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

May 6, 2014

Mr. Timothy S. Rausch
Senior Vice President and Chief Nuclear Officer
PPL Susquehanna, LLC.
769 Salem Boulevard, NUCSB3
Berwick, PA 18603

SUBJECT: SUSQUEHANNA STEAM ELECTRIC STATION, UNITS 1 AND 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 NOS. MF0183 AND MF0184)

Dear Mr. Rausch:

On March 12, 2012,[1] 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,[2] as supplemented by letter dated July 26, 2013,[3] PPL Susquehanna, LLC (the licensee) submitted its Seismic Walkdown Report as requested in Enclosure 3 of the 50.54(f) letter for the Susquehanna Steam Electric Station, Units 1 and 2 (SSES-1 and SSES-2). By letter dated November 27, 2013,[4] PPL Susquehanna, LLC provided a response to the NRC request for additional information for the staff to complete its assessments.

The staff acknowledges that a supplemental letter will be provided within 60 days after the next scheduled refueling outage (spring 2014) addressing the remaining inaccessible items consistent with the regulatory commitment for SSES-1. The NRC staff reviewed the information provided and, as documented in the enclosed staff assessments, determined that sufficient information was provided to be responsive to Enclosure 3 of the 50.54(f) letter.

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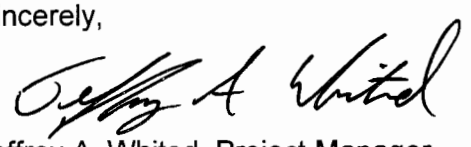
[1] Agencywide Documents Access and Management System (ADAMS) Accession No. ML12053A340.
[2] ADAMS Accession No. ML13002A339.
[3] ADAMS Accession No. ML13211A348.
[4] ADAMS Accession No. ML13331B490.

By letter dated April 16, 2014,[5] the NRC staff sent a DRAFT copy of the enclosed Staff Assessments to you to provide you with the opportunity to comment on any security-related aspects.[6] By e-mail dated April 23, 2014,[7] Mr. Duane Filchner, of your staff, informed the NRC staff that the licensee agreed that there was no security-related information contained in the Staff Assessments.

This concludes the NRC staff's efforts associated with TAC Nos. MF0183 and MF0184.

If you have any questions, please contact me at (301) 415-4090 or at Jeffrey.Whited@nrc.gov.

Sincerely,



Jeffrey A. Whited, Project Manager
Plant Licensing Branch I-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-387 and 50-388

Enclosures:
1. Staff Assessment of Seismic Walkdown Report for SSES-1
2. Staff Assessment of Seismic Walkdown Report for SSES-2

cc w/encls: Distribution via Listserv

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[5] ADAMS Accession No. ML14058B072.
[6] A copy of the DRAFT Staff Assessment can be found at ADAMS Accession No. ML14113A555.
[7] ADAMS Accession No. ML14113A510.

STAFF ASSESSMENT OF SEISMIC WALKDOWN REPORT

NEAR-TERM TASK FORCE RECOMMENDATION 2.3 RELATED TO

THE FUKUSHIMA DAI-ICHI NUCLEAR POWER PLANT ACCIDENT

PPL SUSQUEHANNA, LLC

SUSQUEHANNA STEAM ELECTRIC STATION, UNIT 1

DOCKET NO. 50-387

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 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 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.

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

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1 Agencywide Documents Access and Management System (ADAMS) Accession No. ML12053A340.
2 ADAMS Accession No. ML12056A049.

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) for 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] PPL Susquehanna, LLC (PPL, or the licensee) provided a response to Enclosure 3 of the 50.54(f) letter Required Response Item 2, for Susquehanna Steam Electric Station Unit 1 (SSES-1).

The NRC staff reviewed the walkdown report and determined that additional supplemental information would assist the staff in completing its review. In a letter dated November 1, 2013,[6] the NRC 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 November 27, 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 for Nuclear Power Plants," Criterion 2: "Design bases for protection against natural phenomena;" and Appendix A to 10 CFR Part 100, "Reactor Site Criteria." 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, 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.

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3 ADAMS Package Accession No. ML121640872.
4 ADAMS Accession No. ML12145A529.
5 ADAMS Accession No. ML13002A339.
6 ADAMS Accession No. ML13304B418.
7 ADAMS Accession No. ML13331B490.

