6 (page 146) identified that "ASR is considered to be a degraded nonconforming condition pursuant to Regulatory Issue Summary (RIS) 2005-20."

UFSAR Revision 13-011, dated March 4, 2013, updated the description of the containment structure and all other Category 1 structures. NextEra acknowledged this observation and took action to revise their containment POD to ensure that the non-conforming condition is addressed in their planned license amendment request submittal (Reference AR 02120109, Assignment 10).

- 2) The team reviewed the results of a December 18, 2015, concrete core removed from the Spent Fuel Pool telltale drain sump. This core was removed in accordance with a license renewal commitment (No. 67) and was tracked via AR 00392697. Petrographic examination of the core specimen (designated FSB-1) identified no evidence of boric acid degradation, but did reveal "minor ASR features." The examination was documented in Laboratory Report 151303-LR-1, Revision 0, "Microscopic Examination of a Concrete Core Removed from Seabrook Station for Deterioration Mechanisms," (Foreign Print 101052).

In conjunction with the review of the SFP sump core results, the team reviewed a series of ARs and associated evaluations completed to assess structural movement (deformation) of the reinforced concrete in the Fuel Storage Building (FSB). Dating back to 2009 (reference AR 00196973) movement of FSB structural elements around the spent fuel pool caused deformation of deck plates above the fuel transfer canal and around the new fuel vault. Since 2010, NextEra, utilizing a contractor, has performed periodic laser measurements of the FSB to monitor the deformation. Team review of the measurement data taken between December 2010 and February 24, 2016, concluded that the measurement trends are not attributable to building settlement or thermal expansion and contraction. Instead, the trends indicate a bulk expansion affect, attributable to ASR, in spite of the absence of the more typical signs of ASR, such as patterned cracking and associated ASR gel surface extrusions. NextEra staff acknowledged this observation and indicated that the FSB would be one of a number of additional structures to receive a comprehensive Finite Element Analysis (FEA) to evaluate the impact of ASR on structural performance and possible POD (Reference AR 02120109, Assignment 09).

- 3) The team confirmed through their detailed review of the associated ARs involving structural deformation, that assignments were initiated to revise the UFSAR to reflect this newly identified ASR attribute.
- 4) New PODs were documented for the structural deformation impacting the RHR/CS Vault and the CEB. The team observed that for both of these reinforced concrete structures, a second POD (ARs 01664399 and 01757861) was in effect addressing the material property degradation associated with ASR. Although the respective PODs addressed different attributes of an ASR-affected structure (one material property and the other deformation caused by bulk ASR expansion), in the case of the CEB structural evaluation and the supporting FEA, the material property degradation is concluded to not have a detrimental impact on structural performance based on tests completed at FSEL. Consequently, the team concluded the CEB deformation POD was inconsistent with the original material properties POD. NextEra acknowledged this observation and planned to conduct a collective review of the open PODs to determine how best to address the non-conforming ASR-related attributes (Reference AR 02120109, Assignment 11).
- 5) For both the RHR/CS Vault and CEB PODs, the team identified that neither POD identified a monitoring method to periodically affirm the validity of the operability evaluations. The inspectors determined monitoring (either time or measurement based) is warranted because ASR appears to be slowly progressing in reinforced concrete structures at Seabrook Station. The team noted that an important assumption used in the CEB FEA is that the modeling depicted a limited strain value of 0.03% (comparable to the most advanced ASR aged large specimens in the FSEL testing program). NextEra staff acknowledged this observation and planned to develop appropriate monitoring methods and associated evaluation thresholds to ensure operability evaluations remain valid and that remediation actions, if necessary, are implemented prior to ASR-affected structures becoming compromised (Reference AR 02120109, Assignments 03 and 05).

