



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

April 21, 2014

Mr. William G. Gideon, Vice President  
H. B. Robinson Steam Electric Plant  
Duke Energy Progress, Inc.  
3581 West Entrance Road  
Hartsville, SC 29550

SUBJECT: H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT 2 - STAFF ASSESSMENT  
OF THE SEISMIC WALKDOWN REPORT SUPPORTING IMPLEMENTATION  
OF NEAR-TERM TASK FORCE RECOMMENDATION 2.3 RELATED TO THE  
FUKUSHIMA DAI-ICHI NUCLEAR POWER PLANT ACCIDENT  
(TAC NO. MF0168)

Dear Mr. Gideon:

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) (the 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 February 27, 2014, Duke Energy Progress, Inc. (Duke Energy), formerly known as Carolina Power & Light Company, submitted its Seismic Walkdown Report as requested in Enclosure 3 of the 50.54(f) letter for the H. B. Robinson Steam Electric Plant, Unit 2. By letter dated November 26, 2013, Duke Energy provided a response to the NRC request for additional information for the staff to complete its assessments.

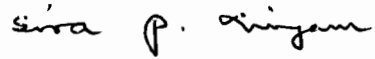
The NRC staff reviewed the information provided and, as documented in the enclosed staff assessment, determined that you have provided sufficient information to be responsive to Enclosure 3 of the 50.54(f) letter.

W. Gideon

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If you have any questions, please contact me at 301-415-1564 or by e-mail at [Siva.Lingam@nrc.gov](mailto:Siva.Lingam@nrc.gov).

Sincerely,

A handwritten signature in black ink, appearing to read "Siva P. Lingam".

Siva P. Lingam, Project Manager  
Plant Licensing Branch II-2  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Docket No. 50-261

Enclosure:  
Staff Assessment of Seismic Walkdown Report

cc w/encl: 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  
DUKE ENERGY PROGRESS, INC.  
H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT 2  
DOCKET NO. 50-261

1.0 INTRODUCTION

On March 12, 2012 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML12053A340), the U.S. Nuclear Regulatory Commission (NRC) issued a request for information per Title 10 of the *Code of Federal Regulations* (10 CFR), Part 50, Subpart 50.54(f) (the 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" (ADAMS Accession No. ML12056A049), 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.

The 50.54(f) letter requested licensees provide the following:

- a. Information concerning the plant-specific hazard licensing bases and a description of the protection and mitigation features considered in the licensing basis evaluation.
- b. Information related to the implementation of the walkdown process.
- c. A list of plant-specific vulnerabilities identified by the 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 (ADAMS Accession No. ML121640872), the Nuclear Energy Institute staff submitted Electric Power Research Institute (EPRI) Draft 7

Enclosure

Report 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 (ADAMS Accession No. ML12145A529), the NRC staff endorsed the walkdown guidance.

By letter dated November 27, 2012 (ADAMS Accession No. ML123410131), Duke Energy Progress, Inc. (the licensee) provided a response to Enclosure 3 of the 50.54(f) letter Required Response Item 2, for H. B. Robinson Steam Electric Plant, Unit 2 (HBRSEP-2).

The NRC staff reviewed the walkdown report and determined that additional supplemental information would assist the NRC staff in completing its review. By letter dated November 1, 2013 (ADAMS Accession No. ML13304B418), 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 (ADAMS Accession No. ML13346A426).

By letter dated February 27, 2014 (ADAMS Accession No. ML14069A151), the licensee 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 at the time of the initial submittal.

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 Criterion (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. As required by 10 CFR 50.2, each licensee should have identified the specific functions each SSC of a facility must perform, and the specific values or ranges of values chosen for controlling parameters as reference bounds for the design.

The design bases for the SSCs reflect appropriate consideration of the most severe natural phenomena that have been historically reported for the site and surrounding area. The design bases also reflect sufficient margin to account for the limited accuracy, quantity, and period of time in which the historical data have been accumulated.

The current licensing basis is the set of NRC requirements applicable to a specific plant, including the licensee's docketed commitments for ensuring compliance with, and operation within,

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 HBRSEP-2 in Section 2.0 of the seismic walkdown report. Consistent with the walkdown guidance, the NRC staff noted that the report includes a summary of the Design-Basis Earthquake (DBE) and a description of the codes, standards, and methods used in the design of the Seismic Category I SSCs for meeting the plant-specific seismic licensing basis requirements. The NRC staff reviewed Section 2.0 of the walkdown report, focusing on the summary of the DBE and the design codes used in the design.