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 SSES-1 in Section 2.0, Seismic Licensing Basis, 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 that were used in the design of the Seismic Category I SSCs for meeting the plant-specific seismic licensing basis requirements.

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 10, 2012,[8] the licensee confirmed that it would utilize the walkdown guidance in the performance of the seismic walkdowns at SSES-1.

The walkdown report dated November 26, 2012, did not identify deviations from the walkdown guidance. The NRC staff reviewed the procedure and methodology and concludes that the walkdown report meets the intent of 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)
- Implementation of the Walkdown Process
- Licensing Basis Evaluations and Results

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8 ADAMS Accession No. ML12200A069.

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 3.0, Personnel Qualifications, 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 SSES-1 base list, SWEL 1 (sample list of designated safety functions equipment), and SWEL 2 (sample list of spent fuel pool (SFP) related equipment). The licensee stated that SWEL 1 contained components common to both, SSES-1 and SSES-2. Also, the licensee stated that no items were included as part of the SWEL 2. The overall equipment selection process followed the screening process shown in Figures 1-1 and 1-2 of the walkdown guidance. Based on Attachment 1 of the walkdown report, SSES-1 SWEL 1 meets 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

As stated above, the NRC staff noted that no items were included as part of the SWEL 2. The licensee explained, in Section 4.3, SWEL 2 Development, of the walkdown report, that the piping, valves, and equipment associated with the normal SFP cooling functions are classified as Seismic Category II for SSES. Therefore, no SPF equipment satisfied Screen #1 described in Figure 1-2 of the walkdown guidance. Further, 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. In Section 4.3 of the walkdown report, the licensee stated that SSES-1 does not have any SFP penetrations below 10 feet above the top of the fuel assemblies. After reviewing the information provided in this section, the NRC staff concludes that the licensee provided sufficient information to justify that there are no items to be included as part of the SWEL 2 for SSES-1.

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 (the screening process is described in Section 3 of the walkdown guidance). 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 SWELs 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 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 5.0, Seismic Walkdowns and Area Walk-Bys, 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 a team 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 during July 10, to October 26, 2012.

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 6.0, Seismic Walkdowns and Area Walk-By Checklists, of the walkdown report provides the completed SWCs and AWCs, documenting the results for each item of equipment on SWEL 1 and each area containing SWEL equipment. The licensee used the checklists provided in Appendix C of the walkdown guidance report without modification.

As stated above, the licensee documented cases of potentially adverse seismic conditions (PASCs) in the checklists for further evaluation. Attachment 8, Summary of Potentially Adverse Seismic Conditions and Minor Issues/Concerns, of the walkdown report list the PASCs identified during the seismic walkdowns and the area walk-bys. The table describes how each condition was addressed (e.g., placement in the CAP), its resolution and current status. Based on the initial 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 the licensee to 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 response to RAI 1, the licensee detailed the step-by-step approach that was adapted by the SWE team during the seismic walkdown for equipment items considered not to be PASCs (no CAP entry needed) and for those found to be PASCs (entered into the CAP). The licensee confirmed that observations that could not be readily judged to be acceptable during the walkdown, were properly documented in the SWCs and AWCs. Observations determined to be PASCs were entered into the CAP by creating a condition report (CR). A Licensing Basis Evaluation (LBE) was performed for those observations that could not be evaluated by existing documentation, engineering judgment, or simple analysis. LBEs were performed within the CAP and documented therein. The licensee referred to Attachment 8 of the walkdown report which includes a description of all these items. Furthermore, the licensee generated CR-2013-03407 to further confirm the adequacy of the process followed by the SWEs when dispositioning field observations. The licensee stated that this effort verified that the basis for any status change (Yes/No/Unknown) in the SWC and AWC for an equipment item between the field and final documentations was properly documented. The licensee also confirmed that no new conditions were identified that warranted a change in the PASCs listed in Attachment 8 of the walkdown report.

After reviewing the licensee's response and Attachment 8 of the walkdown report, the NRC staff concludes that the licensee responded appropriately to RAI 1, PASCs were properly identified and documented, and the summary table in Attachment 8 is considered complete.

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 Section 4 of the walkdown guidance.

Section 5.3, Summary of Seismic Walkdowns, of the walkdown report confirms that cabinets were opened to ensure that visibly accessible internal component mountings were adequate. Additional walkdowns will be conducted during the next refueling outage to perform internal inspections of selected cabinets that were not completely inspected or were not opened during the initial walkdowns.

