



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

March 18, 2014

Vice President, Operations
Arkansas Nuclear One
Entergy Operations, Inc.
1448 S.R. 333
Russellville, AR 72802

SUBJECT: ARKANSAS NUCLEAR ONE, UNITS 1 AND 2 - STAFF ASSESSMENT OF THE SEISMIC WALKDOWN REPORTS SUPPORTING IMPLEMENTATION OF NEAR-TERM TASK FORCE RECOMMENDATION 2.3 RELATED TO THE FUKUSHIMA DAI-ICHI NUCLEAR POWER PLANT ACCIDENT (TAC NOS. MF0090 AND MF0091)

Dear Sir or Madam:

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

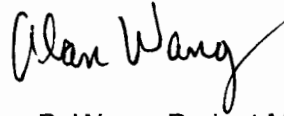
By two letters dated November 27, 2012, Entergy Operations, Inc. (Entergy, the licensee), submitted its Seismic Walkdown Reports as requested in Enclosure 3 of the 50.54(f) letter for the Arkansas Nuclear One (ANO), Units 1 and 2. The responses were updated to include the seismic walkdown of deferred items by two letters dated September 30, 2013. By letter dated November 26, 2013, Entergy provided a response to the NRC request for additional information for the staff to complete its assessments.

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. The staff assessments are provided in Enclosures 1 and 2 for ANO, Units 1 and 2, respectively.

This concludes the NRC's efforts associated with TAC Nos. MF0090 and MF0091.

If you have any questions, please contact me at (301) 415-1445 or by e-mail at alan.wang@nrc.gov.

Sincerely,

A handwritten signature in black ink that reads "Alan Wang". The signature is written in a cursive style with a long, sweeping underline.

Alan B. Wang, Project Manager
Plant Licensing Branch IV-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-313 and 50-368

Enclosures:

1. Unit 1 Staff Assessment of Seismic Walkdown Report
2. Unit 2 Staff Assessment of Seismic Walkdown Report

cc w/enclosures: 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

ENERGY OPERATIONS, INC.

ARKANSAS NUCLEAR ONE, UNIT 1

DOCKET NO. 50-313

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 Individual Plant Examination of External Events (IPEEE) program 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 walkdown process. By letter dated May 29, 2012,³ the Nuclear Energy Institute (NEI) staff

¹ ADAMS Accession No. ML12053A340.

² ADAMS Accession No. ML12056A049.

³ ADAMS Package Accession No. ML121640872.

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 27, 2012,⁵ Entergy Operations, Inc. (the licensee), provided a response to Enclosure 3 of the 50.54(f) letter Required Response Item 2, for Arkansas Nuclear One, Unit 1 (ANO-1). By letter dated September 30, 2013,⁶ the licensee submitted an updated walkdown report to include the results of nine deferred items that were inaccessible during the first inspection. The NRC staff reviewed the walkdown report and determined that additional supplemental information would assist the staff in completing its review. By letter dated November 1, 2013,⁷ the NRC staff requested additional information to gain a better understanding of the processes and procedures used by the licensee in conducting the walkdowns and walk-bys. The licensee responded to the NRC staff request by letter dated November 26, 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

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.

GDC 2 states that the design bases for the SSCs shall reflect appropriate consideration of the most severe natural phenomena that have been historically reported for the site and surrounding area with sufficient margin 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

⁴ ADAMS Accession No. ML12145A529.

⁵ ADAMS Accession Package No. ML123420302.

⁶ ADAMS Accession No. ML13283A067.

⁷ ADAMS Accession No. ML13304B418.

⁸ ADAMS Accession No. ML13336A784.

within, applicable NRC requirements and the plant-specific design basis, including all modifications and additions to such commitments over the life of the 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 ANO-1 in Section 2.0 of the walkdown report. Consistent with the walkdown guidance, the NRC staff noted that the report includes a summary of the Safe Shutdown Earthquake (SSE) and a description of the codes, standards, and methods that were used in the design of the Seismic Category I SSCs for meeting the plant-specific seismic licensing basis requirements. The staff noted an apparent minor inaccuracy in the citing of the referenced standard for concrete design. The standard should be ACI-318-63, instead of ACI-308-63 as documented.

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 provide 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 ANO-1.