Based on its review, the NRC staff concludes that the licensee has provided information on the plant-specific seismic licensing basis and a description of the protection and mitigation features considered in the licensing bases evaluation consistent with Section 8, Submittal Report, of the walkdown guidance.

#### 3.2 Seismic Walkdown Methodology Implementation

Section 2, Personnel Qualifications; Section 3, Selection of SSCs; Section 4, Seismic Walkdowns and Area Walk-Bys; and Section 5, Seismic Licensing Basis Evaluations, of the walkdown guidance (EPRI Document 1025286) provide guidance to licensees regarding the implementation of an appropriate seismic walkdown methodology. By letter dated July 10, 2012 (ADAMS Accession No. ML12202A087), the licensee confirmed that it would utilize the walkdown guidance in performance of the seismic walkdowns at HBRSEP-2.

The walkdown report dated November 27, 2012, as supplemented by letter dated February 27, 2014, did not identify any deviations from the walkdown guidance.

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

- Personnel Qualifications
- Development of Seismic Walkdown Equipment Lists (SWELs)
- Implementation of 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 who will be involved in the conduct of the seismic walkdowns and area walk-bys.

The NRC staff reviewed the information provided in Section 3 and Attachment 8 (under the topic of Peer Review) 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 updated walkdown report provides the qualifications for additional personnel participating in the subsequent walkdown activities. The NRC staff noted that the information provided in Revision 1 to the walkdown report documents the training and experience of these individuals sufficient to determine that they have the appropriate technical knowledge and experience to support the seismic walkdown activities.

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 guidance 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 HBRSEP-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 Sections 4.1 and 4.2 of the walkdown report, HBRSEP-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). 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 NRC staff also noted that a rapid drain-down list containing one item was included in Attachment 4 as meeting the rapid drain-down criteria, and also included in the list as part of the SWEL 2 in Attachment 5. After reviewing this information, the NRC staff concludes that the

licensee provided sufficient justification to describe and assess the rapid drain-down item identified for inclusion in the SWEL 2.

After reviewing the SWELs, 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 5 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 separate inspection teams that consisted of two trained SWEs, a seismic support engineer and a plant representative conducted the seismic walkdowns and area walk-bys. According to the signed seismic walkdown checklists (SWCs) and area walk-by checklists (AWCs), these activities were conducted during the week of September 19, 2012. In addition, internal inspection of five SSCs (electrical cabinets) that were inaccessible during initial walkdown were performed on September 3 and October 11, 2013, as stated in the February 27, 2014, letter from the licensee. The purpose of the last activity was to complete those five 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. Attachments 6 and 7 of the walkdown 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, respectively. 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. In Section 5.3 of the walkdown report the licensee included a table listing the PASCs identified during the seismic walkdowns and the area walk-bys. The table also describes how each condition was addressed (e.g., placement in the CAP), its resolution and its current status.

Based on the initial 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 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 any conditions that were PASCs were evaluated to meet its seismic design basis requirements and, if necessary, were documented on the SWC or AWC and entered into the CAP. Also, in response to RAI 1, the licensee stated that SWE engineering judgment was used to identify and document PASCs. The licensee clarified that non-PASCs not meeting the current licensing basis were also entered into the CAP for resolution.

After evaluating the licensee's response and reviewing the table in Section 5.3 of the walkdown report, the staff concludes that the licensee responded appropriately to RAI 1, PASCs were properly identified and documented in Section 5.3 of the report, and the summary table in Section 5.3 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.

The equipment and areas that were inaccessible during the 180-day period are listed in a table in Section 5.6 of the walkdown report. A limited number of components (total of five) were inaccessible, which were all cabinets, at the time of the initial walkdowns. Section 5.6 states that internal inspection posed a personnel and/or plant safety concern at the time of inspection, leading to the planned delayed walkdown. However, the external anchorage conditions and the immediate area surrounding these components were included during the initial walkdown. The internal inspections for all the remaining five inaccessible cabinets were completed in September and October 2013. No new PASCs were identified. The licensee provided a supplemental submittal with the results of these walkdown items on February 27, 2014.