## .2 Review of Prompt Operability Determinations

### CEB POD Review

The POD for the CEB concluded that deformation in the structure was attributed primarily to ASR expansion in CEB concrete and concrete backfill surrounding the CEB. The POD concluded that the structure is “operable but degraded.” This conclusion was based on the results of an FEA of a model of the CEB that accounted for the deformed shape and effects of ASR expansion. The team reviewed the POD and the associated FEA, and found the assumptions and conclusions reasonable. The team observed that the POD followed NextEra’s criteria for “operable but degraded” in that the CEB does not meet all CLB requirements, but is capable of performing specified functions. The team also affirmed NextEra’s determination that compensatory measures are required. NextEra staff indicated that they are in the process of collecting additional information, and will update their POD, as necessary, based on additional information. During its review, the team noted that NextEra staff made an assumption regarding the yield strength of the concrete reinforcing steel that was not fully supported by the available construction test results. NextEra staff acknowledged this issue and tracked actions to revise their POD to include an appropriate steel yield strength value, for operability, based on Certified Material Test Results (Reference AR 02120109, Assignment 06). This issue was considered minor as it did not impact POD conclusions. The team also questioned the limits as to which the POD would continue to be applicable and valid

considering ASR is an ongoing degradation mechanism. NextEra staff stated they plan to revise their POD to include a 'threshold value' (either time based or measurement based) that will determine the applicability of the POD and will require the POD and conclusions to be re-evaluated if the threshold is reached (AR 02120109, Assignment 05). The team observed that NextEra staff continued to refine their FEA to more accurately represent the in-situ conditions in the model: (1) taking more measurements of the structure to better represent the actual shape within the model; (2) refining the application of the ASR degradation to the model to more accurately represent the ASR identified on the actual structure; and (3) developing load factors to use when assessing the internal ASR expansion loading in the structure.

NextEra staff stated that developing these load factors would allow them to apply the ASR effects to the model in a fashion that is similar to that used in the design code of record. NextEra staff further indicated that these updates will be applied to the model and the structure will be reanalyzed, and any necessary updates will be made to the operability determination.

#### RHR/CS POD Review

The POD for the RHR/CS Vault concluded that the observed horizontal macro cracking is likely due to internal strain from ASR expansion in the vertical direction and that the structure is "operable but nonconforming." The team reviewed the POD and found the assumptions reasonable based on NextEra's current understanding of the cracking mechanism. However, the team questioned NextEra's conclusion that the structure is "operable but nonconforming." NextEra's guidance states that an "operable but nonconforming" SSC "meets CLB functional requirements, but is nonconforming due to inadequate design, testing, construction, modification, or documentation." The team determined that NextEra staff has not shown that the concrete components affected by the horizontal cracking meets all CLB functional requirements, and therefore the classification level should be "operable but degraded." NextEra staff acknowledged this observation and planned to revise their POD (Reference AR 02120109, Assignment 04). The team concluded this issue was minor because, notwithstanding their original conclusion, NextEra staff were developing monitoring plans appropriate for a structural designation of "operable but degraded."

NextEra staff indicated that they may revise their POD based on the results of ongoing investigations being conducted by their contractor (WJE). These investigations are expected to be completed by May 2016. NextEra staff also plan to revise their POD to include a 'threshold value' (either time based or measurement based) that will limit the applicability of the POD and will require the POD to be updated if the threshold is reached (Reference AR 02120109, Assignment 03). NextEra staff further indicated that they intend to include the RHR/CS Vault in a 'susceptibility analysis' to determine how likely it is that the vault may undergo additional cracking due to ASR. Depending on the results of the analysis, NextEra staff stated that they may develop a finite element model to address RHR/CS Vault operability. The team concluded these planned actions were appropriate to continue to verify the RHR/CS Vault capability to perform its intended safety related functions.

### .3 RHR Vault Corrective Action Timeliness Observation

The inspectors determined that NextEra's implementation of corrective actions associated with the NRC identified degradation of the RHR vault concrete structure (AR 01977456) was not completed in a timely manner and contrary to NextEra Procedure PI-AA-104-1000, 'Corrective Action,' Revision 6. Specifically, PI-AA-104-1000 provides guidelines to consider when establishing due dates for low risk corrective actions and states that routine corrective actions to prevent recurrence should be completed within 120 days. In addition, PI-AA-104-1000 states that the Management Review Committee (MRC) is responsible for reviewing justifications and approving due date extensions for significance level (SL) 1, 2 or 3 AR assignments.

