



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

October 28, 2015

Mr. Dean Curtland
Site Vice President
c/o Michael Ossing
Seabrook Station
NextEra Energy Seabrook, LLC
P.O. Box 300
Seabrook, NH 03874

SUBJECT: SEABROOK STATION, UNIT 1 - REPORT FOR THE ONSITE AUDIT REGARDING IMPLEMENTATION OF MITIGATING STRATEGIES AND RELIABLE SPENT FUEL INSTRUMENTATION RELATED TO ORDERS EA-12-049 AND EA-12-051 (TAC NOS. MF0836 AND MF0837)

Dear Mr. Curtland:

On March 12, 2012, the U.S. Nuclear Regulatory Commission (NRC) issued Order EA-12-049, "Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond Design-Basis External Events" and Order EA-12-051, "Order to Modify Licenses With Regard To Reliable Spent Fuel Pool Instrumentation," (Agencywide Documents Access and Management System (ADAMS) Accession Nos. ML12054A736 and ML12054A679, respectively). The orders require holders of operating reactor licenses and construction permits issued under Title 10 of the *Code of Federal Regulations* Part 50 to submit for review, Overall Integrated Plans (OIPs) including descriptions of how compliance with the requirements of Attachment 2 of each order will be achieved.

By letter dated February 26, 2013 (ADAMS Accession No. ML13063A438), NextEra Energy Seabrook, LLC (NextEra, the licensee) submitted its OIP for Seabrook Station, Unit 1 (Seabrook) in response to Order EA-12-049. By letters dated August 28, 2013, February 27, 2014, August 26, 2014, and February 27, 2015 (ADAMS Accession Nos. ML13247A178, ML14064A188, ML14246A193, and ML15068A021, respectively), NextEra submitted its first four six-month updates to the OIP. By letter dated August 28, 2013 (ADAMS Accession No. ML13234A503), the NRC notified all licensees and construction permit holders that the staff is conducting audits of their responses to Order EA-12-049 in accordance with NRC Office of Nuclear Reactor Regulation (NRR) Office Instruction LIC-111, "Regulatory Audits" (ADAMS Accession No. ML082900195). This audit process led to the issuance of the Seabrook interim staff evaluation (ISE) (ADAMS Accession No. ML14030A552) on February 25, 2014, and continues with in-office and onsite portions of this audit.

By letter dated February 26, 2013 (ADAMS Accession No. ML13063A439), the licensee submitted its OIP for Seabrook in response to Order EA-12-051. By email dated July 18, 2013 (ADAMS Accession No. ML13217A166), the NRC staff sent a draft request for additional information (RAI) to the licensee. By letters dated August 28, 2013, February 28, 2014, August 26, 2014, and February 27, 2015 (ADAMS Accession No. ML13247A177, ML14064A181, ML14246A192, and ML15068A007, respectively), the licensee submitted its RAI responses and first four six-month updates to the OIP. The NRC staff's review of these submittals led to the issuance of the Seabrook ISE and RAI dated December 4, 2013 (ADAMS Accession No. ML13267A388). By letter dated March 26, 2014 (ADAMS Accession No. ML14083A620), the NRC notified all licensees and construction permit holders that the staff is conducting in-office and onsite audits of their responses to Order EA-12-051 in accordance with NRC NRR Office Instruction LIC-111, as discussed above.

The ongoing audits allow the staff to review open and confirmatory items from the mitigation strategies ISE, RAI responses from the spent fuel pool instrumentation (SFPI) ISE, the licensee's integrated plans, and other audit questions. Additionally, the staff gains a better understanding of submitted and updated information, audit information provided on ePortals, and preliminary Overall Program Documents/Final Integrated Plans while identifying additional information necessary for the licensee to supplement its plan and staff potential concerns.

In support of the ongoing audit of the licensee's OIPs, as supplemented, the NRC staff conducted an onsite audit at Seabrook from July 27-31, 2015, per the audit plan dated July 6, 2015 (ADAMS Accession No. ML15181A269). The purpose of the onsite portion of the audit was to provide the NRC staff the opportunity to continue the audit review and gain key insights most easily obtained at the plant as to whether the licensee is on the correct path for compliance with the Mitigation Strategies and SFPI orders. The onsite activities included detailed analysis and calculation discussion, walk-throughs of strategies and equipment laydown, visualization of portable equipment storage and deployment, staging and deployment of offsite equipment, and physical sizing and placement of SFPI equipment.

The enclosed audit report provides a summary of the activities for the onsite audit portion. Additionally, this report contains an attachment listing all open audit items currently under NRC staff review.

