



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

April 2, 2014

Mr. Scott Batson  
Site Vice President  
Oconee Nuclear Station  
Duke Energy Carolinas, LLC  
7800 Rochester Highway  
Seneca, SC 29672-0752

SUBJECT: OCONEE NUCLEAR STATION, UNITS 1, 2, AND 3 – 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. MF0149, MF0150, AND MF0151)

Dear Mr. Batson:

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

By letter dated November 27, 2012, as supplemented by letter dated July 1, 2013, Duke Energy Carolinas, LLC (Duke Energy) submitted its Seismic Walkdown Report as requested in Enclosure 3 of the 50.54(f) letter for Oconee Nuclear Station Units 1, 2, and 3 (ONS-1/2/3). By letter dated November 25, 2013, Duke Energy provided a response to the NRC request for additional information for the staff to complete its assessments.

The NRC staff acknowledges that a supplemental letter will be provided by April 15, 2014, for ONS-2 and by September 1, 2014 for ONS-3, addressing the remaining inaccessible items consistent with the regulatory commitment. The NRC staff reviewed the information provided for ONS-1/2/3 and, as documented in the enclosed staff assessment, determined that sufficient information was provided to be responsive to Enclosure 3 of the 50.54(f) letter. This concludes the NRC's efforts associated with technical assignment control nos. MF0149, MF0150, and MF0151.

S. Batson

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If you have any questions regarding this matter, I may be reached at 301-415-1030.

Sincerely,

A handwritten signature in black ink, appearing to read "R. Guzman".

Richard V. Guzman, Senior Project Manager  
Plant Licensing Branch II-1  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Docket Nos. 50-269, 50-270, and 50-287

Enclosures:

1. Staff Assessment of Seismic Walkdown  
Report for ONS-1
2. Staff Assessment of Seismic Walkdown  
Report for ONS-2
3. Staff Assessment of Seismic Walkdown  
Report for ONS-3

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STAFF ASSESSMENT OF SEISMIC WALKDOWN REPORT  
NEAR-TERM TASK FORCE RECOMMENDATION 2.3 RELATED TO  
THE FUKUSHIMA DAI-ICHI NUCLEAR POWER PLANT ACCIDENT  
DUKE ENERGY CAROLINAS, LLC  
OCONEE NUCLEAR STATION, UNIT 1  
DOCKET NO. 50-269

1.0 INTRODUCTION

On March 12, 2012,<sup>1</sup> 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,"<sup>2</sup> to the 50.54(f) letter requested licensees to conduct seismic walkdowns to identify and address degraded, nonconforming, or unanalyzed conditions using the corrective action program (CAP), verify the adequacy of monitoring and maintenance procedures, and report the results to the NRC.

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

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

In accordance with the 50.54(f) letter, Enclosure 3, Required Response Item 2, licensees were required to submit a response within 180 days of the NRC's endorsement of the seismic walkdown process. By letter dated May 29, 2012,<sup>3</sup> the Nuclear Energy Institute (NEI) staff

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<sup>1</sup> Agencywide Documents Access and Management System (ADAMS) Accession No. ML12053A340.

<sup>2</sup> ADAMS Accession No. ML12056A049.

<sup>3</sup> ADAMS Package Accession No. ML121640872.

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,<sup>4</sup> the NRC staff endorsed the walkdown guidance.

By letter dated November 27, 2012,<sup>5</sup> Duke Energy Carolinas, LLC (Duke Energy or the licensee) provided a response to Enclosure 3 of the 50.54(f) letter Required Response Item 2, for Oconee Nuclear Station, Unit 1 (ONS-1). In addition to the aforementioned letter, the licensee, by letter dated July 1, 2013,<sup>6</sup> provided an updated submittal to the initial seismic walkdown report. The purpose of the latter submittal was to update and provide information on inaccessible components not completed in the first submittal.

The NRC staff reviewed the walkdown report and determined that additional supplemental information would assist the NRC staff in completing its review. In letter dated November 1, 2013<sup>7</sup>, the NRC staff requested additional information to gain a better understanding of the processes and procedures used by the licensee in conducting the walkdown and walk-bys. The licensee responded to the NRC staff request by letter dated November 25, 2013<sup>8</sup>.

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.

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4 ADAMS Accession No. ML12145A529

5 ADAMS Package Accession No. ML12347A252

6 ADAMS Package Accession Nos. ML13192A155, -57, -58, -59

7 ADAMS Accession No. ML13304B418

8 ADAMS Accession No. ML13330B685

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 ONS-1 in Section 1 of the walkdown report. Consistent with the walkdown guidance, the NRC staff noted that the report includes a summary of the Operating Basis Earthquake (OBE), as well as the Safe Shutdown Earthquake (SSE), and a description of the codes, standards, and methods that were used in the design of the Seismic Category I SSCs for meeting the plant-specific seismic licensing basis requirements. The NRC staff reviewed Section 1 of the walkdown report, focusing on the summary of the OBE, SSE, and the design codes used in the design of ONS-1.