The walkdown report dated November 27, 2012, and the updated walkdown report dated September 30, 2013, did not identify deviations from the walkdown guidance.

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

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

⁹ ADAMS Accession No. ML12193A079.

3.2.1 Personnel Qualifications

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

The NRC staff reviewed the information provided in Section 4.0, Tables 4-1 and 4-1, and Attachment I of the walkdown report, which includes information on the walkdown personnel and their qualifications. Specifically, the 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.

The licensee stated that licensing basis reviewers were not utilized for the walkdown activities. If an identified condition could not distinctly be shown to be consistent with existing seismic documentation, or no seismic documentation exists, then the condition was entered into the CAP. As such, the NRC staff notes that specific licensing basis reviewers were not necessary because all potentially adverse condition evaluations against the licensing basis were performed through the plant's CAP.

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 ANO-1 base list, SWEL 1 (sample list of designated safety functions equipment), and SWEL 2 (sample list of spent fuel pool-related equipment). The overall equipment selection process followed the screening process shown in Figures 1-1 and 1-2 of the walkdown guidance. Based on Tables 2 and 4 of Attachment B of the walkdown report, ANO-1 SWELs 1 and 2 meet the inclusion requirements of the walkdown guidance. Specifically, the following attributes were considered in the sample selection:

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

Due to individual plant configurations and the walkdown guidance screening process followed to select the final SWEL equipment, it is possible that some classes of equipment will not be

represented on the SWEL. The walkdown guidance recognizes this is due to the equipment not being present in the plant (e.g., some plants generate 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). 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, therefore, concludes that these exclusions are acceptable.

The NRC staff also noted that a rapid drain-down list was not included as part of the SWEL 2, as described in Section 3 of the guidance. In Section 6.2.2 of the walkdown report, the licensee's review found that no spent fuel pool penetrations exist that could drain the water level below 10 ft above the top of the fuel assemblies. Additionally, anti-siphon devices are installed on all piping coming into the spent fuel pool. Therefore, there is no potential for rapid drain-down of the SFP following a seismic event. After reviewing the information provided in this section, the staff concludes that the licensee provided sufficient information to justify that there are no apparent conditions which could lead to rapid drain-down of the ANO-1 spent fuel pool.

In the updated walkdown report, the licensee states that two substitutions were necessary during the walkdowns of the deferred items due to continued inaccessibility. In both cases, similar pieces of equipment were selected for inspection. The NRC staff concludes that the SWEL diversity has been maintained and the overall SWEL with the substitutions continues to have representation from every equipment class as the original SWEL.

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

3.2.3 Implementation of the Walkdown Process

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

The NRC staff reviewed Section 7.0 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 total of nine qualified Seismic Walkdown Engineers (SWEs) were involved in the seismic walkdowns and area walk-bys. Teams consisted of at least two SWEs. According to the signed seismic walkdown checklists (SWCs) and area walkdown checklists (AWCs), these activities were conducted over a 3-week period during September and October 2012. In addition, a subsequent set of walkdowns were performed in May 2013, as stated in the September 30, 2013, letter and updated walkdown report from the licensee. The purpose of the last activity was to complete the walkdowns for the nine deferred items that were inaccessible during the initial walkdowns. Attachments C and D of the walkdown report, as well as Attachments J and K for deferred items of the updated report, provide the completed SWCs and AWCs, documenting the results for each item of equipment on SWELs 1 and 2 and each area containing SWEL

equipment. The checklists were signed by both SWEs. The licensee used the checklists provided in Appendix C of the walkdown guidance report without modification.

Based on the initial review of the checklists, the NRC staff was unable to confirm that all of the potentially adverse seismic conditions (PASCs) identified during the walkdowns were included in the walkdown report. By letter dated November 1, 2013, the NRC staff issued two questions in a request for additional information (RAI) in order to obtain 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 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 confirmed that the SWEs actively discussed their observations and agreed on the PASCs. The PASCs were documented in the checklist with an identification number for condition report in the CAP. Also, in response to RAI-1, the licensee clarified that unusual conditions that were not seismically significant were also entered into the CAP directly. These conditions were generally related to housekeeping procedures. Further resolution of these conditions was not tracked or reported as part of the Near-Term Task Force (NTTF) 2.3 Seismic Walkdown Program except by noting the CR numbers generated on the applicable SWCs and AWCs.