D. Curtland

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If you have any questions, please contact me at 301-415-5888 or by e-mail at Jason.Paige@nrc.gov.

Sincerely,

A handwritten signature in black ink that reads "Peter Bamford for". The signature is written in a cursive, flowing style.

Jason C. Paige, Project Manager
Orders Management Branch
Japan Lessons-Learned Division
Office of Nuclear Reactor Regulation

Docket No.: 50-443

Enclosure:
Audit report

cc w/encl: Distribution via Listserv



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

AUDIT REPORT BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATED TO ORDERS EA-12-049 AND EA-12-051 MODIFYING LICENSES
WITH REGARD TO REQUIREMENTS FOR
MITIGATION STRATEGIES FOR BEYOND-DESIGN-BASIS EXTERNAL EVENTS
AND RELIABLE SPENT FUEL POOL INSTRUMENTATION
NEXTERA ENERGY SEABROOK, LLC.
SEABROOK STATION, UNIT 1
DOCKET NO. 50-443

BACKGROUND AND AUDIT BASIS

On March 12, 2012, the U.S. Nuclear Regulatory Commission (NRC) issued Order EA-12-049, "Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond Design-Basis External Events" and Order EA-12-051, "Order to Modify Licenses With Regard To Reliable Spent Fuel Pool Instrumentation," (Agencywide Documents Access and Management System (ADAMS) Accession Nos. ML12054A736 and ML12054A679, respectively). The orders require holders of operating reactor licenses and construction permits issued under Title 10 of the *Code of Federal Regulations* Part 50 to submit for review, Overall Integrated Plans (OIPs) including descriptions of how compliance with the requirements of Attachment 2 of each order will be achieved.

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(ADAMS Accession No. ML13217A166), the NRC staff sent a draft request for additional information (RAI) to the licensee. By letters dated August 28, 2013, February 28, 2014, August 26, 2014, and February 27, 2015 (ADAMS Accession No. ML13247A177, ML14064A181, ML14246A192, and ML15068A007, respectively), the licensee submitted its RAI responses and first four six-month updates to the OIP. The NRC staff's review of these submittals led to the issuance of the Seabrook ISE and RAI dated December 4, 2013 (ADAMS Accession No. ML13267A388). By letter dated March 26, 2014 (ADAMS Accession No. ML14083A620), the NRC notified all licensees and construction permit holders that the staff is conducting in-office and onsite audits of their responses to Order EA-12-051 in accordance with NRC NRR Office Instruction LIC-111, as discussed above.

The ongoing audits allow the staff to review open and confirmatory items from the mitigation strategies ISE, RAI responses from the spent fuel pool instrumentation (SFPI) ISE, the licensee's integrated plans, and other audit questions. Additionally, the staff gains a better understanding of submitted and updated information, audit information provided on ePortals, and preliminary Overall Program Documents (OPDs)/Final Integrated Plans (FIPs) while identifying additional information necessary for the licensee to supplement its plan and staff potential concerns.

In support of the ongoing audit of the licensee's OIPs, as supplemented, the NRC staff conducted an onsite audit at Seabrook from July 27-31, 2015, per the audit plan dated July 6, 2015 (ADAMS Accession No. ML15181A269). The purpose of the onsite portion of the audit was to provide the NRC staff the opportunity to continue the audit review and gain key insights most easily obtained at the plant as to whether the licensee is on the correct path for compliance with the Mitigation Strategies and SFPI orders. The onsite activities included detailed analysis and calculation discussion, walk-throughs of strategies and equipment laydown, visualization of portable equipment storage and deployment, staging and deployment of offsite equipment, and physical sizing and placement of SFPI equipment.

Following the licensee's declarations of order compliance, the NRC staff will evaluate the OIPs, as supplemented, the resulting site-specific OPDs/FIPs, and, as appropriate, other licensee submittals based on the requirements in the orders. For Order EA-12-049, the staff will make a safety determination regarding order compliance using the Nuclear Energy Institute (NEI) guidance document NEI 12-06, "Diverse and Flexible Coping Strategies (FLEX) Implementation Guide" issued in August, 2012 (ADAMS Accession No. ML12242A378), as endorsed, by NRC Japan Lessons-Learned Directorate (JLD) interim staff guidance (ISG) JLD-ISG-2012-01 "Compliance with Order EA-12-049, 'Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events'" (ADAMS Accession No. ML12229A174) as providing one acceptable means of meeting the order requirements. For Order EA-12-051, the staff will make a safety determination regarding order compliance using the NEI guidance document NEI 12-02, Revision 1, "Industry Guidance for Compliance with NRC Order EA-12-051, 'To Modify Licenses with Regard to Reliable Spent Fuel Pool Instrumentation'" (ADAMS Accession No. ML12240A307), as endorsed, with exceptions and clarifications, by NRC JLD-ISG-2012-03 "Compliance with Order EA-12-051, 'Reliable Spent Fuel Pool Instrumentation'" (ADAMS Accession No. ML12221A339) as providing one acceptable means of meeting the order requirements. Should the licensee propose an alternative strategy or other method deviating from the guidance, additional staff review will be required to evaluate if the alternative strategy complies with the applicable order.