The equipment and areas that were inaccessible during the 180-day period are listed in Attachment 7, Inaccessible Equipment, of 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 25) were inaccessible at the time of the initial walkdowns. The licensee stated that nine of these items have been walked-down but will need to be reinspected to verify the internal components of the electrical cabinets. The other SWEL components could not be walked-down because they were either located in areas of high radiation or safety risks were involved during plant normal operations. However, area-walkbys were performed in the immediate area surrounding all of the inaccessible components. The walkdowns for the inaccessible items were committed to be completed by the end of the next scheduled refueling outage (spring 2014). The licensee committed to provide a supplemental submittal with the results of these walkdown items within 60 days after the completion of the spring 2014 outage.

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 6.0, Licensing Basis Evaluations, of the SSES-1 walkdown report, which discusses the process for conducting the seismic LBEs of the PASCs identified during the seismic walkdowns and area walk-bys. The licensee stated that it performed its LBEs for five of the identified PASCs. These LBEs were performed for all observations that could not be evaluated by existing documentation, engineering judgment, or simple analysis within the CAP. Section 6.3, Licensing Basis Evaluation Summaries, of the walkdown report provides summaries of the performed LBEs. These summaries describe 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 LBEs and CAP entries and the description of the actions taken or planned to address deficiencies. The staff concludes that the licensee appropriately identified potentially 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 the 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 8.0, Peer Review, of the SSES-1 walkdown report, which describes the conduct of the peer review. In addition, the NRC staff reviewed the response to RAI 2. In RAI 2, the NRC staff requested the licensee to provide additional information on the overall peer review process that was followed as part of the

walkdown activities. Specifically, the NRC staff requested the licensee to confirm that the activities identified in 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 Section 8 and Attachments 11 through 13 of the walkdown report. In addition, the licensee provided additional clarification on the responsibilities of those involved in the peer review activities and stated that none of the peer reviewers were involved in the seismic walkdown inspection process 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 the peer review team members' 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 meets 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 vulnerabilities to severe accidents.

The licensee provided background information regarding their IPEEE program. The licensee stated that there were two classes of vulnerabilities described in the IPEEE report: (1) As-found installation did not conform to design basis issues; and (2) seismic margin earthquake outliers. A summary of these identified vulnerabilities, including a description of the conditions and their subsequent resolutions, was provided in Section 7.0, IPEEE Vulnerabilities, of the walkdown report.

Based on the NRC staff's review of Section 7.0 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.

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9 ADAMS Accession No. ML031150465.

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 licensee implemented the seismic walkdowns in accordance with the walkdown guidance for SSES-1. Additionally, the inspectors independently performed walkdowns of a sample of seismic protection features. The inspection report dated February 13, 2013,[11] documents the results of this inspection and states that no findings were identified.

4.0 INACCESSIBLE ITEMS

The equipment and areas that were inaccessible during the 180-day period are listed in Attachment 7 of the walkdown report. The list of inaccessible items also includes the condition which caused the delay of the walkdown. As discussed above, a limited number of SWEL components (total of 25) were inaccessible at the time of the initial walkdowns. The walkdowns for all of the remaining inaccessible items were committed to be completed by the end of the next scheduled refueling outage (spring 2014). The licensee committed to provide a supplemental submittal with the results of these walkdown items within 60 days of the next scheduled refueling 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 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 staff notes that no immediate safety concerns were identified. The staff acknowledges that a supplemental letter will be provided within 60 days after the next scheduled refueling outage (spring 2014) addressing the remaining inaccessible items consistent with the regulatory commitment. The NRC staff reviewed the information provided and determined that sufficient information was provided to be responsive to Enclosure 3 of the 50.54(f) letter.

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10 ADAMS Accession No. ML12156A052.
11 ADAMS Accession No. ML13044A599.

STAFF ASSESSMENT OF SEISMIC WALKDOWN REPORT

NEAR-TERM TASK FORCE RECOMMENDATION 2.3 RELATED TO

THE FUKUSHIMA DAI-ICHI NUCLEAR POWER PLANT ACCIDENT

PPL SUSQUEHANNA, LLC

SUSQUEHANNA STEAM ELECTRIC STATION UNIT 2

DOCKET NO. 50-388

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.