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 9, 2012,<sup>9</sup> the licensee confirmed that it would utilize the walkdown guidance in performance of the seismic walkdowns at ONS-1.

The initial and updated walkdown reports dated November 27, 2012, and July 1, 2013, respectively, 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

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<sup>9</sup> ADAMS Accession No. ML12194A028

### 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 2 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.

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 ONS-1 Base lists, SWEL 1 (sample list of designated safety functions equipment), and SWEL 2 (sample list of spent fuel pool related equipment). The licensee stated that the safe shutdown equipment list (SSEL) developed to address NRC Generic Letter 87-02, Verification of Seismic Adequacy of Mechanical and Electrical Equipment in Operating Reactors, Unresolved Safety Issue (USI) A-46, was the starting point for the Base-1 list. The NRC staff concludes that the SSEL list, which addresses SSCs associated with the reactor safe shutdown functions and previously reviewed by the NRC as part of the A-46 issue, is a valid starting point to develop the plant's base list.

The licensee provided Base 1 and SWEL1 lists for ONS-1 in attachments 1 and 2, respectively, of the walkdown report. The licensee stated that due to plant configuration, some of the Base-1 components are common to all three units. In order to account for common components, the licensee considered a small number of them for each plant's SWEL 1, in this case, ONS-1. The remainders of the SWEL 1 components are unit-specific. The ONS-1 SWEL 1 is composed of 131 components of which 39 are common for all units.

This equipment selection process followed the screening process shown in Figures 1-1 and 1-2 of the walkdown guidance. Based on the walkdown report, ONS-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 SWELs. 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 noted that a detailed explanation was provided justifying cases where specific classes of equipment were not included as part of the SWEL, and concludes that these exclusions are acceptable.

The licensee provided Base 2 and SWEL 2 lists in attachments 3 and 4, respectively, of the walkdown report. The NRC staff noted that rapid drain-down items were not included as part of the SWEL 2, as described in Section 3 of the guidance. In Section 3.2 of the walkdown report, the licensee stated that there are no components that could, upon failure, result in rapid drain-down of the spent fuel pool water level to below ten feet above the top of the fuel. After reviewing the information provided in this section, the NRC staff concludes that the licensee provided sufficient information to justify that there are no items that could lead to rapid drain-down of the ONS-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 Section 4 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 two-person teams of trained Seismic Walkdown Engineers (SWEs) conducted the seismic walkdowns and area walk-bys. According to the signed seismic walkdown checklists (SWCs) and area walkdown checklists (AWCs), these activities were conducted during the months of August to October 2012. In addition, a subsequent set of walkdowns were performed during April 2013 as stated in the July 1, 2013, 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 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. Appendix A of Attachment 5 of the original and updated walkdown reports provide the completed seismic walkdown checklists (SWCs) and area walk-by checklists (AWCs), documenting the results for each item of equipment on the 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 licensee documented cases of potentially adverse seismic conditions (PASCs) in the checklists for further evaluation. Section 7 of Attachment 5 of the walkdown report shows that seventeen (17) PASCs were identified during the seismic walkdowns and the area walk-bys. The licensee stated that each PASC was entered into the plant's CAP. Based on the review of the checklists, the staff was unable to confirm that all PASCs identified during the walkdowns were included in this table. As such, by letter dated November 1, 2013, the NRC staff issued two questions in a request for additional information (RAI) in order to obtain additional clarification regarding the process followed by the licensee when evaluating conditions identified in the field during the walkdowns and walk-bys. Specifically, in RAI 1 the NRC staff requested the licensee to provide further explanation regarding how a field observation was determined to be a 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 "there are no new PASCs to report because all PASC items were addressed and included in previous submittals." The licensee referenced the description of the walkdown process as described in Attachment 5 of each Oconee unit's walkdown report, in this case ONS-1, and stated that all PASCs were entered into the plant's CAP.

After evaluating the licensee's response and reviewing Attachment 5 of the submittal, the NRC staff concludes that the licensee responded appropriately to RAI 1, PASCs were properly identified and documented.

In addition to the information provided above, the NRC staff noted that the method for verifying anchorage configurations was briefly summarized in Section 3 of Attachment 5 of the walkdown report. Detailed results of the anchorage verifications are documented in Section 7 of Attachment 5 and the NRC staff verified that at least 50 percent of the SWEL items, in accordance with Section 4 of the walkdown guidance, were properly checked.

The NRC staff notes that the walkdown report does not explicitly specify that cabinets were opened to ensure that visibly accessible internal component mountings are adequate. Based on a review of the licensee's general walkdown methodology as described in Section 3 of Attachment 5 and the SWCs and AWCs in Attachment 5 of the submittal, the NRC staff confirmed that cabinets were opened, where applicable, by the seismic walkdown team.