AUDIT ACTIVITIES

The onsite audit was conducted at the Seabrook facility from July 27, 2015, through July 31, 2015. The NRC audit team staff was as follows:

Title	Team Member
Team Lead / Project Manager	Jason Paige
Technical Support	Kevin Roche
Technical Support	Matthew McConnell
Technical Support	Joshua Miller
Technical Support	Duc Nguyen

The NRC staff executed the onsite portion of the audit per the three part approach discussed in the July 6, 2015, plan, to include conducting a tabletop discussion of the site's integrated mitigating strategies compliance program, a review of specific technical review items, and discussion of specific program topics. Activities that were planned to support the above included detailed analysis and calculation discussions, walk-throughs of strategies and equipment laydown, visualization of portable equipment storage and deployment, staging and deployment of offsite equipment, and physical sizing and placement of SFPI equipment.

AUDIT SUMMARY

1.0 Entrance Meeting (July 27, 2015)

At the audit entrance meeting, the NRC staff audit team introduced itself followed by introductions from the licensee's staff. The NRC audit team provided a brief overview of the audit's objectives and anticipated schedule.

2.0 Integrated Mitigating Strategies Compliance Program Overview

Per the audit plan and as an introduction to the site's program, the licensee provided a presentation to the NRC audit team titled "Seabrook Station Mitigating Strategies for Beyond Design Basis External Events." The licensee provided an overview of its strategy to maintain core cooling, containment, and spent fuel pool (SFP) cooling in the event of a Beyond-Design-Basis External Event (BDBEE), and the plant modifications being done in order to implement the strategies. Also presented was the design and location of the Diverse and Flexible Coping Strategies (FLEX) equipment storage facility, the FLEX equipment that would be stored there, the interface with the National SAFER Response Centers (NSRC), and the SFP level indication modification.

3.0 Onsite Audit Technical Discussion Topics

Based on the audit plan, and with a particular emphasis on the Part 2 "Specific Technical Review Items," the NRC staff technical reviewers conducted interviews with licensee technical staff, site walk-downs, and detailed document review for the items listed in the plan. Results of these technical reviews that require additional information from the licensee or still under NRC review are documented in the audit item status tables in Attachments 3 and 4, as discussed in the Conclusion section below.

3.1 Reactor Systems Technical Discussions and Walk-Downs

The NRC staff reviewed Seabrook's modeling of an Extended Loss of alternating current (ac) Power (ELAP) and its ability to mitigate the event, including the computer code NOTRUMP used for the ELAP analysis and input parameters assumed to generate the results of the analysis. The licensee provided a calculation comparison of the WCAP-17601-P, "Reactor Coolant System Response to the Extended Loss of AC Power Event for Westinghouse, Combustion Engineering and Babcock & Wilcox NSSS Designs," generic analysis values to the Seabrook specific plant values. The licensee is installing low-leakage shield seals, which accounts for a reactor coolant pump (RCP) seal leakage rate of 1 gallon per minute (gpm)/RCP. In addition, Seabrook's credited strategy assumes a reactor coolant system (RCS) cooldown of 75 degrees °F/hr and RCS high pressure pump injection of at least 15 gpm both being initiated no later than 10 hours into the ELAP event.

3.2 Electrical Technical Discussions and Walk-Downs

The NRC staff reviewed Seabrook's load shedding procedures, FLEX diesel generator (DG) sizing calculations, manufacture's specifications, and FLEX Support Guidelines (FSGs) to confirm that they are of sufficient capacity to supply the expected loads. The safety-related dc system will be utilized initially to mitigate an ELAP event. The direct current (dc) system consists of 4 125 V batteries, chargers, and dc buses separated into two redundant trains, each with two distribution subsystems. The licensee calculated that the dc system can provide power to the required BDBEE loads for at least 12 hours given that load shedding is completed within 60 minutes of an ELAP being declared. Subsequently, either the Supplemental Emergency Power System (SEPS), if available, or the portable 405 kilowatt (kW) 480 V and 30 kW DGs will assume the role of powering the required loads.

