



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

January 24, 2014

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

SUBJECT: SEABROOK STATION, UNIT 1 – U.S. NUCLEAR REGULATORY COMMISSION
STAFF ASSESSMENT OF THE SEISMIC WALKDOWN REPORT SUPPORTING
IMPLEMENTATION OF NEAR-TERM TASK FORCE RECOMMENDATION 2.3
RELATED TO THE FUKUSHIMA DAI-ICHI NUCLEAR POWER PLANT
ACCIDENT (TAC NO. MF0175)

Dear Mr. Walsh:

On March 12, 2012, the U.S. Nuclear Regulatory Commission (NRC) issued a request for information letter per Title 10 of the *Code of Federal Regulations*, Subpart 50.54(f) (50.54(f) letter). The 50.54(f) letter was issued to power reactor licensees and holders of construction permits requesting addressees to provide further information to support the NRC staff's evaluation of regulatory actions to be taken in response to lessons learned from Japan's March 11, 2011, Great Tōhoku Earthquake and subsequent tsunami. The request addressed the methods and procedures for nuclear power plant licensees to conduct seismic and flooding hazard walkdowns to identify and address degraded, nonconforming, or unanalyzed conditions through the corrective action program, and to verify the adequacy of the monitoring and maintenance procedures.

By letter dated November 26, 2012, as supplemented by letter dated September 30, 2013, NextEra Energy Seabrook, LLC submitted its Seismic Walkdown Report as requested in Enclosure 3 of the 50.54(f) letter for the Seabrook Station, Unit 1. From July 30 to August 1, 2013, an NRC audit team conducted an on-site audit to gain a better understanding of the methods and procedures used by NextEra Energy to conduct the seismic walkdowns and to facilitate the NRC staff review of the walkdown report.

The NRC staff reviewed the information provided and, as documented in the enclosed NRC staff assessment, determined that you have provided sufficient information to be responsive to Enclosure 3 of the 50.54(f) letter. This concludes the NRC's efforts associated with TAC No. MF0175. Any limited remaining effort, if necessary, will be associated with TAC No. ME7954.

K. Walsh

- 2 -

If you have any questions, please contact me at 301-415-3100 or by e-mail at John.Lamb@nrc.gov.

Sincerely,

A handwritten signature in black ink, appearing to read "John G. Lamb". The signature is fluid and cursive, with a large initial "J" and "L".

John G. Lamb, Acting Chief
Plant Licensing Branch I-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-443

Enclosure:
NRC Staff Assessment of Seismic
Walkdown Report

cc w/encl: Distribution via Listserv

U.S. NUCLEAR REGULATORY COMMISSION STAFF ASSESSMENT
OF THE SEISMIC WALKDOWN REPORT
NEAR-TERM TASK FORCE RECOMMENDATION 2.3
RELATED TO
THE FUKUSHIMA DAI-ICHI NUCLEAR POWER PLANT ACCIDENT
NEXTERA ENERGY SEABROOK, LLC
SEABROOK STATION, UNIT 1
DOCKET NO. 50-443

1.0 INTRODUCTION

On March 12, 2012,¹ the U.S. Nuclear Regulatory Commission (NRC) issued a request for information per Title 10 of the *Code of Federal Regulations*, Subpart 50.54(f) (50.54(f) letter) to all power reactor licensees and holders of construction permits in active or deferred status. The request was part of the implementation of lessons learned from the accident at the Fukushima Dai-ichi nuclear power plant. Enclosure 3, "Recommendation 2.3: Seismic,"² to the 50.54(f) letter requested licensees to conduct seismic walkdowns to identify and address degraded, nonconforming, or unanalyzed conditions using the corrective action program (CAP), verify the adequacy of monitoring and maintenance procedures, and report the results to the NRC.