The equipment that was inaccessible during the 180-day period is listed in Section 4 of the original ONS-1 walkdown report. There are thirteen (13) ONS-1 SSCs that can only be accessed during a plant outage and three (3) SSCs that were inaccessible due to their physical location or due to personnel safety. In addition, the licensee listed six (6) inaccessible SSC's common to all Oconee units in the ONS-1 submittal.

The licensee stated that all ONS-1 inaccessible items, including SSC's common to all units that were identified in the first submittal that required walkdowns were completed and presented in the updated submittal. The NRC staff noted that some SSCs (total of three) were substituted with others. The licensee stated that the reasons for these substitutions were because of personnel safety concerns and the SWEs not being appropriately qualified to go into certain areas. The licensee emphasized that such substitutions do not affect the equipment sample considerations and are allowed by the EPRI guidance. The NRC staff agrees that the new SSC's substituted are comparable to the previous ones and located in similar environmental conditions.



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 5 of the ONS-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 documented seventeen (17) cases of PASCs in the checklists for further evaluation. The licensee stated that all PASCs were entered into the plant's CAP. Attachment 5 of the submitted report lists the PASCs and their individual Problem Investigation Process (PIP) tracking numbers.

The NRC staff notes that items that could not be accessed at the time of the November 27, 2012, submittal were reviewed at a later time and these results were provided in a submittal dated July 1, 2013. No new PASCs were encountered as a result of the latest submittal.

The NRC staff reviewed the CAP entries and the description of the actions taken or planned to address potential deficiencies. The NRC staff concludes that the licensee appropriately identified potentially degraded, nonconforming, or unanalyzed conditions and entered them into the CAP, which meets the intent of the walkdown guidance.

#### 3.2.5 Conclusion

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

#### 3.3 Peer Review

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

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

The NRC staff reviewed the information provided in Section 7 of the ONS-1 Walkdown Report which describes the conduct of the peer review. In addition, the NRC staff reviewed the response to RAI 2. In RAI 2, the 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 licensee was also requested to confirm that any individual involved in performing any given walkdown activity was not a peer reviewer for that same activity. In response to RAI 2, the licensee confirmed that all the activities identified on page 6-1 of the walkdown guidance were included as part of the peer review process and referred to Attachment 6 of the ONS-1 walkdown report for both the original and updated submittal. In addition, the licensee provided additional information on Table 2-1 of both submittals which illustrated the names and assigned tasks of the peer review team.

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

Based on the discussion above, the NRC staff concludes that the licensee's results of the peer review and subsequent actions taken in response to the peer review 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 GL 88-20, licensees previously had performed a systematic examination to identify any plant-specific vulnerabilities to severe accidents.

The licensee provided background information regarding their IPEEE program and referenced several submittals to the NRC in which the IPEEE outliers were identified along with their status at that time. In those submittals, the licensee stated that there were no underlying significant sequences (vulnerabilities) from external events and that there were no plant changes identified that would significantly reduce risk from external events. Furthermore, the licensee confirmed that, regarding their original IPEEE submittal, enhancements were identified and completed by Station Work Request, plant modification or analysis. Regarding the USI A-46 walkdowns, the licensee stated that they were performed in conjunction with the IPEEE walkdowns and that any identified outliers were conservatively completed and evaluated in order to be enveloped by both programs.

Based on the NRC staff's review of Section 6 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,<sup>10</sup> 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 ONS-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. No inspection findings were identified. The inspection report dated January 25, 2013,<sup>11</sup> documents the results of this inspection.

### 4.0 CONCLUSION

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

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<sup>10</sup> ADAMS Accession No. ML12156A052

<sup>11</sup> ADAMS Accession No. ML13028A133

STAFF ASSESSMENT OF SEISMIC WALKDOWN REPORT  
NEAR-TERM TASK FORCE RECOMMENDATION 2.3 RELATED TO  
THE FUKUSHIMA DAI-ICHI NUCLEAR POWER PLANT ACCIDENT  
DUKE ENERGY CAROLINAS, LLC  
OCONEE NUCLEAR STATION, UNIT 2  
DOCKET NO. 50-270

1.0 INTRODUCTION

On March 12, 2012,<sup>1</sup> 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,"<sup>2</sup> to the 50.54(f) letter requested licensees to conduct seismic walkdowns to identify and address degraded, nonconforming, or unanalyzed conditions using the corrective action program (CAP), verify the adequacy of monitoring and maintenance procedures, and report the results to the NRC.