Seabrook's primary strategy relies on the use of the pre-installed SEPS, which is normally the backup power system independent of the safety-related emergency DGs. SEPS starts automatically on a loss of offsite power if Bus 6 is not re-energized by its emergency DG. The licensee recognized that Seabrook's reliance on SEPS during an ELAP is an alternative to NEI 12-06. The licensee indicated that SEPS will be protected from all hazards, except for high wind events (i.e., missiles). Therefore, during a high wind, missile event or when SEPS is not available, Seabrook will utilize portable equipment to power loads, including a 405 kW/480 V DG and 30 kW DG. The licensee plans to connect the portable DGs to the battery chargers within 8 hours.

The SEPS generators are rated at 5400 kW combined (i.e., 2700 kW each with a full load rating of 2640 kW – subtracts 60 kW for SEPS auxiliaries). The licensee analyzed SEPS and the minimum loads that are required on Bus 6 or 5 in response to an ELAP event. The minimum required loads on Bus 6 are 2468.5 kW (171.5 kW margin). The minimum required loads on Bus 5 are 2493 kW (147 kW margin). The analysis concluded that the minimum required loads could be powered using a single SEPS genset. When SEPS is not available, the licensee analyzed the capability and capacity of the 405 kW DG and 30 kW DG to support powering the required loads. For the 405 kW DG, power will be delivered to the required loads by three 480 V distribution centers and two of the larger loads (Train A or B Control Room Ventilation Supply and Motor

Control Center (MCC)-111/MCC-231 Control Room Lighting) will connect directly to the 405 kW DG. The licensee indicated that they expect the required loading on the 405 kW DG to be 401.59 kW. The loading on the 30 kW DG is expected to be 22.27 kW.

3.3 SFPI Technical Discussions and Walk-Downs

The NRC staff walked down the SFP area, SFPI locations, and related equipment mounting areas. No concerns were identified during the walk-downs.

3.4 Other Technical Discussion Areas and Walk-Downs

- a. The staff reviewed the licensee's protection of FLEX equipment from seismic and high wind hazards. The licensee indicated that the majority of the FLEX equipment including the FLEX diesel powered pumps and hose trailer will be stored in the service water pump house. The remainder of the FLEX equipment and materials such as cables, hoses, connectors and tools will be located in the primary auxiliary building (PAB) and the emergency feedwater pump building. Measuring and test equipment will be stored in the main control room and essential switchgear room (located in the lower level of the control building). The diesel fuel transfer pumps will be located in the DG building. All of these buildings are seismic Category I buildings, protected from seismic and high winds hazards per Seabrook Station Updated Final Safety Analysis Report, Section 3.8.4, "Design of Structures, Components, Equipment and Systems, Design of Category I Structures, Other Seismic Category I Structures," Rev 16. In addition, the licensee is installing a new tornado missile barrier entranceway to the service water pump house to allow for large FLEX equipment to be easily deployed.
- b. The staff verified that at least one connection point for RCS and steam generator (SG) injection will be available after a seismic event. Seabrook's primary strategy for coping with an ELAP repowers installed equipment using SEPS. An alternate strategy uses one high pressure and one low pressure diesel driven pump (called the FLEX high pressure pump and the FLEX low pressure pump) to inject water into the RCS and SGs, respectively. The staff reviewed Tables 2.5.1 and 2.5.2 of EC 282580, "Fukushima FLEX Strategy RCS & SG Makeup," Rev 0, and walked down the connection points for the high pressure and low pressure FLEX pumps. The tables concluded that at least one connection will be available after a seismic event. All the FLEX equipment connection points are located in seismic Category 1 buildings.
- c. The staff reviewed the licensee's water sources for SG and RCS injection. Regarding SG injection, the licensee indicated that the low pressure pump can be aligned to the condensate storage tank (CST) or the Unit 2 piping cistern, which is an underground holding tank that is seismically qualified and missile protected, and discharge to either the emergency feedwater header or the feedwater header. Regarding RCS injection, the high pressure pump suction can be aligned to the boric acid tank (BAT) or the refueling water storage tank (RWST) and will discharge via two connections into the RCS.
- d. Seabrook does not plan to use raw water during phase 2; therefore, the licensee

does not plan to use the NSRC water purification unit. For SG injection, the licensee determined that the protected CST volume is sufficient for 17 hours and an additional 309,000 gallons of feedwater is required to makeup to the SGs for at least 72 hours mark. The licensee is protecting approximately 824,000 gallons of water in the Unit 2 cistern piping. For RCS injection, assuming approximately 6,000 gallons of injection from the accumulators prior to isolation, the licensee determined that 4,500 gallons is required from the BATs to provide shutdown boration requirements and recover pressurizer level. The licensee determined that the BAT's volume (37,200 gallons) is sufficient to make-up the 5 gpm RCS leakage for longer than 72 hours. In addition, the RWST is a potential backup to the BAT.