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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 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.

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

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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] PPL Susquehanna, LLC (PPL or the licensee) provided a response to Enclosure 3 of the 50.54(f) letter Required Response Item 2, for Susquehanna Steam Electric Station Unit 2 (SSES-2). In addition to the aforementioned letter, the licensee, by letter dated July 26, 2013,[6] provided an updated submittal to the initial seismic walkdown report. The purpose of the latter submittal was to update and provide information on inaccessible components not completed in the first submittal.

The NRC staff reviewed the walkdown report and determined that additional supplemental information would assist the staff in completing its review. In a letter dated November 1, 2013,[7] the NRC 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 November 27, 2013.[8]

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

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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.

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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 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 SSES-2 in Section 2.0, Seismic Licensing Basis, of its 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.

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 10, 2012,[9] the licensee confirmed that it would utilize the walkdown guidance in the performance of the seismic walkdowns at SSES-2.

The walkdown report dated November 26, 2012, as supplemented by letter dated July 26, 2013, did not identify deviations from the walkdown guidance. The NRC staff reviewed the procedure and methodology and concludes that the walkdown report meets the intent of 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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9 ADAMS Accession No. ML12200A069.

- 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 3.0, Personnel Qualifications, 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 SSES-2 base list, SWEL 1 (sample list of designated safety functions equipment), and SWEL 2 (sample list of spent fuel pool (SFP) related equipment). The licensee stated that no items were included as part of the SWEL 2. The overall equipment selection process followed the screening process shown in Figures 1-1 and 1-2 of the walkdown guidance. Based on Attachment 1 of the walkdown report, SSES-2 SWEL 1 meets 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 NRC staff noted that no items were included as part of the SWEL 2. The licensee explained, in Section 4.3, SWEL 2 Development, of the walkdown report, that the piping, valves, and equipment associated with the normal SFP cooling functions are classified as Seismic Category II for SSES. Therefore, there were no SPF equipment that satisfied Screen #1 described in Figure 1-2 of the walkdown guidance. 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. In Section 4.3 of the walkdown report, the licensee stated that SSES-2 does not have any SFP penetrations below 10 feet above the top of the fuel assemblies. After reviewing the information provided in this

section, the NRC staff concludes that the licensee provided sufficient information to justify that there are no items to be included as part of the SWEL 2 list for SSES-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 (the screening process is described in Section 3 of the walkdown guidance). 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 SWELs 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 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 5.0, Seismic Walkdowns and Area Walk-Bys, 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 a team, 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 during July 10, to October 26, 2012. In addition, a subsequent set of walkdowns were performed during April 25, to May 3, 2013, as stated in the July 26, 2013, letter. The purpose of the last activity was to complete a number of items that were inaccessible during the initial walkdowns.

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 6, Seismic Walkdown and Area Walk-By Checklists, of the walkdown report and Attachment 18, Seismic Walkdown and Area Walk-By Checklists for Inaccessible Equipment Item Seismic Walkdowns, of the supplemental report provide the completed SWCs and AWCs, documenting the results for each item of equipment on SWEL 1 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. Attachment 8, Summary of Potentially Adverse Seismic Conditions and Minor Issues/Concerns, of the initial walkdown report and Attachment 20, Summary of Potentially Adverse Seismic Conditions and Minor Issues/Concerns, of the

supplemental report list the PASCs and issues/concerns identified during the seismic walkdowns and the area walk-bys. The table describes how each condition was addressed (e.g., placement in the CAP), its resolution and current status. Based on the initial 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 the licensee to 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 response to RAI 1, the licensee detailed the step-by-step approach that was adapted by the SWE team during the seismic walkdown for equipment items considered not to be PASCs (no CAP entry needed) and for those found to be PASCs (entered into the CAP). The licensee confirmed that observations that could not be readily judged to be acceptable during the walkdown, were properly documented in the SWCs and AWCs. Observations determined to be PASCs were entered into the CAP by creating a condition report (CR). A Licensing Basis Evaluation (LBE) was performed for those observations that could not be evaluated by existing documentation, engineering judgment, or simple analysis. LBEs were performed within the CAP and documented therein. The licensee referred to Attachment 8 of the walkdown report and Attachment 20 of the supplemental report which includes a description of all these items. Furthermore, the licensee generated CR-2013-03407 to further confirm the adequacy of the process followed by the SWEs when dispositioning field observations. The licensee stated that this effort verified that the basis for any status change (Yes/No/Unknown) in the SWC and AWC for an equipment item between the field and final documentations was properly documented. The licensee also confirmed that no new conditions were identified that warranted a change in the PASCs listed in Attachment 8 of the walkdown report.