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- a. Information concerning the plant-specific hazard licensing bases and a description of the protection and mitigation features considered in the licensing basis evaluation.
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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,<sup>3</sup> the Nuclear Energy Institute (NEI) staff

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By letter dated November 27, 2012,<sup>5</sup> Duke Energy Carolinas, LLC (the licensee) provided a response to Enclosure 3 of the 50.54(f) letter Required Response Item 2, for Oconee Nuclear Station, Unit 2 (ONS-2). In addition to the aforementioned letter, the licensee, by letter dated July 1, 2013<sup>6</sup>, provided an updated submittal to the initial seismic walkdown report for ONS-1. For the ONS-2 review, the purpose of the latter submittal was to update and provide information on inaccessible SSCs, which were common to all three Oconee units, not completed in the first submittal.

The NRC staff reviewed the walkdown report and determined that additional information would assist the NRC staff in completing its review. In letter dated November 1, 2013<sup>7</sup>, 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 25, 2013<sup>8</sup>.

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.

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

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The 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 ONS-2 in Section 1 of the walkdown report. Consistent with the walkdown guidance, the NRC staff noted that the report includes a summary of the Operating Basis Earthquake (OBE), as well as the Safe Shutdown Earthquake (SSE), and a description of the codes, standards, and methods that were used in the design of the Seismic Category I SSCs for meeting the plant-specific seismic licensing basis requirements. The NRC staff reviewed Section 1 of the walkdown report, focusing on the summary of the OBE, SSE, and the design codes used in the design of ONS-2.

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 9, 2012<sup>9</sup>, the licensee confirmed that it would utilize the walkdown guidance in the performance of the seismic walkdowns at ONS-2.

The walkdown report dated November 27, 2012, did not identify deviations from the walkdown guidance. The NRC staff reviewed the following sections of the walkdown methodology implementation provided in the walkdown report:

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

### 3.2.1 Personnel Qualifications

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

The NRC staff reviewed the information provided in Section 2 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.

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 ONS-2 Base lists, and then SWEL 1 (sample list of designated safety functions equipment) and SWEL 2 (sample list of spent fuel pool related equipment). The licensee stated that the safe shutdown equipment list (SSEL) developed to address NRC Generic Letter 87-02, Verification of Seismic Adequacy of Mechanical and Electrical Equipment in Operating Reactors, Unresolved Safety Issue (USI) A-46, was the starting point for the Base-1 list. The NRC staff concludes that the SSEL list, which addresses SSCs associated with the reactor safe shutdown functions and previously reviewed by the NRC as part of the A-46 issue, is a valid starting point to develop the plant's base list.

The licensee provided Base 1 and SWEL1 lists for ONS-2 in Attachments 1 and 2, respectively, of the walkdown report. The licensee stated that due to plant configuration, some of the Base-1 components are common to all three units. In order to account for common components, the licensee considered a small number of them for each plant's SWEL 1, in this case, ONS-2. The remainder of the SWEL 1 components are unit-specific. The ONS-2 SWEL 1 is composed of 131 components of which 39 are common for all units.

This equipment selection process followed the screening process shown in Figures 1-1 and 1-2 of the walkdown guidance. Based on the walkdown report, ONS-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 SWELs. 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 noted that a detailed explanation was provided justifying cases where specific classes of equipment were not included as part of the SWEL, and concludes that these exclusions are acceptable.

The licensee provided Base 2 and SWEL 2 lists in Attachments 3 and 4, respectively, of the walkdown report. The NRC staff also noted that rapid drain-down items were not included as part of the SWEL 2, as described in Section 3 of the guidance. In Section 3.2 of the walkdown report, the licensee stated that there are no components that could, upon failure, result in rapid drain-down of the spent fuel pool water level to below ten feet above the top of the fuel. After reviewing the information provided in this section, the NRC staff concludes that the licensee provided sufficient information to justify that there are no items that could lead to rapid drain-down of the ONS-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 4 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 two-person teams of trained Seismic Walkdown Engineers (SWEs) conducted the seismic walkdowns and area walk-bys. According to the signed seismic walkdown checklists (SWCs) and area walkdown checklists (AWCs), these activities were conducted during the months of August to October 2012.

The walkdown report also states that the SWEs discussed their observations and judgments with each other during the walkdowns. Additionally, the SWEs agreed on the results of their seismic walkdowns and area walk-bys before reporting the results of their review. Appendix A of Attachment 5 of the walkdown report provides the completed seismic walkdown checklists (SWCs) and area walk-by checklists (AWCs), documenting the results for each item of equipment on the 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 licensee documented cases of potentially adverse seismic conditions (PASCs) in the checklists for further evaluation. Section 7 of Attachment 5 of the walkdown report shows that thirteen (13) PASCs were identified during the seismic walkdowns and the area walk-bys. The licensee stated that each PASC was entered into the plant's CAP. Based on the review of the checklists, the staff was unable to confirm that all the PASCs identified during the walkdowns were included in this table. As such, by letter dated November 1, 2013, the NRC staff issued two questions in a request for additional information (RAI) in order to obtain additional clarification regarding the process followed by the licensee when evaluating conditions identified in the field during the walkdowns and walk-bys. Specifically, in RAI 1 the NRC staff requested the licensee to provide further explanation regarding how a field observation was determined to be a 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 "there are no new PASCs to report because all PASC items were addressed and included in previous submittals." The licensee referenced the description of the walkdown process as described in Attachment 5 of each Oconee unit's walkdown report, in this case ONS-2, and stated that all PASCs were entered into the plant's CAP.