Enclosure 3 of the 50.54(f) letter requested licensees provide the following:

- a. Information concerning the plant-specific hazard licensing bases and a description of the protection and mitigation features considered in the licensing basis evaluation.
- b. Information related to the implementation of the walkdown process.
- c. A list of plant-specific vulnerabilities . . . identified by the [Individual Plant Examination of External Events] IPEEE and a description of the actions taken to eliminate or reduce them . . .
- d. Results of the walkdown including key findings and identified degraded, nonconforming, or unanalyzed conditions . . .
- e. Any planned or newly installed protection and mitigation features.
- f. Results and any subsequent actions taken in response to the peer review.

¹ Agencywide Documents Access and Management System (ADAMS) Accession No. ML12053A340.

² ADAMS Accession No. ML12056A049.

In accordance with the 50.54(f) letter, Enclosure 3, Required Response Item 2, licensees were required to submit a response within 180 days of the NRC's endorsement of the seismic walkdown process. By letter dated May 29, 2012,³ the Nuclear Energy Institute staff submitted Electric Power Research Institute document 1025286, "Seismic Walkdown Guidance for Resolution of Fukushima Near-Term Task Force Recommendation 2.3: Seismic," (walkdown guidance) to the NRC staff to consider for endorsement. By letter dated May 31, 2012,⁴ the NRC staff endorsed the walkdown guidance.

By letter dated November 26, 2012,⁵ NextEra Energy Seabrook, LLC (NextEra or the licensee) provided a response to Enclosure 3 of the 50.54(f) letter Required Response Item 2, for Seabrook Station, Unit 1 (Seabrook). The NRC staff reviewed the walkdown report and determined that a regulatory audit would assist the NRC staff in completing its review. A regulatory audit was conducted from July 30 to August 1, 2013, to gain a better understanding of the processes and procedures used by the licensee in conducting the walkdowns and walk-bys. In response to the NRC staff's questions during the audit, the licensee supplemented the Seabrook walkdown report by letter dated September 30, 2013.⁶

The NRC staff evaluated the licensee's submittals to determine if the information provided in the walkdown report met the intent of the walkdown guidance and if the licensee responded appropriately to Enclosure 3 of the 50.54(f) letter.

2.0 REGULATORY EVALUATION

The structures, systems, and components (SSCs) important to safety in operating nuclear power plants are designed either in accordance with, or meet the intent of Appendix A to 10 CFR Part 50, General Design Criteria (GDC) 2: "Design Bases for Protection Against Natural Phenomena;" and Appendix A to 10 CFR Part 100, "Reactor Site Criteria." GDC 2 states that SSCs important to safety at nuclear power plants shall be designed to withstand the effects of natural phenomena such as earthquakes, tornadoes, hurricanes, floods, tsunamis, and seiches without loss of capability to perform their safety functions.

For initial licensing, each licensee was required to develop and maintain design bases that, as defined by 10 CFR 50.2, identify the specific functions that an SSC of a facility must perform, and the specific values or ranges of values chosen for controlling parameters as reference bounds for the design.

The design bases for the SSCs reflect appropriate consideration of the most severe natural phenomena that have been historically reported for the site and surrounding area. The design bases also reflect sufficient margin to account for the limited accuracy, quantity, and period of time in which the historical data have been accumulated.

³ ADAMS Package Accession No. ML121640872.

⁴ ADAMS Accession No. ML12145A529.

⁵ ADAMS Accession Nos. ML12340A486 and ML12340A487.

⁶ ADAMS Accession No. ML13275A202.

The current licensing basis is the set of NRC requirements applicable to a specific plant, including the licensee's docketed commitments for ensuring compliance with, and operation within, applicable NRC requirements and the plant-specific design basis, including all modifications and additions to such commitments over the life of the facility operating license.

3.0 TECHNICAL EVALUATION

3.1 Seismic Licensing Basis Information

The licensee provided information on the plant-specific licensing basis for the Seismic Category I SSCs for Seabrook in Section 2.0 of its walkdown report. Consistent with the walkdown guidance, the NRC staff noted that the report includes a summary of the Safe Shutdown Earthquake and a description of the codes, standards, and methods used in the design of the Seismic Category I SSCs for meeting the plant-specific seismic licensing basis requirements.