The licensee documented cases of PASCs in the checklists for further evaluation. Table 1 of Attachment E of the original and updated walkdown reports list the all 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 its current status. The NRC staff noted a few minor discrepancies between the information documented in Table 1 of Attachment E and the AWCs provided in Attachment D of the walkdown report. Specifically, the NRC staff noted minor differences in the description of field observations and potential issues. The NRC staff also noted that CRs were opened for these conditions and plant procedures will be followed to evaluate and correct the condition, which meets the intent of the walkdown guidance.

After evaluating the licensee's response and reviewing Table 1 of Attachment E of the updated walkdown report, the NRC staff concludes that the licensee responded appropriately to RAI-1, PASCs were properly identified and documented, and summary Table 1 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 7.1 of the walkdown report states that cabinets were opened to ensure that visibly accessible internal components mountings are adequate. Based on a detailed review of SWCs and AWCs, the NRC staff confirmed that cabinets were opened by the seismic walkdown team.

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 8.0 of the ANO-1 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 it performed licensing basis evaluations and resolved PASCs using the plant's CAP. Table 1 of Attachment E of the walkdown report lists the key licensee findings, and provides a complete list of the potentially degraded, nonconforming, or unanalyzed conditions. This table also describes the actions taken or planned to address these conditions, including the current status of each of the items the licensee entered into the CAP.

The NRC staff reviewed the CAP entries and the description of the actions taken or planned to address potential deficiencies. The 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 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 ANO-1 walkdown report which describes the conduct of the peer review, which includes Attachment G, "Peer Review Checklist for SWEL," and Attachment H, "Peer Review Comment Form." In addition, the 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 on page 6-1 of the walkdown guidance were assessed and documented in the report. The NRC staff also requested the licensee 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 9.0 of the walkdown report. The staff noted in addition to the peer review activities listed on Section 9.1 of the ANO-1 walkdown report, the licensee expanded the activities to include sample in-field observations in its response to RAI 2.

The NRC staff reviewed the licensee's description of each of these activities in the walkdown report and RAI response, which included a discussion of the peer review team members' qualifications and level of involvement, the peer review findings, and resolution of peer review comments. After reviewing the licensee's submittals, the NRC staff concludes that the licensee documented the results of the peer review activities sufficiently and how these reviews affected the work described in the walkdown report.

Based on the 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 of External Events for Severe Accident Vulnerabilities," dated November 23, 1988,¹⁰ licensees previously had performed a systematic examination to identify any plant-specific vulnerabilities to severe accidents.

The licensee discussed IPEEE evaluations of ANO-1 in Section 5.0 of the walkdown report. The EPRI Seismic Margin Assessment was used in the IPEEE program. The seismic vulnerabilities identified in the ANO-1 IPEEE program are listed in IPEEE Vulnerabilities Table in Attachment A of the walkdown report. The table includes the actions taken to reduce or eliminate the seismic vulnerabilities, resolution completion year, and status of configuration management program.

Based on its review of Section 5.0 of the walkdown report, the NRC staff concludes that the licensee's identification of plant-specific vulnerabilities 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.

¹⁰ 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, 2012,¹¹ 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 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 the licensee, through the implementation of the walkdown guidance activities and, in accordance with plant processes and procedures, verified the plant configuration with the current seismic licensing basis; addressed degraded, nonconforming, or unanalyzed seismic conditions; and verified the adequacy of monitoring and maintenance programs for protective features. Furthermore, the staff notes that no immediate safety concerns were identified. The NRC staff concludes that the licensee responded appropriately to Enclosure 3 of the 50.54(f) letter, dated March 12, 2012.

¹¹ ADAMS Accession No. ML12156A052.

¹² ADAMS Accession No. ML13045A520.