After reviewing the licensee's response and Attachment 5 of the walkdown report, the NRC staff concludes that the licensee responded appropriately to RAI 1 and PASCs were properly identified and documented.

In addition to the information provided above, the NRC staff noted that the method for verifying anchorage configurations was briefly summarized in Section 3 of Attachment 5 of the walkdown report. Detailed results of the anchorage verifications are documented in Section 7 of Attachment 5 and the NRC staff verified that at least 50 percent of the SWEL items, in accordance with Section 4 of the walkdown guidance, were properly checked.

The NRC staff notes that the walkdown report does not explicitly specify that cabinets were opened to ensure that visibly accessible internal component mountings are adequate. Based on a review of the licensee's general walkdown methodology as described in Section 3 of Attachment 5 and the SWCs and AWCs in Attachment 5 of the walkdown report, the NRC staff confirmed that cabinets were opened, where applicable, by the seismic walkdown team.

The equipment that was inaccessible during the 180-day period is listed in Section 4 of the ONS-2 walkdown report. There were thirteen (13) ONS-2 SSCs that could only be accessed during a plant outage. The licensee stated that these items will be walked down at a later date and an updated report will be submitted by April 15, 2014. In addition, the licensee listed six (6) inaccessible SSCs common to all Oconee units in the ONS-2 submittal. The staff notes that these common SSCs are included in an updated submittal for ONS-1, dated July 1, 2013.

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 5 of the ONS-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 documented thirteen (13) cases of PASCs in the checklists for further evaluation. The licensee stated that all PASCs were entered into the CAP. Attachment 5 of the walkdown report lists the PASCs and their individual Problem Investigation Process (PIP) tracking numbers.

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

### 3.2.5 Conclusion

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

### 3.3 Peer Review

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

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

The NRC staff reviewed the information provided in Section 7 of the ONS-2 Walkdown Report which describes the conduct of the peer review. In addition, the NRC staff reviewed the response to RAI 2. In RAI 2, the staff requested the licensee to provide additional information on the overall peer review process that was followed as part of the walkdown activities. Specifically, the 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 licensee was also requested to confirm that any individual involved in performing any given walkdown activity was not a peer reviewer for that same activity. In response to RAI 2, the licensee confirmed that all the activities identified on page 6-1 of the walkdown guidance were included as part of the peer review process and referred to Attachment 6 of the ONS-2 walkdown report. In addition, the

licensee provided additional information on Table 2-1 of the walkdown report which provided the names and assigned tasks of the peer review team.

The NRC staff reviewed the licensee's summary of each of these activities, which included a discussion of the peer review team members' qualifications and level of involvement, the peer review findings, and resolution of peer review comments. After reviewing the licensee's submittals, the NRC staff concludes that the licensee sufficiently documented the results of the peer review activities and how these reviews affected the work described in the walkdown report. Based on the discussion above, the NRC staff concludes that the licensee's results of the peer review and subsequent actions taken in response to the peer review 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 GL 88-20, licensees previously had performed a systematic examination to identify any plant-specific vulnerabilities to severe accidents.

The licensee provided background information regarding their IPEEE program and referenced several submittals to the NRC in which the IPEEE outliers were identified along with their status at that time. In those submittals, the licensee stated that there were no underlying significant sequences (vulnerabilities) from external events and that there were no plant changes identified that would significantly reduce risk from external events. Furthermore, the licensee confirmed that, regarding their original IPEEE submittal, enhancements were identified and completed by Station Work Request, plant modification or analysis. Regarding the USI A-46 walkdowns, the licensee stated that they were performed in conjunction with the IPEEE walkdowns and that any identified outliers were conservatively completed and evaluated in order to be enveloped by both programs.

Based on the NRC staff's review of Section 6 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,<sup>10</sup> 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 ONS-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. No findings were identified. The inspection report dated January 25, 2013,<sup>11</sup> documents the results of this inspection.

#### 4.0 INACCESSIBLE ITEMS

The equipment that was inaccessible during the 180-day period is listed in Section 4 of the ONS-2 walkdown report. As discussed above, there were thirteen (13) ONS-2 SSCs that could only be accessed during a plant outage and six (6) inaccessible SSC's common to all Oconee units in the ONS-2 submittal. The NRC staff notes that the results of the delayed walkdowns for these common SSCs are included in an updated submittal for ONS-1, dated July 1, 2013<sup>12</sup>. The licensee committed to provide a supplemental submittal with the results of the ONS-2 specific items by April 15, 2014.