Based on the NRC staff's review, the NRC staff concludes that the licensee has provided information on the plant-specific seismic licensing basis and a description of the protection and mitigation features considered in the licensing bases evaluation consistent with Section 8, Submittal Report, of the walkdown guidance.

3.2 Seismic Walkdown Methodology Implementation

Section 2, Personnel Qualifications; Section 3, Selection of SSCs; Section 4, Seismic Walkdowns and Area Walk-Bys; and Section 5, Seismic Licensing Basis Evaluations, of the walkdown guidance provide information to licensees regarding the implementation of an appropriate seismic walkdown methodology. By letter dated July 9, 2012,⁷ the licensee confirmed that it would utilize the walkdown guidance in performance of the seismic walkdowns at Seabrook.

The Seabrook walkdown report dated November 26, 2012, did not identify deviations from the walkdown guidance.

The NRC staff reviewed the following sections of the walkdown methodology implementation provided in the Seabrook walkdown report:

- Personnel Qualifications
- Development of the Seismic Walkdown Equipment Lists (SWELs)
- Implementation of the Walkdown Process
- Licensing Basis Evaluations and Results

3.2.1 Personnel Qualifications

Section 2, Personnel Qualifications, of the walkdown guidance provides licensees with qualification information for personnel involved in the conduct of the seismic walkdowns and area walk-bys.

⁷ ADAMS Accession No. ML12195A005.

The NRC staff reviewed the information provided in Section 3 and Table 3-1 of the Seabrook walkdown report, which includes information on the walkdown personnel and their qualifications. Specifically, the NRC staff reviewed the summary of the background, experience, and level of involvement for the following personnel involved in the seismic walkdown activities: equipment selection personnel, seismic walkdown engineers (SWEs), licensing basis reviewers, IPEEE reviewers, peer review team, and operations staff.

Based on the review of the licensee's submittals, the NRC staff concludes that those involved in the seismic walkdown activities have the appropriate seismic background, knowledge and experience, as specified in Section 2 of the walkdown guidance.

3.2.2 Development of the SWELs

Section 3, Selection of SSCs, of the walkdown guidance provides information to licensees for selecting the SSCs that should be placed on the SWELs, so that they can be walked down by qualified personnel.

The NRC staff reviewed the overall process used by the licensee to develop the Seabrook Master Component List (base list 1 & 2) and SWEL 1 (sample list of designated safety functions equipment) and SWEL 2 (sample list of spent fuel pool related equipment). The equipment selection process followed the screening process shown in Figures 1-1 and 1-2 of the walkdown guidance. Based on Appendix B of the walkdown report, SWELs 1 and 2 meet the inclusion requirements of the walkdown guidance. Specifically, the following attributes were considered in the sample selection:

- A variety of systems, equipment and environments
- IPEEE equipment
- Major new or replacement equipment
- Risk considerations

Due to individual plant configurations and the walkdown guidance screening process followed to select the final SWEL equipment, it is possible that some classes of equipment will not be represented on the SWEL. The walkdown guidance recognizes this is due to the equipment not being present in the plant (e.g., some plants generate DC power using inverters and therefore do not have motor generators) or the equipment being screened out during the screening process (the screening process is described in Section 3 of the walkdown guidance). Based on the information provided, the NRC staff notes that a detailed explanation was provided justifying cases where specific classes of equipment were not included as part of the SWEL, and concludes that these exclusions are acceptable.

The NRC staff also noted that a rapid drain-down list was not included as part of the SWEL 2, as described in Section 3 of the guidance. The basis for determining which SSCs could or could not cause rapid drain-down was described in Section 4.2 of the report. The licensee stated that "there are no [spent fuel pool] SFP penetrations that could fail from a seismic event and lead to rapid draindown." After reviewing the information provided in this section, the NRC staff concludes that sufficient information was provided to justify that there are no items which could lead to a rapid drain-down of the Seabrook SFP.

After reviewing SWELs 1 and 2, the NRC staff concludes that the sample of SSCs represents a diversity of component types and assures inclusion of components from critical systems and functions, thereby meeting the intent of the walkdown guidance. In addition, the NRC staff notes that the equipment selection personnel were appropriately supported by plant operations staff as described in the walkdown guidance.