Based on the information provided in the licensee's submittals, the NRC staff concludes that the licensee's implementation of the walkdown process meets the intent of the walkdown guidance.

#### 3.2.4 Licensing Basis Evaluations and Results

Section 5, Seismic Licensing Basis Evaluations, of the walkdown guidance provides information to licensees regarding the conduct of licensing basis evaluations for items identified during the seismic walkdowns as degraded, nonconforming, or unanalyzed that might have potential seismic significance.

The NRC staff reviewed Section 6.0 of the original HBRSEP-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 its licensing basis evaluations and resolved PASCs using the CAP. The tables in Sections 5.3 and 5.6 of the walkdown report list the key licensee findings, and provide a complete list of potentially degraded, nonconforming, or unanalyzed conditions. The table in Section 5.6 of the Walkdown Report, Revision 1, also describes the actions or planned to address these conditions, including the current status of each of the items the licensee entered into the CAP. In addition, the licensee also stated that during subsequent reviews after the initial walkdowns, a portion of the Emergency Diesel Generator Jacket Water Expansion Tank piping was found not meeting its licensing basis, although it was still operable. This condition was entered into the CAP.



The NRC staff reviewed the CAP entries and the description of the actions taken or planned to address 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 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 SWEL
- 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 submittal report
- Summarize the results of the peer review process in the submittal report

The NRC staff reviewed the information provided in Section 8.0 of the HBRSEP-2 walkdown report, which describes the conduct of the peer review. In addition, the staff reviewed the response to RAI 2. The staff notes that a completed peer review checklist following Appendix F of the guidance was not included in the HBRSEP-2 walkdown report. 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 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 stated that the separate peer review report provided as Attachment 8 to the walkdown report was organized to emphasize the activities identified on page 6-1 of the walkdown guidance. In addition, in response to RAI 2, the licensee referred to Section 3 of the walkdown report stating that the Peer Review Team had no duties regarding other seismic walkdown-related activities.

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

Based on the discussion above, the NRC staff concludes that the licensee's results of the peer review and subsequent actions taken in response to the peer review meet the intent of Section 6 of the walkdown guidance.

### 3.4 IPEEE Information

Section 7, IPEEE Vulnerabilities, of the walkdown guidance provides information to licensees regarding the reporting of the evaluations conducted and actions taken in response to seismic vulnerabilities identified during the IPEEE program. Through the IPEEE program and Generic Letter 88-20, "Individual Plant Examination for Severe Accident Vulnerabilities – 10 CFR 50.54(f)," dated November 23, 1988 (ADAMS Accession No. ML031150465), licensees previously had performed a systematic examination to identify any plant-specific vulnerabilities to severe accidents.

The licensee stated that no seismic vulnerabilities were identified in the IPEEE program for HBRSEP-2 I Section 7.0 of the walkdown report.

Based on its review of Section 7.0 of the walkdown report, the NRC staff concludes that the licensee's identification of plant-specific vulnerabilities (including anomalies, outliers, and other findings) identified by the IPEEE program, as well as actions taken to eliminate or reduce them, meets the intent of Section 7 of the walkdown guidance.

### 3.5 Planned Upgrades

The licensee did not identify any planned or newly installed protection and mitigation features in Section 5.5 of the HBRSEP-2 walkdown report.

### 3.6 NRC Oversight

#### 3.6.1 Independent Verification by Resident Inspectors

On July 6, 2012 (ADAMS Accession No. ML12156A052), 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 April 22, 2013 (ADAMS Accession No. ML13112A171), 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 for HBRSEP-2. 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

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staff reviewed the information provided and determined that the licensee responded appropriately to Enclosure 3 of the 50.54(f) letter, dated March 12, 2012, for HBRSEP-2.

W. Gideon

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If you have any questions, please contact me at 301-415-1564 or by e-mail at [Siva.Lingam@nrc.gov](mailto:Siva.Lingam@nrc.gov).

Sincerely,

**/RA/**

Siva P. Lingam, Project Manager  
Plant Licensing Branch II-2  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Docket No. 50-261

Enclosure:  
Staff Assessment of Seismic Walkdown Report

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**\* concurrence by e-mail**

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