



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

February 10, 2014

Mr. Eric A. Larson, Site Vice President
FirstEnergy Nuclear Operating Company
Beaver Valley Power Station
Mail Stop A-BV-SEB1
P.O. Box 4, Route 168
Shippingport, PA 15077

SUBJECT: BEAVER VALLEY POWER 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. MF0092 AND MF0093)

Dear Mr. Larson:

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 tsunamis. 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 27, 2012, as supplemented by letter dated September 24, 2013, First Energy Nuclear Operating Company (FENOC) submitted its Seismic Walkdown Report, as requested in Enclosure 3 of the 50.54(f) letter, for the Beaver Valley Power Station, Units 1 and 2. From July 22 to July 25, 2013, an NRC audit team conducted an on-site audit to gain a better understanding of the methods and procedures used by FENOC to conduct the seismic walkdowns and to facilitate the NRC staff's review of the walkdown report. By letter dated January 27, 2014, the licensee provided an addendum to the Beaver Valley Unit 1 walkdown report, documenting the results of additional seismic walkdowns performed for items that were inaccessible during the initial walkdowns.

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. This concludes the NRC staff's efforts associated with TAC Nos. MF0092 and MF0093.

E. Larson

- 2 -

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

Sincerely,

Handwritten signature of Jeffrey A. White in black ink.

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

Docket Nos. 50-334 and 50-412

Enclosures:

1. Staff Assessment of Seismic Walkdown Report for BVPS-1
2. Staff Assessment of Seismic Walkdown Report for BVPS-2

cc w/encls: Distribution via Listserv

STAFF ASSESSMENT OF SEISMIC WALKDOWN REPORT
NEAR-TERM TASK FORCE RECOMMENDATION 2.3 RELATED TO
THE FUKUSHIMA DAI-ICHI NUCLEAR POWER PLANT ACCIDENT
FIRST ENERGY NUCLEAR OPERATING COMPANY
BEAVER VALLEY POWER STATION, UNIT 1
DOCKET NO. 50-334

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 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

1 Agencywide Document 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 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 27, 2012,⁵ First Energy Nuclear Operating Company (FENOC, or the licensee) provided a response to Enclosure 3 of the 50.54(f) letter Required Response Item 2, for Beaver Valley Power Station, Unit 1 (BVPS-1). The NRC staff reviewed the walkdown report and determined that a regulatory audit would assist the staff in completing its review. A regulatory audit was conducted from July 22 to July 25, 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 walkdown report by letter dated September 24, 2013.⁶ By letter dated January 27, 2014,⁷ the licensee provided an addendum to the walkdown report. The purpose of these addendum was to document the results of additional seismic walkdowns performed for items that were inaccessible during the initial walkdowns.

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 Package Accession No. ML130080030.

6 ADAMS Package Accession No. ML13284A030.

7 ADAMS Accession No. ML14028A263.

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 BVPS-1 in Section 2.0 of its walkdown report. Consistent with the walkdown guidance, the 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 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 10, 2012,⁸ the licensee confirmed that it would utilize the walkdown guidance in performance of the seismic walkdowns at BVPS-1.

The walkdown report dated November 26, 2012, updated on September 24, 2013, and the addendum provided on January 27, 2014, did not identify any 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)
- Implementation of the Walkdown Process
- Licensing Basis Evaluations and Results

8 ADAMS Accession No. ML12192A615.

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 and Appendix A of the walkdown report, which includes information regarding 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 BVPS-1 base list, SWEL 1 (sample list of designated safety function equipment) and SWEL 2 (sample list of spent fuel pool related equipment). This equipment selection process followed the screening process shown in Figures 1-1 and 1-2 of the walkdown guidance. Based on walkdown report Tables 4-2 and 4-4, BVPS-1 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

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.

In Section 4.2 of the walkdown report, the licensee described the approach used to identify items that could lead to a rapid drain-down of the spent fuel pool. Based on the discussions provided

in this section, the licensee determined that no rapid drain-down items were added to the SWEL 2. After reviewing this information, the NRC staff concludes that sufficient information was provided to justify that there are no items that could lead to a rapid drain-down of the BVPS-1 spent fuel pool.