STAFF ASSESSMENT OF SEISMIC WALKDOWN REPORT
NEAR-TERM TASK FORCE RECOMMENDATION 2.3 RELATED TO
THE FUKUSHIMA DAI-ICHI NUCLEAR POWER PLANT ACCIDENT
ENTERGY OPERATIONS, INC
ARKANSAS NUCLEAR ONE, UNIT 2
DOCKET NO. 50-368

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 Individual Plant Examination of External Events (IPEEE) program and a description of the actions taken to eliminate or reduce them.
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By letter dated November 27, 2012,⁵ Entergy Operations, Inc. (the licensee), provided a response to Enclosure 3 of the 50.54(f) letter Required Response Item 2, for Arkansas Nuclear One, Unit 2 (ANO-2). By letter dated September 30, 2013,⁶ the licensee submitted an updated walkdown report to include the results of one deferred item that was inaccessible during the first inspection. The NRC staff reviewed the walkdown report and determined that additional supplemental information would assist the staff in completing its review. By letter dated November 1, 2013⁷, the NRC staff requested additional information to gain a better understanding of the processes and procedures used by the licensee in conducting the walkdowns and walk-bys. The licensee responded to the NRC staff request by letter dated November 26, 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

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.

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⁵ ADAMS Package Accession No. ML123420069.

⁶ ADAMS Accession No. ML13283A064.

⁷ ADAMS Accession No. ML13304B418.

⁸ ADAMS Accession No. ML13336A784.

within, applicable NRC requirements and the plant-specific design basis, including all modifications and additions to such commitments over the life of the 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 ANO-2 in Section 2.0 of the walkdown report. Consistent with the walkdown guidance, the NRC staff noted that the report includes a summary of the Safe Shutdown Earthquake (SSE) and a description of the codes, standards, and methods that were used in the design of the Seismic Category I SSCs for meeting the plant-specific seismic licensing basis requirements. The staff noted an apparent minor inaccuracy in the citing of the referenced standard for concrete design. The standard should be ACI-318-63, instead of ACI-308-63 as documented.

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 provide 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 ANO-2.

The walkdown report dated November 27, 2012, and the updated walkdown report dated September 30, 2013, did not identify deviations from the walkdown guidance.

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

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

⁹ ADAMS Accession No. ML12193A079.

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.

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The licensee stated that licensing basis reviewers were not utilized for the walkdown activities. If an identified condition could not distinctly be shown to be consistent with existing seismic documentation, or no seismic documentation exists, then the condition was entered into the CAP. As such, the NRC staff notes that specific licensing basis reviewers were not necessary because all potentially adverse condition evaluations against the licensing basis were performed through the plant's CAP.

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 ANO-2 base list, SWEL 1 (sample list of designated safety functions equipment), and SWEL 2 (sample list of spent fuel pool related equipment). The overall equipment selection process followed the screening process shown in Figures 1-1 and 1-2 of the walkdown guidance. Based on Tables 2 and 4 of Attachment B of the walkdown report, ANO-2 SWELs 1 and 2 meet the inclusion requirements of the walkdown guidance. Specifically, the following attributes were considered in the sample selection:

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

Due to individual plant configurations and the walkdown guidance screening process followed to select the final SWEL equipment, it is possible that some classes of equipment will not be

represented on the SWEL. The walkdown guidance recognizes this is due to the equipment not being present in the plant (e.g., some plants generate 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). 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, therefore, concludes that these exclusions are acceptable.

The NRC staff also noted that a rapid drain-down list was not included as part of the SWEL 2, as described in Section 3 of the guidance. In Section 6.2.2 of the walkdown report, the licensee's review found that no spent fuel pool penetrations exist that could drain the water level below 10 ft above the top of the fuel assemblies. Additionally, anti-siphon devices are installed on all piping coming into the spent fuel pool. Therefore, there is no potential for rapid drain-down of the spent fuel pool following a seismic event. After reviewing the information provided in this section, the staff concludes that the licensee provided sufficient information to justify that there are no apparent conditions which could lead to rapid drain-down of the ANO-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 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 7.0 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 total of nine qualified Seismic Walkdown Engineers (SWEs) were involved in the seismic walkdowns and area walk-bys. Teams consisted of at least two SWEs. According to the signed seismic walkdown checklists (SWCs) and area walkdown checklists (AWCs), these activities were conducted over a 3-week period during September and October 2012. In addition, a subsequent set of walkdowns were performed in December 2012, as stated in the September 30, 2013, letter and updated walkdown report from the licensee. The purpose of the last activity was to complete the walkdowns for the one deferred item that was inaccessible during the initial walkdowns. The checklists were signed by both SWEs. Attachments C and D of the walkdown report, as well as Attachment J for deferred item of the updated report, provide the completed SWCs and AWCs, documenting the results for each item of equipment on SWELs 1 and 2 and each area containing SWEL equipment. The checklists were signed by both SWEs. The licensee used the checklists provided in Appendix C of the walkdown guidance report without modification.