- e. The staff reviewed the refueling strategy and procedures for the FLEX equipment, including SEPS. The licensee has a 1,000 gallon refueling trailer that will be stored in the service water pump house. The staff noted that the procedures contain a fuel plan and usage table that shows that SEPS engines will need to be refueled before 24 hours. In addition, the staff walked down the refueling strategy and observed the future location of the FLEX fuel oil transfer pumps, which will be housed in the emergency DG fuel oil storage tank buildings. The FLEX fuel oil transfer pumps will be used to fill up the portable fuel tank and distribute fuel to the FLEX equipment.
- f. While onsite, the staff reviewed the licensee's hydraulic analysis of the FLEX low pressure, high pressure, and submersible pumps. The calculation analyzed the flow capabilities of the pumps to show that they meet the flow and head requirements of Seabrook's FLEX strategy. The calculation concluded that the pumps have adequate capacity.

4.0 Exit Meeting (July 31, 2015)

The NRC staff audit team conducted an exit meeting with the licensee's staff following the closure of onsite audit activities. The NRC staff highlighted items reviewed and noted that the results of the onsite audit trip will be documented in this report. The following items that require additional information from the licensee or still under NRC review were discussed at the exit meeting (see Attachments 3 and 4 for additional information):

- a. ISE CI 3.1.1.2.A, Deployment Paths
The licensee's alternate strategy for SG makeup relies on a FLEX low pressure pump. As mentioned above, the staff reviewed Tables 2.5.1 and 2.5.2 of EC 282580, "Fukushima FLEX Strategy RCS & SG Makeup," Rev 0, and walked down the connection points for the high pressure and low pressure pumps to verify that at least one connection point will be available after a seismic event. However, during the walkdown, the staff noted non-seismic piping above the FLEX low pressure pump hose deployment path. The staff requested that the licensee make available an evaluation of the non-seismic piping over the FLEX deployment paths. After the conclusion of the onsite audit, the licensee made available the evaluation of the non-seismic piping, and the staff is currently reviewing the evaluation.

- b. **AQ 3, Soil Liquefaction**
The NRC staff reviewed the FLEX equipment deployment routes from the storage locations to the staging locations, including potential soil liquefaction that could impede movement of the equipment following a severe seismic event. The staff requested that the licensee make available the soil liquefaction assessments performed on the deployment routes. After the conclusion of the onsite audit, the licensee made available the soil liquefaction assessment, and the staff is currently reviewing the assessment.

- c. **AQ 19, Heat Tracing**
The NRC staff reviewed plant procedures to determine the licensee's consideration on the loss of heat tracing effects on equipment required to cope with an ELAP. Specifically, heat tracing is used at some plants to ensure cold weather conditions do not result in freezing important piping and instrumentation systems with small diameter piping. The staff requested that the licensee make available a heat tracing analysis for equipment required to cope with an ELAP.

- d. **AQ 33, Non-Safety Related Equipment**
The NRC staff reviewed the licensee's summary of non-safety related equipment that is credited to mitigate an ELAP event. As mentioned above, the Unit 2 piping cistern is an underground holding tank used as a water source for SG injection. The licensee indicated that the cistern is seismically protected and made available a seismic evaluation. The staff is currently reviewing the evaluation.

- e. **SE Review Item 12, Missile Protection**
The NRC staff reviewed the tornado missile protection of the turbine driven emergency feedwater pump (TDEFWP) exhaust. The TDEFWP will be used to feed the SGs during Phase 1 to cool down and depressurize the RCS. The licensee made available its missile protection evaluation of the TDEFWP exhaust and the staff is currently reviewing the evaluation.

- f. **SE Review Items 14, 15, and 20, Heat-up Calculations**
The NRC staff reviewed the temperature heat-up calculations and associated ventilation actions to protect electrical equipment that is being credited to mitigate an ELAP event. The staff reviewed the heat-up calculations for the control room, battery rooms, essential switchgear rooms, emergency feedwater pumphouse, main stem and feedwater pipe chases, and containment. In summary, the licensee indicated that the existing 4-hour duration station blackout results were extrapolated to determine the temperature profiles for the analyzed rooms during an ELAP event, except for containment. The licensee generated a calculation to determine the containment pressure and temperature response during an ELAP. The staff noted that the credited ELAP equipment qualification limits and personnel habitability limits should be considered when completing the heat-up calculations. In addition, personnel habitability in containment is not a concern, since Seabrook's strategy does not involve containment entry during an ELAP event. The staff requested the following actions:
 - 1. The staff requested that the control room temperature extrapolation be formally documented.