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 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 Sections 5.0 and 6.0 of the walkdown report which summarize 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 two-person team of trained Seismic Walkdown Engineers (SWEs) conducted the seismic walkdowns and area walk-bys together during the week of September 10 to September 14, 2012. In addition, a subsequent set of walkdowns were performed in September and October 2013, during the BVPS-1 refueling outage, as stated in the January 27, 2014 letter from the licensee. The purpose of the last activity was to complete a number of items that were inaccessible during the initial walkdowns. The SWEs were assisted by plant operations personnel during the walkdown activities. The SWEs were also assisted by a senior structural engineer who served as a structural mentor and provided overall support to the walkdown team. 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. Appendices B and C of the initial walkdown report and Attachments 4 and 5 of the addendum, 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 that SWCs were signed on October 1, 2012, and AWCs were signed on September 28, 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 several weeks after the completion of the walkdowns. The licensee explained the internal process that was followed, which included the use of electronic tablets during the walkdowns. The licensee stated that the electronic tablet entries were discussed and evaluated per their licensing basis at the daily meetings immediately after the walkdown. The results of these assessments were then documented in their respective SWCs or AWCs. The SWCs and AWCs were not signed until all of the documentation, which included reviewer comments, was incorporated into the checklists. For this reason, according to the licensee, the SWCs and AWCs were signed when the final report was prepared, and not when the in-field walkdowns were completed.

The licensee documented cases of potentially adverse seismic conditions (PASCs) in the checklists for further evaluation. Tables 6-5 and 6-6 of the walkdown report list each PASC identified during the initial seismic walkdowns and the area walk-bys, respectively. No PASCs were identified during the subsequent walkdowns documented in the addendum to the walkdown report. These tables describe how each condition was addressed (e.g., placement in the CAP), its resolution, 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 Section 4 of the walkdown guidance.

Finally, although the walkdown report does not clearly state whether the licensee opened cabinets as part of the walkdowns, the licensee clarified during the audit that cabinets were opened for internal inspections. This information was confirmed by the staff after a detailed review of SWCs.

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 7.0 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. Based on the information provided in the walkdown report, any PASC identified in the seismic walkdowns or area walk-bys was evaluated with respect to the seismic licensing basis at the end of each day. Some conditions were resolved by additional calculations or by plant documents that substantiated the as-built condition. Reference to these calculations and plant documentation was provided in the SWCs and AWCs. If the PASC could not be readily shown to meet the licensing basis, then the condition was immediately documented in a Condition Report to be further evaluated using the plant's CAP. Tables 6-5 and 6-6 in the walkdown report list each PASC identified during the initial seismic walkdowns and the area walk-bys, respectively. These tables describe how each condition has been addressed (e.g., placement in the CAP) and its current status.

The NRC staff noted that the process for conducting the licensing basis evaluations and entering items in the CAP, as described in the licensee's walkdown report, is consistent with the walkdown guidance. The staff also noted that items that could not be readily (within a few days) dispositioned by a licensing basis evaluation were entered into the CAP 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 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 9.0 of the 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 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 staff reviewed the licensee's summary of each of these activities including a discussion of the peer review team members, qualification and level of involvement, 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)," licensees previously had performed a systematic examination to identify any plant-specific vulnerabilities to severe accidents.

The NRC staff reviewed Section 8.0 of the walkdown report which states that there were no seismic vulnerabilities identified in the IPEEE submittal for BVPS-1. The Unresolved Safety Issue (USI) A-46, "Seismic Qualification of Equipment in Operating Plants," and IPEEE programs for BVPS-1 identified multiple enhancements and a representative sample was included in Table 4-2 of the walkdown report. Appendix F of the updated walkdown report includes a compilation of the A-46 outliers and their resolutions, as well as a summary of the identified IPEEE enhancements.