3.2.3 Implementation of the Walkdown Process

Section 4, Seismic Walkdowns and Area Walk-Bys, of the walkdown guidance provides information to licensees regarding the conduct of the seismic walkdowns and area walk-bys for each site.

The NRC staff reviewed Section 5 of the Seabrook walkdown report which summarizes the results of the seismic walkdowns and area walk-bys including an overview of the number of items walked down and the number of areas walked-by. The Seabrook walkdown report states that walkdown and area walk-bys were conducted by two seismic review teams, each of which included at least two SWEs who conducted the walkdowns and area walk-bys together. These walkdowns and area walk-by activities were conducted during the week of August 29, 2012, and on September 14, and September 20, 2012. The walkdown report and additional clarification provided in the supplement to this report state that the SWEs discussed their observations and judgments with each other during the walkdowns. Additionally, the SWEs agreed on the results of their seismic walkdowns and area walk-bys before reporting the results of their review. The SWEs were also assisted in some of the walkdowns by the plant operations staff and probabilistic risk analysis group. Appendices C and D of the walkdown report provide the completed seismic walkdown checklists (SWCs) and area walk-by checklists (AWCs) documenting the results for each item of equipment on SWELs 1 and 2 and each area containing SWEL equipment. The licensee used the checklists provided in Appendix C of the walkdown guidance report without modification.

The NRC staff reviewed these checklists and noted they were all dated on November 5, 2012. During the audit, the NRC staff requested that the licensee explain the process that was followed when completing the checklists and explain why they were not signed until approximately one month after the completion of the walkdowns. The licensee explained the internal process that was followed after the checklists were completed, including seismic walkdown team discussions and management approval prior to the formal signature and dating of the checklists. This process resulted in two sets of SWCs and AWCs. The first set included those checklists completed in the field when the walkdowns occurred, and the second set included the final checklists sent to the NRC. The final checklists were those that were formally signed and dated and included the outcomes and disposition documentation for identified conditions (e.g., reviewer comments, calculation reference, CAP identifications).

The licensee documented cases of potentially adverse seismic conditions (PASCs) in the checklists for further evaluation. Tables 5-2 and 5-3 of the walkdown report list the PASCs identified during the initial seismic walkdowns and the area walk-bys. These tables were updated and provided in Attachments A and B of the supplement report and describe how the conditions were addressed (e.g., placement in CAP) and its current status.

In addition to the information provided above, the NRC staff notes that anchorage configurations were verified to be consistent with existing plant documentation for at least 50 percent of the SWEL items in accordance with the walkdown guidance.

Section 5.1 of the walkdown report confirms that additional walkdowns were conducted on September 14, 2012, to perform internal inspections of selected electrical equipment cabinets that were not completely inspected or were not opened during the initial inspections. The NRC staff reviewed the seismic walkdown checklists and confirmed that cabinets were opened to view internal lateral anchorages to adjacent cabinets, any internal floor anchorage, and to determine if any sagging existed of internal equipment.

Based on the information provided in the licensee's submittals, the NRC staff concludes that the licensee's implementation of the walkdown process meets the intent of the walkdown guidance.

3.2.4 Licensing Basis Evaluations and Results

Section 5, Seismic Licensing Basis Evaluations, of the walkdown guidance provides information to licensees regarding the conduct of licensing basis evaluations for items identified during the seismic walkdowns as degraded, nonconforming, or unanalyzed that might have potential seismic significance.

The NRC staff reviewed Section 6 of the walkdown report which discusses the process for conducting the seismic licensing basis evaluations of the PASCs identified during the seismic walkdowns and area walk-bys. The licensee stated that the disposition of a potential issue as not being a challenge to the seismic design basis was based on SWE engineering judgment and/or simplified calculations. In addition, several issues were entered into the CAP for further evaluation or housekeeping actions. The licensee stated that no potentially adverse conditions were identified that challenged the plant's seismic design basis. Report Tables 5-2 and 5-3 list each of these conditions identified during the initial seismic walkdowns and the area walk-bys, respectively. These tables, which were updated as part of the supplemental report to include additional items entered into the CAP based on the licensee's self-assessment, describe how the condition has been addressed (e.g., placement in the CAP) and its current status.