Contrary to this procedural guidance, SL 2 AR 01977456, Assignment 17, "Develop design change to implement (FP100903) recommendations," was initially assigned a due date of April 30, 2015, extended to June 30, 2015, and then extended again to December 1, 2015, without appropriate justification or MRC approval. Assignment 17 was extended to January 8, 2016 with MRC approval and closed-out on January 7, 2016 with the issuance of an Engineering Design Change. The elapsed time from corrective action assignment to completion was 245 days, well in excess of the 120 day guidance without MRC justification and approval.

The specific corrective actions associated with this SL 2 AR and incorporated into a design change package involve:

- Install crack gauges at 25 locations to monitor progression of RHR vault cracking
- Extract 20 concrete cores from the RHR vaults for material testing to identify expansion mechanism
- Install large-scale measurement devices to monitor vertical expansion of the RHR vault walls
- Install relative humidity and temperature probes at three locations in each train of the RHR vaults to measure moisture gradient in the wall to better understand ongoing behavior of ASR and/or drying shrinkage mechanisms

The inspectors evaluated this performance deficiency in accordance with the guidance in IMC 0612, Appendix B, "Issue Screening," and Appendix E, "Examples of Minor Issues," and concluded this performance deficiency was minor in safety significance. Additionally, this issue is closely related to NextEra's inadequate performance in not initiating appropriate immediate and prompt operability determinations (PODs) when new information was received in FP100903. An appropriate POD would have better informed the timing of planned corrective actions. This issue is addressed in the Notice of Violation included in this report. Accordingly, this performance deficiency is not subject to further enforcement action, but is addressed in the Seabrook CAP (reference AR 02085029) and documented for performance assessment purposes.

**4OA5 Other Activities****.1 (Closed) Unresolved Item 05000443/2015004-01, Issue of Concern Regarding Implementation of the Seabrook Structures Monitoring Program and Structural Evaluations of the CEB and RHR/CS Vault.**

The inspectors had identified potential shortcomings in NextEra's implementation of the Seabrook Structures Monitoring Program, acceptance of evaluations via the document control (Foreign Print) process, and implementation of the Corrective Action Program as it relates to Foreign Print 100895 for the CEB and Foreign Print 100903 for the RHR/CS Vault walls. Additional inspection identified a performance deficiency and associated violation (cited in this report) with two examples, involving NextEra's failure to appropriately evaluate non-conforming conditions identified in Foreign Print 100895 for the CEB and Foreign Print 100903 for the RHR/CS Vault (See Section 4OA2.1.b). This unresolved item is closed.

**4OA6 Meetings, Including Exit**

On March 24, the inspectors presented the results of this inspection to Mr. Dean Curtland, Site Vice President, and other members of Seabrook Station and NextEra Corporate staffs. The inspectors also confirmed with NextEra that no proprietary information was retained by inspectors during the course of the inspection.

**SUPPLEMENTARY INFORMATION**

**KEY POINTS OF CONTACT**

NextEra Personnel

B. Brown, Design Engineer  
 V. Brown, Senior Licensing Analyst  
 K. Browne, Special Projects Director  
 E. Carley, Engineering Supervisor  
 S. Chesno, Performance Improvement Manager  
 M. Collins, Engineering Director  
 D. Curtland, Site Vice President  
 A. Dodds, Plant General Manager  
 K. Douglas, Maintenance Director  
 M. Guth, Licensing Manager, Turkey Point  
 M. Hanson, Assistant Operations Manager  
 L. Nicholson, Regulatory Affairs Director  
 M. Ossing, Licensing Manager  
 V. Pascucci, Manager, Nuclear Oversight  
 S. Ramdeen, Civil Engineering Chief  
 D. Ritter, Operations Director  
 J. Simons, MPR Associates  
 C. Thomas, Senior Licensing Engineer