Based on the NRC staff's review of Section 8.0 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.

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, 2012,⁹ 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 BVPS-1 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 5, 2013,¹⁰ documents the results of this inspection and states that no findings were identified.

3.6.2 NRC Staff Site Audit

The NRC staff performed an audit of BVPS-1 during the week of July 22 to July 25, 2013. During the audit, the staff gained a better understanding of the process used by the licensee to perform the walkdowns. The staff identified and conveyed to the licensee the specific issues to be addressed, and the licensee subsequently submitted an updated walkdown report accordingly. The NRC staff also noted that the licensee addressed several self-identified issues in the revised walkdown report. The audit report dated November 21, 2013,¹¹ provides the results of this audit.

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

9 ADAMS Accession No. ML12156A052.

10 ADAMS Accession No. ML13036A302.

11 ADAMS Accession No. ML13295A695.

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 reviewed the information provided and determined that sufficient information was provided to be responsive to Enclosure 3 of the 50.54(f) letter for BVPS-1.

STAFF ASSESSMENT OF SEISMIC WALKDOWN REPORT
NEAR-TERM TASK FORCE RECOMMENDATION 2.3 RELATED TO
THE FUKUSHIMA DAI-ICHI NUCLEAR POWER PLANT ACCIDENT
FIRST ENERGY NUCLEAR OPERATING COMPANY
BEAVER VALLEY POWER STATION, UNIT 2
DOCKET NO. 50-412

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 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 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 27, 2012,⁵ First Energy Nuclear Operating Company (FENOC or the licensee) provided a response to Enclosure 3 of the 50.54(f) letter Required Response Item 2, for Beaver Valley Power Station, Unit 2 (BVPS-2). The NRC staff reviewed the walkdown report and determined that a regulatory audit would assist the staff in completing its review. A regulatory audit was conducted from July 22 to July 25, 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 walkdown report by letter dated September 24, 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.

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,

3 ADAMS Package Accession No. ML121640872.

4 ADAMS Accession No. ML12145A529.

5 ADAMS Package Accession No. ML130080030.

6 ADAMS Package Accession No. ML13284A030.

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 BVPS-2 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 that were 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 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 10, 2012,⁷ the licensee confirmed that it would utilize the walkdown guidance in performance of the seismic walkdowns at BVPS-2.

The walkdown report dated November 26, 2012, and updated on September 24, 2013, did not identify any 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)
- 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. ML12192A615.

The NRC staff reviewed the information provided in Section 3.0 and Appendix A of the walkdown report, which includes information regarding 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 BVPS-2 base list, SWEL 1 (sample list of designated safety function equipment) and SWEL 2 (sample list of spent fuel pool related equipment). This equipment selection process followed the screening process shown in Figures 1-1 and 1-2 of the walkdown guidance. Based on walkdown report Tables 4-2 and 4-4, BVPS-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

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.

In Section 4.2 of the walkdown report, the licensee described the approach used to identify items that could lead to a rapid drain-down of the spent fuel pool. Based on the discussions provided in this section, the licensee determined that no rapid drain-down items were added to the SWEL 2. After reviewing this information, the NRC staff concludes that sufficient information was provided to justify that there are no items that could lead to a rapid drain-down of the BVPS-2 spent fuel pool.

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 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 Sections 5.0 and 6.0 of the walkdown report which summarize 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 two-person team of trained Seismic Walkdown Engineers (SWEs) conducted the seismic walkdowns and area walk-bys together during the week of September 17 to September 21, 2012, and October 5, 2012. The SWEs were assisted by plant operations personnel during the walkdown activities. The SWEs were also assisted by a senior structural engineer who served as a structural mentor and provided overall support to the walkdown team. 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. Appendices B and C 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 that SWCs and AWCs were all signed on October 10, 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 several weeks after the completion of the walkdowns. The licensee explained the internal process that was followed, which included the use of electronic tablets during the walkdowns. The licensee stated that the electronic tablet entries were discussed and evaluated per their licensing basis at the daily meetings immediately after the walkdown. The results of these assessments were then documented in their respective SWCs or AWCs. The SWCs and AWCs were not signed until all the documentation, which included reviewer comments, was incorporated into the checklists. For this reason, according to the licensee, the SWCs and AWCs were signed when the final report was prepared, and not when the in-field walkdowns were completed.