The NRC staff notes that items that could not be readily (within a few days) dispositioned by a licensing basis evaluation were entered into the CAP; however, there were instances where the process took longer than several days. This issue was discussed during the audit. The NRC staff concluded that the licensee provided sufficient information to justify that these cases were isolated and that in most cases, issues were dispositioned appropriately and in a timely manner.

The NRC staff concludes that the licensee entered potential deficiencies against the licensing basis into the CAP and addressed these potential deficiencies through licensing basis evaluations or entry into the CAP, and that these actions meet the intent of the walkdown guidance. The NRC staff reviewed the CAP entries and the description of the actions taken or planned to address potential deficiencies. The NRC staff concludes that the licensee appropriately identified degraded, nonconforming, or unanalyzed conditions and entered them into the CAP, which meets the intent of the walkdown guidance.

3.2.5 Conclusion

Based on the discussion above, the NRC staff concludes that the licensee's implementation of seismic walkdown methodology meets the intent of the walkdown guidance for personnel qualifications, development of SWELs, implementation of the walkdown process, and seismic licensing basis evaluations.

3.3 Peer Review

Section 6, Peer Review, of the walkdown guidance provides licensees with information regarding the conduct of peer reviews for the activities performed during the seismic walkdowns. Page 6-1 of the walkdown guidance identifies the following activities to be conducted during the peer review process:

- Review the selection of the SSCs included on the SWELs
- Review a sample of the checklists prepared for the seismic walkdowns and area walk-bys
- Review the licensing basis evaluations
- Review the decisions for entering the potentially adverse conditions into the CAP
- Review the walkdown report
- Summarize the results of the peer review process in the walkdown report

The NRC staff reviewed the information provided in Section 8 of the Seabrook Walkdown Report which describes the conduct of the peer review. The licensee described the results and any subsequent actions taken in response to the peer review in the same section. The NRC staff noted that all the activities identified on page 6-1 of the walkdown guidance were included as part of the peer review process. The NRC staff reviewed the licensee's summary of each of these activities, which included a discussion of the peer review team members' qualifications and level of involvement, the peer review findings, and resolution of peer review comments. After reviewing the licensee's submittals, the NRC staff concludes that the licensee sufficiently documented the results of the peer review activities and how these reviews affected the work described in the walkdown report.

Based on the discussion above, the NRC staff concludes that the licensee's results of the peer review and subsequent actions taken in response to the peer review meet the intent of Section 6 of the walkdown guidance.

3.4 IPEEE Information

Section 7, IPEEE Vulnerabilities, of the walkdown guidance provides information to licensees regarding the reporting of the evaluations conducted and actions taken in response to seismic vulnerabilities identified during the IPEEE program. Through the IPEEE program and Generic Letter 88-20, "Individual Plant Examination for Severe Accident Vulnerabilities - 10 CFR 50.54(f)," licensees previously had performed a systematic examination to identify any plant-specific vulnerabilities to severe accidents.

The licensee stated that no seismic vulnerabilities were identified during the IPEEE program and no seismic design enhancements were recommended or implemented as a result of the external events risk study. Thus, no plant improvements were required as a result of the seismic portion of the IPEEE.

Based on the NRC staff's review of Section 7 of the walkdown report, the NRC staff concludes that the licensee's identification of plant-specific vulnerabilities (including anomalies, outliers and other findings) identified by the IPEEE program, as well as actions taken to eliminate or reduce them, meets the intent of Section 7 of the walkdown guidance.

3.5 Planned Upgrades

The licensee did not identify any planned or newly installed protection and mitigation features in the walkdown report.