After reviewing the licensee's response and Attachment 8 of the initial walkdown report, and Attachment 20 of the supplemental report, the NRC staff concludes that the licensee responded appropriately to RAI 1, PASCs were properly identified and documented and the summary tables in Attachment 8 and updated in Attachment 20 of the supplemental report were considered complete.

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 Section 4 of the walkdown guidance.

Section 5.3, Summary of Seismic Walkdowns, of the walkdown report confirms that cabinets were opened to ensure that visibly accessible internal component mountings were adequate. Additional walkdowns were conducted, as described in the supplemental report, to perform internal inspections of selected cabinets that were not completely inspected or were not opened during the initial walkdowns.

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 6.0, Licensing Basis Evaluations, of the SSES-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 stated that no licensing basis evaluations were required. Issues identified during the walkdowns and area walk-bys were dispositioned through the plant's CAP.

The NRC staff reviewed the CAP entries and the description of the actions taken or planned to address deficiencies. The NRC staff concludes that the licensee appropriately identified potentially 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, Peer Review, of the SSES-2 walkdown report, which describes the conduct of the peer review. In addition, the NRC staff reviewed the response to RAI 2. In RAI 2, the staff requested the licensee to provide additional information on the overall peer review process that was followed as part of the walkdown activities. Specifically, the staff requested the licensee to confirm that the activities identified in 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 Section 8 and Attachments 11 through 13 of the walkdown report. In addition, the licensee provided additional clarification on the responsibilities of those involved in the peer review activities and stated that none of the peer reviewers were involved in the seismic walkdown inspection process 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 the peer review team members' 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 meets 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,"[10] licensees previously had performed a systematic examination to identify any plant-specific vulnerabilities to severe accidents.

The licensee provided background information regarding their IPEEE program. The licensee stated that there were two classes of vulnerabilities described in the IPEEE report: (1) As-found installation did not conform to design basis issues; and (2) seismic margin earthquake outliers. A summary of these identified vulnerabilities including a description of the conditions and their subsequent resolutions was provided in Section 7, IPEEE Vulnerabilities, of the walkdown report.

Based on the NRC staff's review of Section 7 of the walkdown report, the 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.

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10 ADAMS Accession No. ML031150465.

3.6 NRC Oversight

3.6.1 Independent Verification by Resident Inspectors

On July 6, 2012,[11] 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 SSES-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 13, 2013,[12] documents the results of this inspection and states that no findings were identified.

4.0 CONCLUSION

The NRC staff concludes that the licensee's implementation of seismic walkdown methodology meets the intent of the walkdown guidance. The 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 staff notes that no immediate safety concerns were identified. The NRC staff reviewed the information provided and determined that sufficient information was provided to be responsive to Enclosure 3 of the 50.54(f) letter.

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11 ADAMS Accession No. ML12156A052.
12 ADAMS Accession No. ML13044A599.

By letter dated April 16, 2014,[5] the NRC staff sent a DRAFT copy of the enclosed Staff Assessments to you to provide you with the opportunity to comment on any security-related aspects.[6] By e-mail dated April 23, 2014,[7] Mr. Duane Filchner, of your staff, informed the NRC staff that the licensee agreed that there was no security-related information contained in the Staff Assessments.

This concludes the NRC staff's efforts associated with TAC Nos. MF0183 and MF0184.

If you have any questions, please contact me at (301) 415-4090 or at Jeffrey.Whited@nrc.gov.

Sincerely,
/RA/
Jeffrey A. Whited, Project Manager
Plant Licensing Branch I-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-387 and 50-388

Enclosures:
1. Staff Assessment of Seismic Walkdown Report for SSES-1
2. Staff Assessment of Seismic Walkdown Report for SSES-2

cc w/encls: Distribution via Listserv

[5] ADAMS Accession No. ML14058B072.
[6] A copy of the DRAFT Staff Assessments can be found at ADAMS Accession No. ML14113A555.
[7] ADAMS Accession No. ML14113A510.

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