2. The staff requested that the battery rooms' temperature extrapolation for both hot and cold outside ambient conditions be formally documented.
3. The staff requested that the essential switch gear rooms' temperature extrapolation be formally documented considering the additional heat loads being added by the restoration of electric power during Phases 2 and 3 of the ELAP event.
4. The staff requested that the emergency feedwater pumphouse temperature extrapolation be formally documented.
5. The staff requested that the main steam and feedwater pipe chase's temperature extrapolation be formally documented. In addition, the staff requested that the licensee make available an evaluation of the impact of any uninsulated atmospheric steam dump valve (ASDV) piping, if the ASDVs are in service during the ELAP. The staff noted that the evaluation should include justification that the actions that need to be performed in the chases (i.e., connection of the FLEX low pressure pump to the SG feed lines) are capable of being accomplished with the conditions that will exist in those areas. Lastly, the staff requested that the licensee make available an evaluation of the environmental qualification of the ASDV nitrogen supply system.
6. The staff requested that the licensee make available the containment pressure and temperature calculation.
7. The staff requested that the licensee make available the ventilation actions (e.g., open doors, stage temporary ventilation, etc.) as a result of the heat-up calculations for the rooms listed above.

CONCLUSION

The NRC staff completed all three parts of the July 6, 2015, onsite audit plan. Each audit item listed in Part 2 of the plan was reviewed by NRC staff members while on site. In addition to the list of NRC and licensee onsite audit staff participants in Attachment 1, Attachment 2 provides a list of documents reviewed during the onsite audit portion.

In support of the continuing audit process as the licensee proceeds towards orders compliance for this site, Attachments 3 and 4 provide the status of all open audit review items that the NRC staff is evaluating in anticipation of issuance of a combined safety evaluation for both the Mitigation Strategies (MS) and Spent Fuel Pool Level Instrumentation orders. The five sources for the audit items referenced below are as follows:

- a. Interim Staff Evaluation (ISE) Open Items (OIs) and Confirmatory Items (CIs)
- b. Audit Questions (AQs)
- c. Licensee-identified Overall Integrated Plan (OIP) Open Items (OIs)

- d. Spent Fuel Pool Level Instrumentation (SFPLI) Requests for Additional Information (RAIs)
- e. Additional Safety Evaluation (SE) needed information

The attachments provide audit information as follows:

- a. Attachment 1: List of NRC staff and licensee staff audit participants
- b. Attachment 2: List of documents reviewed during the onsite audit
- c. Attachment 3: Seabrook MS/SFPI SE Audit Items currently under NRC staff review and requiring licensee input as delineated
- d. Attachment 4: Seabrook MS/SFPI SE Audit Items currently under NRC staff review but not requiring further licensee input

While this report notes the completion of the onsite portion of the audit per the audit plan dated July 6, 2015, the ongoing audit process continues, as per the letters dated August 28, 2013, and March 26, 2014, to all licensees and construction permit holders for both orders.

Additionally, while Attachments 3 and 4 provide a progress snapshot of the NRC staff's review of the licensee's OIPs, as supplemented, and as augmented in the audit process, the status and progress of the NRC staff's review may change based on licensee plan changes, resolution of generic issues, and other NRC staff concerns not previously documented. Changes in the NRC staff review will be communicated in the ongoing audit process.

Lastly, the licensee has identified open items that need to be completed to implement orders EA-12-049 and EA-12-051, and the staff expects that the licensee continue to provide updates on the status of the licensee identified open items in their 6-month updates or on the ePortal.

