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

May 14, 2014

Mr. Thomas Joyce
President and Chief Nuclear Officer
PSEG Nuclear LLC-N09
P. O. Box 236
Hancocks Bridge, NJ 08038

SUBJECT: SALEM NUCLEAR GENERATING STATION, UNIT 2 - 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. MF0172)

Dear Mr. Joyce:

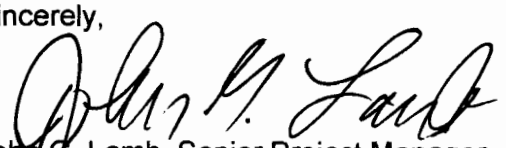
On March 12, 2012, the U.S. Nuclear Regulatory Commission staff (NRC)) issued a request for information letter per Title 10 of the *Code of Federal Regulations,* Section 50.54(f) (50.54(f) letter). The 50.54(f) letter was issued to power reactor licensees and holders of construction permits requesting 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 plants 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 letters dated November 26, 2012, and December 20, 2013, PSEG Nuclear, LLC (PSEG) submitted its Seismic Walkdown Reports as requested in Enclosure 3 of the 50.54(f) letter for the Salem Nuclear Generating Station, Unit 2. By letter dated December 2, 2013, PSEG provided a response to an NRC request for additional information in order for the NRC staff to complete its assessments.

The NRC staff has reviewed the information provided and, as documented in the enclosed NRC staff assessment, determined that sufficient information was provided to be responsive to Enclosure 3 of the 50.54(f) letter.

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

Sincerely,



John G. Lamb, Senior Project Manager
Plant Licensing Branch I-2
Division of Operating Reactor Regulation
Office of Nuclear Reactor Regulation

Docket No. 50-311

Enclosure:
Staff Assessment of Seismic
Walkdown Report

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STAFF ASSESSMENT OF SEISMIC WALKDOWN REPORT

NEAR-TERM TASK FORCE RECOMMENDATION 2.3 RELATED TO

THE FUKUSHIMA DAI-ICHI NUCLEAR POWER PLANT ACCIDENT

PSEG NUCLEAR LLC

SALEM NUCLEAR GENERATING STATION, UNIT 2

DOCKET NO. 50-311

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 to provide the following:

a. Information on 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 IPEEE [Individual Plant Examination of External Events] 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 (NEI) staff submitted Electric Power Research Institute (EPRI) 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] PSEG Nuclear LLC (PSEG or the licensee) provided a response to Enclosure 3 of the 50.54(f) letter Required Response Item 2, for Salem Nuclear Generating Station, Unit 2 (SGS-2). The NRC staff reviewed the initial walkdown report and determined that additional supplemental information would assist the staff in completing its review. In letter dated November 1, 2013,[6] the NRC staff requested additional information to gain a better understanding of the processes and procedures used by the licensee in conducting the walkdowns and walk-bys. The licensee responded to the NRC staff request by letter dated December 2, 2013.[7]

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] for Nuclear Power Plants, " Criterion 2: "Design bases for protection against natural phenomena;" and Appendix A to 10 CFR Part 100, "Reactor Site Criteria." SGS-2 was designed to the Atomic Industrial Forum version of the GDC, dated October 2, 1967. In Section 3.1.3 of the SGS Updated Final Safety Analysis Report, the licensee discusses compliance with the GDC in Appendix A of 10 CFR Part 50 and does not identify any deviations from Criterion 2. Criterion 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, tsunami, 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, "Definitions," 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.

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[3] ADAMS Package Accession No. ML121640872.
[4] ADAMS Accession No. ML12145A529.
[5] ADAMS Accession No. ML12339A127.
[6] ADAMS Accession No. ML13304B418.
[7] ADAMS Accession No. ML13337A394.

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.

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's 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 SGS-2 in Section 3 of the walkdown report. Consistent with the walkdown guidance, the NRC staff noted that the report includes a summary of the Safe Shutdown Earthquake (SSE) and a description of the codes, standards, and methods that were used in the design of the Seismic Category I SSCs for meeting the plant-specific seismic licensing basis requirements. The NRC staff reviewed Section 3 of the walkdown report, focusing on the summary of the SSE and the design codes used in the design.

Based on its 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 (EPRI Document 1025286) provides information to licensees regarding the implementation of an appropriate seismic walkdown methodology. By letter dated July 9, 2012,[8] the licensee confirmed that it would utilize the walkdown guidance in the performance of the seismic walkdowns at SGS-2.

The walkdown report submitted by letter 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 walkdown report:

- Personnel Qualifications
- Development of the Seismic Walkdown Equipment Lists (SWELs)

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[8] ADAMS Accession No. ML12192A214.

- 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.

The NRC staff reviewed the information provided in Section 4, Table 4-1 and Attachment 4 of the 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 SGS-1 base list, SWEL 1 (sample list of designated safety functions equipment), and SWEL 2 (sample list of spent fuel pool related equipment). The overall equipment selection process followed the screening process shown in Figures 1-1 and 1-2 of the walkdown guidance. Based on Attachment 2 and the descriptions provided in Section 5 of the walkdown report, SGS-2 SWEL 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

The approach to identifying all items that can lead to rapid drain down is discussed and explained in sufficient detail in Section 5.3.4 of the walkdown report. The licensee stated that the SGS-2 spent fuel pool contains no penetrations below 10 ft. above the top of the fuel assemblies. Therefore, no components related to rapid drain-down were added to SWEL 2. After reviewing the information provided in this section, the NRC staff concludes that the licensee provided adequate justification for not including a rapid drain-down list as part of the SWEL 2.