The licensee documented cases of potentially adverse seismic conditions (PASCs) in the checklists for further evaluation. Tables 6-4 and 6-5 of the walkdown report list each PASC identified during the initial seismic walkdowns and the area walk-bys, respectively. These tables describe how each condition was addressed (e.g., placement in the CAP), its resolution and its current status.

In addition to the information provided above, the NRC staff noted 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.

Finally, although the walkdown report does not clearly state whether the licensee opened cabinets as part of the walkdowns, the licensee clarified during the audit that cabinets were opened for internal inspections. This information was confirmed by the staff after a detailed review of SWCs.

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 7.0 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. Based on the information provided in the walkdown report, any PASC identified in the seismic walkdowns or area walk-bys was evaluated with respect to the seismic licensing basis at the end of each day. Some conditions were resolved by additional calculations or by plant documents that substantiated the as-built condition. Reference to these calculations and plant documentation was provided in the SWCs and AWCs. If the PASC could not be readily shown to meet the licensing basis, then the condition was immediately documented in a Condition Report to be further evaluated using the plant's CAP. Tables 6-4 and 6-5 in the walkdown report list each PASC identified during the initial seismic walkdowns and the area walk-bys, respectively. These tables describe how each condition has been addressed (e.g., placement in the CAP) and its current status.

The NRC staff noted that the process for conducting the licensing basis evaluations and entering items in the CAP, as described in the licensee's walkdown report, is consistent with the walkdown guidance. The staff also noted that items that could not be readily (within a few days) dispositioned by a licensing basis evaluation were entered into the CAP 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 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 a peer review 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 9.0 of the walkdown report which describes the conduct of the peer review. The licensee described the results and 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 staff reviewed the licensee's summary of each of these activities including a discussion of the peer review team members, qualification and level of involvement, 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)," licensees previously had performed a systematic examination to identify any plant-specific vulnerabilities to severe accidents.

The NRC staff reviewed Section 8.0 of the walkdown report which states that there were no seismic vulnerabilities identified in the IPEEE submittal for BVPS-2. The licensee stated that several submittals to the NRC covered IPEEE enhancements, but none would be classified as

vulnerabilities that required a plant modification. A representative sample was included in Table 4-2 of the walkdown report. BVPS-2 was not involved in Unresolved Safety Issue (USI) A-46; therefore, there was not a Seismic Qualification Utility Group walkdown to review. Appendix E of the walkdown report documents the IPEEE report summary, which concluded that there were no vulnerabilities identified.

Based on the NRC staff's review of Section 8.0 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.

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 BVPS-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 5, 2013,⁹ documents the results of this inspection and states that no finding were identified.

3.6.2 NRC Staff Site Audit

The NRC staff performed an audit of BVPS-2 during the week of July 22 to July 25, 2013. During the audit, the staff gained a better understanding of the process used by the licensee to perform the walkdowns. The staff identified and conveyed to the licensee the specific issues to be addressed, and the licensee subsequently submitted an updated walkdown report accordingly. The NRC staff also noted that the licensee addressed several self-identified issues in the revised walkdown report. The audit report dated November 21, 2013,¹⁰ provides the results of this audit.

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

8 ADAMS Accession No. ML12156A052.

9 ADAMS Accession No. ML13036A302.

10 ADAMS Accession No. ML13295A695.

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 concludes that the licensee responded appropriately to Enclosure 3 of the 50.54(f) letter for BVPS-2.

E. Larson

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

Sincerely,

/ra/

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Plant Licensing Branch I-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-334

Enclosures:

1. Staff Assessment of Seismic Walkdown Report for BVPS-1
2. Staff Assessment of Seismic Walkdown Report for BVPS-2

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