Attachments:

- 1. NRC and Licensee Staff Onsite Audit Participants
- 2. Onsite Audit Documents Reviewed
- 3. Seabrook MS/SFPI SE Audit Items currently under NRC staff review and requiring licensee input
- 4. Seabrook MS/SFPI SE Audit Items currently under NRC staff review but not requiring further licensee input

Onsite Audit Participants

NRC Staff:

Jason Paige	NRR/JLD/JOMB
Kevin Roche	NRR/JLD/JCBB
Matthew McConnell	NRR/JLD/JERB

Joshua Miller	NRR/JLD/JERB
Duc Nguyen	NRR/JLD/JERB

Seabrook Staff:

Dean Curtland	Site Vice President
Al Dodds	Plant Manager
Ronnie Lingle	Fleet Fukushima Lead
Jack Hoffman (Enercon)	Project Engineer
Eric Bixoll	Project Engineer
Dana Skiffington	Project Manager
Jim Dupre	Project Manager
Jeff Sobotra	Design Engineer Manager
Victoria Brown	Engineering Analyst
Michael Ossing	Licensing Manager
JR Tucker	Security Manager
Richard Noble	Project Manager
Michael Finnegan	EP Coordinator
David Currier	EP Manager
Phil Gaspar	NSO

Documents Reviewed

- Tables 2.5.1 and 2.5.2 of EC 282580, "Fukuskima FLEX Strategy RCS & SG Makeup," Revision 0
- EC 282582, "Fukushima FLEX Portable Equipment Storage," Revision 0
- FSG-3, "Alternate Low Pressure Feedwater," Rev 7/01/15
- FSG-3.1, "Alternate Low Pressure Feedwater Equipment Deployment," Rev 7/11/15
- FSG-3.1.1, "FLEX Low Pressure Pump Operation," Rev 7/1/15
- EC 282982, "Unit 2 CW Pipe Water Storage Seabrook Station," Revision 0
- Procedure OS1215.07, "Loss of Spent Fuel Pool Cooling or Level," Revision 14
- FSG-11, "Alternate SFP Makeup and Cooling," Revision 6/24/15
- FSG-11.1, "Alternate SFP Makeup and Cooling Equipment Deployment," Revision 6/3/15
- Procedure OS1016.07, "Cooling Tower Portable Makeup Pump Operation," Revision 11
- FSG-5, "Initial Assessment and FLEX Equipment Staging," Revision 7/21/15
- FSG-5 Attachment G, "Restore Power to MCC-111 and MCC-231 Loads," Revision 7/21/15
- EC 282825, "Fukushima SEPS Components Seismic Upgrade," Revision 0
- EC 282774, "Fukushima – Seismic Upgrades of SEPS DG Foundation, Exhaust Seismic, and Pipe Supports," Revision 0
- ECA-0.0, "Loss of All AC Power," Revision 6/04/15
- FSG-0.0, "Extended Loss of All AC Power with SEPS," Revision 7/14/15
- FSG-0.1, "Extended Loss of All AC Power without SEPS," Revision 6/23/15
- FSG-4, "ELAP Power Management," Revision 7/22/15
- FSG-4.1, "ELAP Power Management Equipment Deployment," Revision 7/24/15
- FSG-5.1, "FLEX Equipment Deployment," Revision 6/24/15
- FSG-7, "Loss of Vital Instrumentation or Control Power," Revision 7/20/15
- FSG-7.1.1, "Control Room Instrumentation Alternate Indication Readout," Revision 0
- Calculation BTP ASB 9-2 "Residual Decay Energy for Light-Water Reactors for Long Term Cooling," Revision 2
- Electrical Drawing, "Powering Bus 5 DC Loads from Bus 6 or Portable Generator," Dated 6/08/15
- Electrical Drawing, "Powering Bus 6 DC Loads from Bus 6 or Portable Generator," Dated 6/08/15
- Electrical Drawing, "SEPS Bus 6 Loading," Dated 6/08/15
- Electrical Drawing, "SEPS Bus 5 Loading," Dated 6/08/15
- Electrical Drawing, "RRC Genset Connection Bus 5," Dated 6/08/15
- Electrical Drawing, "RRC Genset Connection Bus 6," Dated 6/08/15
- Electrical Drawing, "Bus 5 Backfeed to RATs to Power Bus 1, 2, & 4," Dated 6/08/15