Based on the initial review of the checklists, the NRC staff was unable to confirm that all of the potentially adverse seismic conditions (PASCs) identified during the walkdowns were included in the walkdown report. By letter dated November 1, 2013, the NRC staff issued two questions in a request for additional information (RAI) in order to obtain 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 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 confirmed that the SWEs actively discussed their observations and agreed on the PASCs. The PASCs were documented in the checklist with an identification number for condition report (CR) in the CAP. Also, in response to RAI-1, the licensee clarified that unusual conditions that were not seismically significant were also entered into the CAP directly. These conditions were generally related to housekeeping procedures. Further resolution of these conditions was not tracked or reported as part of the Near-Term Task Force (NTTF) 2.3 Seismic Walkdown Program except by noting the CR numbers generated on the applicable SWCs and AWCs.

The licensee documented cases of PASCs in the checklists for further evaluation. Table 1 of Attachment E of the original and updated walkdown report list the all 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 its current status.

After evaluating the licensee's response and reviewing Table 1, Attachment E of the walkdown report, the NRC staff concludes that the licensee responded appropriately to RAI-1, PASCs were properly identified and documented, and summary Table 1 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 7.1 of the walkdown report states that cabinets were opened to ensure that visibly accessible internal components mountings are adequate. Based on a detailed review of SWCs and AWCs, the NRC staff confirmed that cabinets were opened by the seismic walkdown team.

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 8.0 of the ANO-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 it performed licensing basis evaluations and resolved PASCs using the plant's CAP. Table 1 of Attachment E of the

walkdown report lists the key licensee findings, and provides a complete list of the potentially degraded, nonconforming, or unanalyzed conditions. This table also describes the actions taken or planned to address these conditions, including the current status of each of the items the licensee entered into the CAP.

The NRC staff reviewed the CAP entries and the description of the actions taken or planned to address potential deficiencies. The 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 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 ANO-2 walkdown report which describes the conduct of the peer review, which includes Attachment G, "Peer Review Checklist for SWEL," and Attachment H, "Peer Review Comment Form" of the walkdown report. In addition, the 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 NRC staff requested the licensee to confirm that the activities identified on page 6-1 of the walkdown guidance were assessed and documented in the report. The NRC staff also requested the licensee 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 9.0 of the walkdown report. The staff

noted in addition to the peer review activities listed on Section 9.1 of the ANO-2 walkdown report, the licensee expanded the activities to include sample in-field observations in its response to RAI 2.

The staff reviewed the licensee's description of each of these activities in the walkdown report and RAI response, which included a discussion of the peer review team members' qualifications and level of involvement, the peer review findings, and resolution of peer review comments. After reviewing the licensee's submittals, the NRC staff concludes that the licensee documented the results of the peer review activities sufficiently and how these reviews affected the work described in the walkdown report.

Based on the 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 of External Events for Severe Accident Vulnerabilities," dated November 23, 1988,¹⁰ licensees previously had performed a systematic examination to identify any plant-specific vulnerabilities to severe accidents.

The licensee discussed IPEEE evaluations of ANO-2 in Section 5.0 of the walkdown report. The EPRI Seismic Margin Assessment was used in the IPEEE program. The seismic vulnerabilities identified in the ANO-2 IPEEE program are listed in IPEEE Vulnerabilities Table in Attachment A of the walkdown report. The table includes the actions taken to reduce or eliminate the seismic vulnerabilities, resolution completion year, and status of configuration management program.

Based on its review of Section 5.0 of the walkdown report, the NRC staff concludes that the licensee's identification of plant-specific vulnerabilities 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.

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

¹¹ ADAMS Accession No. ML12156A052.

¹² ADAMS Accession No. ML13045A520.

If you have any questions, please contact me at (301) 415-1445 or by e-mail at alan.wang@nrc.gov.

Sincerely,

/RA/

Alan B. Wang, Project Manager
Plant Licensing Branch IV-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-313 and 50-368

Enclosures:

1. Unit 1 Staff Assessment of Seismic Walkdown Report
2. Unit 2 Staff Assessment of Seismic Walkdown Report

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* concurrence by e-mail

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