3.6 NRC Oversight

3.6.1 Independent Verification by Resident Inspectors

On July 6, 2012,⁸ the NRC issued Temporary Instruction (TI) 2515/188, "Inspection of Near-Term Task Force Recommendation 2.3 Seismic Walkdowns." In accordance with the TI, NRC inspectors independently verified that the Seabrook licensee implemented the seismic walkdowns in accordance with the walkdown guidance. Additionally, the inspectors independently performed walkdowns of a sample of seismic protection features. The inspection report dated February 11, 2013,⁹ documents the results of this inspection.

3.6.2 Site Audit

The NRC staff performed an audit of Seabrook Station, Unit 1 during the week of July 30, 2013. During the audit, the NRC staff gained a better understanding of the process used by the licensee to perform the walkdowns. The NRC staff identified and conveyed to the licensee the specific issues to be addressed, and the licensee subsequently submitted a supplemental walkdown report. The NRC staff also noted that the licensee discussed several self-identified issues in the revised walkdown report. The audit report dated November 21, 2013,¹⁰ provides the results of this audit for Seabrook.

4.0 OPEN ITEMS

4.1 Inaccessible Items

The equipment and areas that were inaccessible during the 180-day period are listed in Table E-1 of Appendix E to the walkdown report. The list of inaccessible items also includes the condition which caused the delay of the walkdown. A limited number of SWEL components (total of three) were inaccessible at the time of the initial walkdowns. The licensee stated that the electrical cabinets were inaccessible due to the energized nature of the cabinets. The walkdowns for this

⁸ ADAMS Accession No. ML12156A052.

⁹ ADAMS Accession No. ML13042A058.

¹⁰ ADAMS Accession No. ML13281A476.

limited number of inaccessible items are planned to be completed by the end of the refueling Outage 16 in the spring of 2014.

The NRC staff concludes that the inaccessible equipment list was developed consistent with the walkdown guidance. The schedule for completion is consistent with the time to the next scheduled outage.

5.0 CONCLUSION

The NRC staff concludes that the licensee's implementation of seismic walkdown methodology meets the intent of the walkdown guidance. The NRC staff concludes that, through the implementation of the walkdown guidance activities and, in accordance with plant processes and procedures, the licensee verified the plant configuration with the current seismic licensing basis; addressed degraded, nonconforming, or unanalyzed seismic conditions; and verified the adequacy of monitoring and maintenance programs for protective features. Furthermore, the NRC staff notes that no immediate safety concerns were identified. The NRC staff concludes that, at the successful completion and reporting of the remaining limited number of inaccessible walkdown items, the licensee responded appropriately to Enclosure 3 of the 50.54(f) letter, dated March 12, 2012.

K. Walsh

- 2 -

If you have any questions, please contact me at 301-415-3100 or by e-mail at John.Lamb@nrc.gov.

Sincerely,

/ra/

John G. Lamb, Acting Chief
Plant Licensing Branch I-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-443

Enclosure:
NRC Staff Assessment of Seismic
Walkdown Report

cc w/encl: Distribution via Listserv

DISTRIBUTION:

PUBLIC	RidsRgn1MailCenter Resource	
LPL1-2 R/F	RidsOpaMail Resource	BRini, EDO RI, RII, RIII, RIV
RidsNroDsea	RidsNrrLAMHenderson Resource	RidsAcrcsAcnw MailCTR Resource
RidsNrrDorl Resource	RidsNrrPMSeabrookResource	RidsNrrDorlLpli-2 Resource
LRegner, NRR	NChokshi, NRO	SFlanders, NRO
DJackson, NRO	RKaras, NRO	FVega, NRO
MJardaneh, NRO		

ADAMS Accession Number: ML13364A311

* concurrence by e-mail

OFFICE	DORL/LPLI-2/PM	JLD/PMB/PM	DORL/LPLI-2/LA	DSEA/RGS2/BC
NAME	JWhited for JLamb	LRegner*	ABaxter*	DJackson *
DATE	01/27/14	01/13/14	01/22/14	12/23/2013
OFFICE	DORL/LPLI-2/BC (A)			
NAME	JLamb			
DATE	01/24/14			

OFFICIAL RECORD COPY