- Electrical Drawing, "480V 405KW Portable Generator Supply to Train A DC Buses," Dated 6/08/15
- Electrical Drawing, "480V 405KW Portable Generator Supply to Train B DC Buses," Dated 6/08/15
- Electrical Drawing, "480V 405KW Portable Generator Supply to CBA-FN-21A or 21B," Dated 6/08/15
- Electrical Drawing, "480V 405KW Portable Generator Distribution Panel Set-up," 7/25/15
- Electrical Drawing, "480V 405KW Portable Generator Supply to RC-V-323, Head Vent," Dated 6/08/15
- Electrical Drawing, "4160V RRC Genset Bus 5 Loading," Dated 6/08/15
- Electrical Drawing, "4160V RRC Genset Bus 6 Loading," Dated 6/08/15
- Electrical Drawing, "480V RRC Genset US-53 Connection," Dated 6/08/15
- Electrical Drawing, "480V RRC Genset US-63 Connection," Dated 6/08/15
- Electrical Drawing, "Train A Control Room Ventilation Power from 480V Portable Genset," Dated 6/08/15
- Electrical Drawing, "Train B Control Room Ventilation Power from 480V Portable Genset," Dated 6/08/15
- Electrical Drawing, "480V 405KW Portable Generator Supply to RC-V-122, PORV Block Valve," Dated 6/08/15
- Electrical Drawing, "480V 405KW Portable Generator Supply to RC-V-124, PORV Block Valve," Dated 6/08/15
- Electrical Drawing, "BRS-P-86A Temporary Power from a Portable Generator," Dated 6/08/15
- Electrical Drawing, "MCC-111/231 Temporary Power from a Portable Generator," Dated 6/08/15
- SBC-227-CACL, "DC System Evaluation for Station Blackout and Beyond Design Basis External Events," Revision 5
- EC-282186, "Bus 5 & 6 and Substation 53 & 63 Connections for NSRC Generators," Revision 0
- Electrical Drawing, EC 282186, "4160V RRC Genset Bus 6 Loading," Dated 4/1/15
- Electrical Drawing, EC 282186, "4160V RRC Genset Bus 5 Loading," 4/1/15

Seabrook
Mitigation Strategies/Spent Fuel Pool Instrumentation Safety Evaluation Audit Items:

Audit Items Currently Under NRC Staff Review and Requiring Licensee Input

Audit Item Reference	Item Description	Licensee Input Needed
AQ 19	Heat Tracing	The staff requested that the licensee make available a heat tracing analysis for equipment required to cope with an ELAP.

<p>SE Review Items 14 SE Review Item 15 SE Review Item 20</p>	<p>Heat-up Calculations</p>	<ol style="list-style-type: none">1. The staff requested that the control room temperature extrapolation be formally documented.2. The staff requested that the battery rooms' temperature extrapolation for both hot and cold outside ambient conditions be formally documented.3. The staff requested that the essential switch gear rooms' temperature extrapolation be formally documented considering the additional heat loads being added by the restoration of electric power during Phases 2 and 3 of the ELAP event.4. The staff requested that the emergency feedwater pumphouse temperature extrapolation be formally documented.5. The staff requested that the main steam and feedwater pipe chases temperature extrapolation be formally documented. In addition, the staff requested that the licensee make available an evaluation of the impact of any uninsulated atmospheric steam dump valve (ASDV) piping, if the ASDVs are in service during the ELAP. The staff noted that the evaluation should include justification that the actions that need to be performed in the chases (i.e., connection of the FLEX low pressure pump to the SG feed lines) are capable of being accomplished with the conditions that will exist in those areas. Lastly, the staff requested that the licensee make available an evaluation of the qualification of the ASDV nitrogen supply system.6. The staff requested that the licensee make available the containment pressure and temperature calculation.
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Audit Item Reference	Item Description	Licensee Input Needed
		7. The staff requested that the licensee make available the ventilation actions (e.g., open doors, stage temporary ventilation, etc.) as a result of the heat-up calculations for the rooms listed above.

Seabrook
Mitigation Strategies/Spent Fuel Pool Instrumentation Safety Evaluation Audit Items:

Audit Items Currently Under NRC Staff Review But Not Requiring Further Licensee Input

Audit Item Reference	Item Description	Action
ISE CI 3.1.1.2.A	Deployment Paths	The staff requested that the licensee make available an evaluation of the non-seismic piping over the FLEX deployment paths. After the conclusion of the onsite audit, the licensee made available the evaluation of the non-seismic piping, and the staff is currently reviewing the evaluation.
AQ 3	Soil Liquefaction	The staff requested that the licensee make available the soil liquefaction assessments performed on the deployment routes. After the conclusion of the onsite audit, the licensee made available the soil liquefaction assessment, and the staff is currently reviewing the assessment.
AQ 33	Non-Safety Related Equipment	The licensee performed a seismic evaluation of the Unit 2 piping cistern and made it available for the staff's review. The staff is currently reviewing the evaluation.
SE Review Item 12	Missile Protection	The licensee made available its missile protection evaluation of the TDEFWP exhaust and the staff is currently reviewing the evaluation.

D. Curtland

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If you have any questions, please contact me at 301-415-5888 or by e-mail at Jason.Paige@nrc.gov.

Sincerely,

/RA/

Jason C. Paige, Project Manager
Orders Management Branch
Japan Lessons-Learned Division
Office of Nuclear Reactor Regulation

Docket No.: 50-443

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