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

#### 5.0 CONCLUSION

The NRC staff concludes that the licensee's implementation of seismic walkdown methodology meets the intent of the walkdown guidance. The NRC staff concludes that, through the implementation of the walkdown guidance activities and, in accordance with plant processes and procedures, the licensee verified the plant configuration with the current seismic licensing basis; addressed degraded, nonconforming, or unanalyzed seismic conditions; and verified the adequacy of monitoring and maintenance programs for protective features. Furthermore, the NRC staff notes that no immediate safety concerns were identified. The staff acknowledges that a supplemental letter will be provided by April 15, 2014, addressing the remaining inaccessible items consistent with the regulatory commitment. The NRC staff reviewed the information provided and determined that sufficient information was provided to be responsive to Enclosure 3 of the 50.54(f) letter.

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10 ADAMS Accession No. ML12156A052

11 ADAMS Accession No. ML13028A133

12 ADAMS Accession No. ML13192A157

STAFF ASSESSMENT OF SEISMIC WALKDOWN REPORT  
NEAR-TERM TASK FORCE RECOMMENDATION 2.3 RELATED TO  
THE FUKUSHIMA DAI-ICHI NUCLEAR POWER PLANT ACCIDENT  
DUKE ENERGY CAROLINAS, LLC  
OCONEE NUCLEAR STATION, UNIT 3  
DOCKET NO. 50-287

1.0 INTRODUCTION

On March 12, 2012,<sup>1</sup> 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,"<sup>2</sup> to the 50.54(f) letter requested licensees to conduct seismic walkdowns to identify and address degraded, nonconforming, or unanalyzed conditions using the corrective action program (CAP), verify the adequacy of monitoring and maintenance procedures, and report the results to the NRC.

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

- a. Information concerning the plant-specific hazard licensing bases and a description of the protection and mitigation features considered in the licensing basis evaluation.
- b. Information related to the implementation of the walkdown process.
- c. A list of plant-specific vulnerabilities... identified by the IPEEE [Individual Plant Examination of External Events] 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,<sup>3</sup> the Nuclear Energy Institute (NEI) staff

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1 Agencywide Documents Access and Management System (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,<sup>4</sup> the NRC staff endorsed the walkdown guidance.

By letter dated November 27, 2012,<sup>5</sup> Duke Energy Carolinas, LLC (the licensee) provided a response to Enclosure 3 of the 50.54(f) letter Required Response Item 2, for Oconee Nuclear Station, Unit 3 (ONS-3). In addition to the aforementioned letter, the licensee, by letter dated July 1, 2013<sup>6</sup>, provided an updated submittal to the initial seismic walkdown report for ONS-1. For the ONS-2 review, the purpose of the latter submittal was to update and provide information on inaccessible systems, structures and components (SSCs), which were common to all three Oconee units, not completed in the first submittal.

The NRC staff reviewed the walkdown report and determined that additional supplemental information would assist the NRC staff in completing its review. In letter dated November 1, 2013<sup>7</sup>, 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 25, 2013<sup>8</sup>.

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 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.

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4 ADAMS Accession No. ML12145A529.

5 ADAMS Package Accession No. ML12347A252

6 ADAMS Package Accession Nos. ML13192A155, -57, -58, and -59

7 ADAMS No. ML13304B418

8 ADAMS Accession No. ML13330B685

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 ONS-3 in Section 1 of the walkdown report. Consistent with the walkdown guidance, the NRC staff noted that the report includes a summary of the Operating Basis Earthquake (OBE), as well as the Safe Shutdown Earthquake (SSE), and a description of the codes, standards, and methods that were used in the design of the Seismic Category I SSCs for meeting the plant-specific seismic licensing basis requirements. The NRC staff reviewed Section 1 of the walkdown report, focusing on the summary of the OBE, SSE, and the design codes used in the design of ONS-3.

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 9, 2012<sup>9</sup>, the licensee confirmed that it would utilize the walkdown guidance in the performance of the seismic walkdowns at ONS-3.

The walkdown report dated November 27, 2012, did not identify deviations from the walkdown guidance. The NRC staff reviewed the following sections of the walkdown methodology implementation provided in the walkdown report:

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

### 3.2.1 Personnel Qualifications

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

The NRC staff reviewed the information provided in Section 2 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.

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 ONS-3 Base lists, SWEL 1 (sample list of designated safety functions equipment), and SWEL 2 (sample list of spent fuel pool related equipment). The licensee stated that the safe shutdown equipment list (SSEL) developed to address NRC Generic Letter 87-02, Verification of Seismic Adequacy of Mechanical and Electrical Equipment in Operating Reactors, Unresolved Safety Issue (USI) A-46, was the starting point for the Base-1 list. The NRC staff concludes that the SSEL list, which addresses SSCs associated with the reactor safe shutdown functions and previously reviewed by the NRC as part of the A-46 issue, is a valid starting point to develop the plant's base list.