**LIST OF ITEMS OPENED, CLOSED, DISCUSSED, AND UPDATED**

Opened

05000443/2016-008-01	NOV	Failure to Complete Operability Determinations for ASR-affected Structures (4OA2.1)
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Closed:

05000443/2015-004-01	URI	Issue of Concern Regarding Implementation of the Seabrook Structures Monitoring Program and Structural Evaluations of the CEB and RHR/CS Vault (4OA5)
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**LIST OF DOCUMENTS REVIEWED**Procedures

EN-AA-203-1001, Operability Determinations/Functionality Assessments, Revision 21  
 PI-AA-104-1000, Corrective Action, Revision 6  
 Engineering Department Standard 36180, Structural Monitoring Program, Revision 06  
 NexEra Nuclear Policy PI-AA-01, Corrective Action Program and Condition Reporting,  
 Revision 03  
 Plant Engineering Guidelines, PEG-98, CEB Extent of Condition Equipment Walkdown,  
 Revision 00

Reports

Seabrook Station Updated Final Safety Analysis Report, Revision 16 Foreign Print (FP100903),  
 Wiss, Janney, Elstner (WJE) Associates "Condition Assessment of the Cracking in RHR and  
 CS Equipment Vault," dated March 5, 2015, Revision 0  
 FP101055, Condition Assessment of Cracking in the RHR and CS Equipment Vault –  
 Second Visit, dated 2/6/16  
 Containment Enclosure Building Local Deformation, Event Date December 19, 2014, issued  
 August 5, 2015 (reference CR 2014325)  
 FP100985, Evaluation and Design Confirmation of As-Deformed CEB, dated November 2015  
 FP100915, CEB Site Visit Report, dated July 14, 2015  
 Evaluation of OASIS Inspection Data, dated January 2015  
 OASIS Report, NextEra Energy Services Seabrook, NH, Fuel Storage Building Inspection,  
 dated February 23-24, 2016  
 FP100903, Condition Assessment of Cracking in RHR and CS Equipment Vault, dated  
 3/17/2015

Action Request

02016863	02014325	02056483
00196973	02044627	01977456
02094762	02004748	01929460
01804477	02108728	02109229
02094762	02085029	

**LIST OF ACRONYMS**

AR	Action Request
ACE	Apparent Cause Evaluation
ACI	American Concrete Institute
ASR	Alkali-Silica Reaction
ASME	American Society of Mechanical Engineers
CB	Control Building
CEB	Containment Enclosure Building
CEVA	Containment Enclosure Ventilation Area
CFR	Code of Federal Regulations
CLB	Current Licensing Basis
CR	Condition Report
CS	Containment Spray System
DRS	Division of Reactor Safety
EC	Engineering Change
EN	Procedural Notice for Engineering Department
FEA	Finite Element Analysis
FIN	Finding
FP	Foreign Print
FSB	Fuel Storage Building
FSEL	Ferguson Structural Engineering Laboratory (At UT-Austin)
IMC	Inspection Manual Chapter
IOD	Immediate Operability Determination
IP	Inspection Procedure
KSI	Kilo-pounds per square inch
LAR	License Amendment Request
LRA	License Renewal Application
MRC	Management Review Committee
NCV	Non-Cited Violation
NOV	Notice of Violation
NRC	U.S. Nuclear Regulatory Commission
NRR	Office of Nuclear Reactor Regulation
OD	Operability Determination
PD	Performance Deficiency
POD	Prompt Operability Determination
PSIG	Pounds per square inch (gage)
RCA	Radiological Controlled Area
RCE	Root Cause Evaluation
RHR	Residual Heat Removal System
SDP	Significance Determination Process
SG&H	Simpson, Gumpertz & Heger Associates
SL	Severity Level
SR	Safety-related
SSC	Structure, System, or Component
TIA	Task Interface Agreement
TS	Technical Specification
UFSAR	Updated Final Safety Analysis Report
URI	Unresolved Item
WJE	Wiss, Janney, Elstner Associates