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 direct current power using inverters and therefore do not have motor generators) or the equipment being screened out during the screening process (described in Section 3). Based on the information provided, the NRC staff noted 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.

After reviewing the SWEL 1 and 2, the NRC staff concludes that the sample of SSCs represents 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 6 of the 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 walkdown report states that the Seismic Review Team (SRT), which consisted of two qualified SWEs, conducted the seismic walkdowns and area walk-bys. According to the signed seismic walkdown checklists (SWCs) and area walk-by checklists (AWCs), these activities were conducted from September 12, 2012, to October 26, 2012. All items on the SWEL have been walked down. SGS-2 refueling outage (2RF19) coincided with the 180-day period; therefore, any inaccessible components that originally were deferred for the outage have been completed.

The walkdown report also states 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. Attachment 3 of the walkdown report provides the completed SWCs and AWCs, documenting the results for each item of equipment on SWEL 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 licensee documented cases of potentially adverse seismic conditions (PASCs) in the checklists for further evaluation. Table 6-1 of the updated walkdown report lists the PASCs identified during the seismic walkdowns and the area walk-bys. The table describes how the condition was addressed (e.g., placement in the CAP), their resolution and its current status.

Based on the review of the checklists, the NRC staff was unable to confirm that all the PASCs identified during the walkdowns were included in this table. As such, by letter dated November 1, 2013, the NRC staff issued two questions in a request for additional information (RAI) in order to obtain additional clarification regarding the process followed by the licensee when evaluating conditions identified in the field during the walkdowns and walk-bys. Specifically, in RAI 1, the NRC staff requested that the licensee provide further explanation regarding how a field observation was determined to be PASC, and to ensure that the basis for determination was addressed using normal plant processes and documented in the walkdown report. In the response to RAI 1, dated December 2, 2013, the licensee confirmed that observations which could not be judged to be acceptable during the walkdown were identified as PASCs and were documented in the CAP. The licensee confirmed that it did not use a licensing basis evaluation process outside of the CAP. In addition, the licensee created a new CAP item to verify that appropriate actions are taken when reporting and dispositioning identified PASCs.

After evaluating the licensee's response and reviewing Table 6-1, the NRC staff concludes that the licensee responded appropriately to RAI 1 and PASCs were properly identified and documented in Table 6-1.

In addition to the information provided above, the NRC staff noted that the anchorage configurations were verified to be consistent with existing plant documentation for at least 50 percent of the SWEL items, in accordance with Section 4 of the walkdown guidance.

The walkdown report does not clearly state whether the licensee opened cabinets as part of the walkdowns. The NRC staff reviewed the SWCs provided in the walkdown report and confirmed that accessible cabinets were opened to determine if any adverse conditions existed with regard to 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 6.3.3 of the SGS-2 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 clarified as part of the response to RAI 1 that it did not use a licensing basis evaluation process outside of the CAP, but elected to document PASCs in the CAP and in the seismic walkdown report. Table 6-1 of the walkdown report lists the key licensee findings, and provides a complete list of the potentially degraded, nonconforming, or unanalyzed conditions. Table 6-1 also describes the actions taken or planned to address these conditions, including the current status of each of the items the licensee entered into the CAP.

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 9 of the SGS-2 walkdown report which describes the conduct of the peer review. In addition, the NRC staff reviewed the response to RAI 2 in the licensee's letter dated December 2, 2013. In RAI 2, the NRC staff requested that the licensee provide additional information on the overall peer review process that was followed as part of the walkdown activities. Specifically, the NRC staff requested that the licensee confirm that the activities identified on page 6-1 of the walkdown guidance were assessed and documented in the report. The licensee was also requested to confirm that any individual involved in performing any given walkdown activity was not a peer reviewer for that same activity. In response to RAI 2, the licensee confirmed that all the activities identified on page 6-1 of the walkdown guidance were included as part of the peer review process and referred to the summary of the peer review activities provided in five subsections of Section 9 of the walkdown report. The licensee also provided additional information in Table 4-1 regarding the level of involvement of the peer review team and its leader, in order to further demonstrate the independence 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)," dated November 23, 1988,[9] licensees previously had performed a systematic examination to identify any plant-specific vulnerability to severe accidents.

The licensee stated in Section 8 of the walkdown report that no seismic vulnerabilities were identified during the IPEEE program for inspection. Furthermore, no plant improvements were required as a result of the seismic portion of the IPEEE. There were no vulnerabilities identified during the IPEEE report, and no scenario or event sequence has been identified which is considered to be a severe accident vulnerability in response to GL 88-20.

Based on the NRC staff's review of Section 8 of the walkdown report, the NRC staff concludes that the licensee's identification of no plant-specific vulnerabilities (i.e., enhancements, outliers, findings) in the IPEEE program 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,[10] 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 SGS-2 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 7, 2013,[11] documents the results of this inspection for SGS Units 1 and 2. No findings were identified.

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[9] ADAMS Accession No. ML031105465.
[10] ADAMS Accession No. ML12156A052.
[11] ADAMS Accession No. ML13038A672.

4.0 CONCULSION

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 the licensee, through the implementation of the walkdown guidance activities and, in accordance with plant processes and procedures, 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 the licensee responded appropriately to Enclosure 3 of the 50.54(f) letter, dated March 12, 2012.

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

Sincerely,

/RA/

John G. Lamb, Senior Project Manager
Plant Licensing Branch I-2
Division of Operating Reactor Regulation
Office of Nuclear Reactor Regulation

Docket No. 50-311

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Staff Assessment of Seismic
Walkdown Report

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