The licensee provided Base 1 and SWEL1 lists for ONS-3 in Attachments 1 and 2, respectively, of the walkdown report. The licensee stated that due to plant configuration, some of the Base-1 components are common to all three units. In order to account for common components, the licensee considered a small number of them for each plant's SWEL 1, in this case, ONS-3. The remainder of the SWEL 1 components are unit-specific. The ONS-3 SWEL 1 is composed of 131 components, of which 39 are common for all units.

This equipment selection process followed the screening process shown in Figures 1-1 and 1-2 of the walkdown guidance. Based on the walkdown report, ONS-3 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 SWELs. 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 noted that a detailed explanation was provided justifying cases where specific classes of equipment were not included as part of the SWEL, and concludes that these exclusions are acceptable.

The licensee provided Base 2 and SWEL 2 lists in Attachments 3 and 4, respectively, of the walkdown report. The NRC staff noted that rapid drain down items were not included as part of the SWEL 2, as described in Section 3 of the walkdown guidance. In Section 3.2 of the walkdown report, the licensee stated that there are no components that could, upon failure, result in rapid drain-down of the spent fuel pool water level to below ten feet above the top of the fuel. After reviewing the information provided in this section, the NRC staff concludes that the licensee provided sufficient information to justify that there are no items that could lead to rapid drain-down of the ONS-3 spent fuel pool.

After reviewing the 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 4 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 two-person teams of trained Seismic Walkdown Engineers (SWEs) conducted the seismic walkdowns and area walk-bys. According to the signed seismic walkdown checklists (SWCs) and area walkdown checklists (AWCs), these activities were conducted during the months of August to October 2012.

The walkdown report also states that the SWEs discussed their observations and judgments with each other during the walkdowns. Additionally, the SWEs agreed on the results of their seismic walkdowns and area walk-bys before reporting the results of their review. Appendix A of Attachment 5 of the walkdown report provides the completed seismic walkdown checklists (SWCs) and area walk-by checklists (AWCs), documenting the results for each item of equipment on the 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 licensee documented cases of potentially adverse seismic conditions (PASCs) in the checklists for further evaluation. Section 7 of Attachment 5 of the walkdown report shows that fifteen (15) PASCs were identified during the seismic walkdowns and the area walk-bys. The licensee stated that each PASC was entered into the plant's CAP. Based on the review of the checklists, the NRC staff was unable to confirm that all the PASCs identified during the walkdowns were included in this table. As such, by letter dated November 1, 2013, the NRC staff requested additional information (RAI) in order to obtain additional clarification regarding the process followed by the licensee when evaluating conditions identified in the field during the walkdowns and walk-bys. Specifically, in RAI 1 the staff requested the licensee to provide further explanation regarding how a field observation was determined to be a 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 "there are no new PASCs to report because all PASC items were addressed and included in previous submittals." The licensee referenced the description of the walkdown process as described in Attachment 5 of each Oconee unit's walkdown report, in this case ONS-3, and stated that all PASCs were entered into the plant's CAP.

After reviewing the licensee's response and Attachment 5 of the walkdown report, the NRC staff concludes that the licensee responded appropriately to RAI 1 and PASCs were properly identified and documented.

In addition to the information provided above, the NRC staff noted that the method for verifying anchorage configurations was briefly summarized in Section 3 of Attachment 5. Detailed results of the anchorage verifications are documented in Section 7 of Attachment 5 and the NRC staff verified that at least 50 percent of the SWEL items, in accordance with Section 4 of the walkdown guidance, were properly checked.

The NRC staff notes that the walkdown report does not explicitly specify that cabinets were opened to ensure that visibly accessible internal component mountings are adequate. Based on a review of the licensee's general walkdown methodology as described in Section 3 of Attachment 5 and the SWCs and AWCs in Attachment 5 of the walkdown report, the NRC staff confirmed that cabinets were opened, where applicable, by the seismic walkdown team.

The equipment that was inaccessible during the 180-day period is listed in Section 4 of the ONS-3 walkdown report. There are thirteen (13) ONS-3 SSCs that can only be accessed during a plant outage and three (3) SSCs that are inaccessible due to their physical location or due to personnel safety. The licensee stated that these items will be walked down at a later date and an updated report will be submitted by September 1, 2014. In addition, the licensee listed six (6) inaccessible SSC's common to all Oconee units in the ONS-3 walkdown report. The NRC staff notes that these common SSCs are included in an updated submittal for ONS 1 dated July 1, 2013<sup>10</sup>.

The licensee noted that for three (3) SSCs, anchorage configurations were not visible due to the installation of carpet and, therefore, were given a status of "Unknown". The licensee affirmed that the aforementioned anchors were properly torqued and QC inspected recently in 2012; and

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10 ADAMS Accession No. ML13192A157

referenced the plant's modification documentation. The NRC staff accepts this assessment as it has been inspected recently and meets the intent of the guidance.

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 5 of the ONS-3 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 documented fifteen (15) cases of PASCs in the checklists for further evaluation. The licensee stated that all PASCs were entered into the plant CAP. Attachment 5 of the walkdown report lists the PASCs and their individual Problem Investigation Process (PIP) tracking numbers.

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

#### 3.2.5 Conclusion

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

#### 3.3 Peer Review

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

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

The NRC staff reviewed the information provided in Section 7 of the ONS-3 Walkdown Report which describes the conduct of the peer review. In addition, the NRC staff reviewed the response to RAI 2. In RAI 2, the NRC staff requested the licensee to provide additional information on the overall peer review process that was followed as part of the walkdown activities. Specifically, the NRC staff requested the licensee to confirm that the activities identified on page 6-1 of the walkdown guidance were assessed and documented in the report. The licensee was also requested to confirm that any individual involved in performing any given walkdown activity was not a peer reviewer for that same activity. In response to RAI 2, the licensee confirmed that all the activities identified on page 6-1 of the walkdown guidance were included as part of the peer review process and referred to Attachment 6 of the ONS-3 walkdown report. In addition, the licensee provided additional information on Table 2-1 of the walkdown report which illustrated the names and assigned tasks of the peer review team.

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

Based on the discussion above, the NRC staff concludes that the licensee's results of the peer review and subsequent actions taken in response to the peer review 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 GL 88-20, licensees previously had performed a systematic examination to identify any plant-specific vulnerabilities to severe accidents.

The licensee provided background information regarding their IPEEE program and referenced several submittals to the NRC in which the IPEEE outliers were identified along with their status at that time. In those submittals, the licensee stated that there were no underlying significant sequences (vulnerabilities) from external events and that there were no plant changes identified that would significantly reduce risk from external events. Furthermore, the licensee confirmed that, regarding their original IPEEE submittal, enhancements were identified and completed by Station Work Request, plant modification or analysis. Regarding the USI A-46 walkdowns, the licensee stated that they were performed in conjunction with the IPEEE walkdowns and that any identified outliers were conservatively completed and evaluated in order to be enveloped by both programs.

Based on the NRC staff's review of Section 6 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,<sup>11</sup> 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 ONS-3 licensee implemented the seismic walkdowns in accordance with the walkdown guidance. Additionally, the inspectors independently performed walkdowns of a sample of seismic protection features. No findings were identified. The inspection report dated January 25, 2013,<sup>12</sup> documents the results of this inspection.

### 4.0 INACCESSIBLE ITEMS

The equipment that was inaccessible during the 180-day period is listed in Section 4 of the ONS-3 walkdown report. As discussed above, there are thirteen (13) ONS-3 SSCs that can only be accessed during a plant outage and three (3) SSCs that are inaccessible due to their physical location or due to personnel safety. In addition, the licensee listed six (6) inaccessible SSCs common to all Oconee units in the ONS-3 walkdown report. The NRC staff notes that the results of the delayed walkdowns for these common SSCs are included in an updated submittal for ONS-1, dated July 1, 2013<sup>13</sup>. The licensee committed to provide a supplemental submittal with the results of the ONS-3 specific items by September 1, 2014.

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

### 5.0 CONCLUSION

The NRC staff concludes that the licensee's implementation of seismic walkdown methodology meets the intent of the walkdown guidance. The NRC staff concludes that, through the implementation of the walkdown guidance activities and, in accordance with plant processes and procedures, the licensee verified the plant configuration with the current seismic licensing basis; addressed degraded, nonconforming, or unanalyzed seismic conditions; and verified the adequacy of monitoring and maintenance programs for protective features. Furthermore, the NRC staff notes that no immediate safety concerns were identified. The NRC staff acknowledges that a supplemental letter will be provided by September 1, 2014, addressing the remaining inaccessible items consistent with the regulatory commitment. The NRC staff reviewed the information provided and determined that sufficient information was provided to be responsive to Enclosure 3 of the 50.54(f) letter.

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11 ADAMS Accession No. ML12156A052

12 ADAMS Accession No. ML13028A133

13 ADAMS Accession No. ML13192A157

S. Batson

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If you have any questions regarding this matter, I may be reached at 301-415-1030.

Sincerely,

/RA/

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Plant Licensing Branch II-1  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Docket Nos. 50-269, 50-270, and 50-287

Enclosures:

1. Staff Assessment of Seismic Walkdown Report for ONS-1
2. Staff Assessment of Seismic Walkdown Report for ONS-2
3. Staff Assessment of Seismic Walkdown Report for ONS-3

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