



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

April 15, 2014

Mr. Oscar A. Limpias
Vice President-Nuclear and CNO
Nebraska Public Power District
72676 648A Avenue
Brownville, NE 68321

SUBJECT: COOPER NUCLEAR STATION - 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. MF0112)

Dear Mr. Limpias:

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, Nebraska Public Power District (NPPD) submitted its Seismic Walkdown Report as requested in Enclosure 3 of the 50.54(f) letter for the Cooper Nuclear Station. By letter dated November 21, 2013, NPPD provided a response to the NRC request for additional information for the staff to complete its assessments.

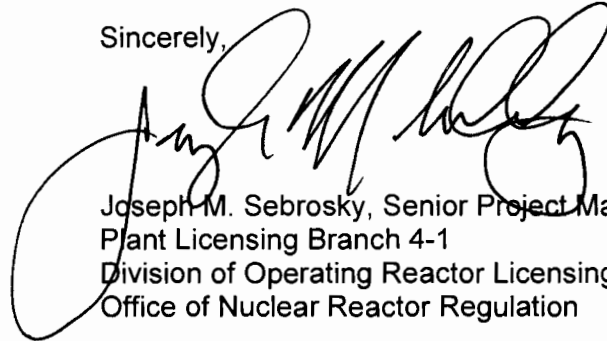
The NRC staff acknowledges that the delayed walkdowns of the remaining inaccessible items will be completed following the next outage (RE28) planned in the fall of 2014. The staff acknowledges that NPPD will submit an updated seismic walkdown report within 90 days after startup from the refueling outage RE28, consistent with the regulatory commitment. The NRC staff reviewed the information provided 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.

O. Limpias

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If you have any questions, please contact me at 301-415-1132 or by e-mail at Joseph.Sebrosky@nrc.gov

Sincerely,

A handwritten signature in black ink, appearing to read "Joseph M. Sebrosky", written over a large, stylized circular flourish.

Joseph M. Sebrosky, Senior Project Manager
Plant Licensing Branch 4-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-298

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
NEBRASKA PUBLIC POWER DISTRICT
COOPER NUCLEAR STATION
DOCKET NO. 50-298

1.0 INTRODUCTION

On March 12, 2012,¹ the U.S. Nuclear Regulatory Commission (NRC) issued a request for information per Title 10 of the *Code of Federal Regulations*, Subpart 50.54(f) (50.54(f) letter) to all power reactor licensees and holders of construction permits in active or deferred status. The request was part of the implementation of lessons learned from the accident at the Fukushima Dai-ichi nuclear power plant. Enclosure 3, "Recommendation 2.3: Seismic,"² to the 50.54(f) letter requested licensees to conduct seismic walkdowns to identify and address degraded, nonconforming, or unanalyzed conditions using the corrective action program (CAP), verify the adequacy of monitoring and maintenance procedures, and report the results to the NRC.

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

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

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

¹ 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, 2012,⁴ the NRC staff endorsed the walkdown guidance.

By letter dated November 27, 2012,⁵ Nebraska Public Power District (NPPD, the licensee) provided a response to Enclosure 3 of the 50.54(f) letter Required Response Item 2, for Cooper Nuclear Station (CNS). The NRC staff reviewed the walkdown report and determined that additional supplemental information would assist the staff in completing its review. By letter dated November 1, 2013,⁶ 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's request for additional information (RAI) by letter dated November 21, 2013.⁷

The NRC staff evaluated the licensee's submittals to determine if the information provided in the walkdown report met the intent of the walkdown guidance and if the licensee responded appropriately to Enclosure 3 of the 50.54(f) letter.

2.0 REGULATORY EVALUATION

The structures, systems, and components (SSCs) important to safety in operating nuclear power plants are designed either in accordance with, or meet the intent of Appendix A to 10 CFR Part 50, General Design Criteria (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, tsunami, and seiches without loss of capability to perform their safety functions.

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

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

⁴ ADAMS Accession No. ML12145A529.

⁵ ADAMS Package Accession No. ML123400257.

⁶ ADAMS Accession No. ML13304B418

⁷ ADAMS Accession No. ML13330B000.

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 CNS in Section 3.0 of the walkdown report. Consistent with the walkdown guidance, the staff noted that the report includes a summary of the Design Basis Earthquake (DBE) 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 3.0 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 provide information to licensees regarding the implementation of an appropriate seismic walkdown methodology. By letter dated July 6, 2012,⁸ the licensee confirmed that it would utilize the walkdown guidance in the performance of the seismic walkdowns at CNS.

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

⁸ ADAMS Accession No. ML12195A007.

The NRC staff reviewed the information provided in Section 2, and Attachment A 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: seismic walkdown engineers (SWEs), licensing basis reviewers, and peer review team.

The NRC staff noted that the walkdown report does not provide any qualification information for the staff involved in the selection of the equipment on the SWEL. However, the walkdown report states that the existing Safe Shutdown Earthquake List (SSEL), which formed the basis for the SWEL, was reviewed by a licensed operator for updates that may be required as a result of safe shutdown flowpath changes since the list was initially developed. Additionally, the Peer Review Team, whose qualifications reflect the appropriate level of expertise, worked with CNS staff to modify the initial SWEL to ensure SWEL items selected for inspection represented a diverse sample of plant equipment required to perform the five safety functions (reactor reactivity control, reactor coolant pressure control, reactor coolant inventory control, decay heat removal, containment function).

The NRC staff noted that the walkdown report provides qualification information for some of the staff involved in the walkdowns and area walk-bys, and for the operations staff. The seismic walkdown checklists were signed by at least one of the senior personnel on the team, for whom the provided qualification information demonstrates an appropriate level of expertise.

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 of the walkdown guidance, Selection of SSCs, 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 CNS base list, SWEL 1 (sample list of designated safety functions equipment), and SWEL 2 (sample list of spent fuel pool (SFP)-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 Attachment B of the walkdown report, CNS SWELs 1 and 2 meet the inclusion requirements of the walkdown guidance. Sample selection attributes that were considered include:

- 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.

In the walkdown report, the licensee stated that one substitution will be necessary during the deferred walkdowns of the inaccessible items due to plant conditions requiring this component to remain energized. A similar piece of equipment was identified to be inspected in place of the inaccessible one during the next refueling outage (RE28). The NRC staff reviewed the licensee's proposed substitution and the justification provided for the equipment substitution and concludes that the SWEL diversity has been maintained and the overall SWEL with the substitution continues to have representation from every equipment class as the original SWEL.

The walkdown report states that the initial screening identified items that if failed could lead to a rapid drain-down of the SFP were added to the SWEL 2. After reviewing the information provided in Section 5.5 of the walkdown report, the SWEL 2, the Fuel Storage Rack controlled drawing, and the Updated Safety Analysis Report (USAR)-referenced General Arrangement of the Reactor Building drawing, the NRC staff concludes that the licensee provided sufficient information to justify the proper implementation of the seismic walkdown guidance for inclusion of items that could lead to rapid drain-down of the CNS SFP on the SWEL 2.

After reviewing the SWELs 1 and 2 and substitutions, 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.

3.2.3 Implementation of the Walkdown Process

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

The NRC staff reviewed Section 6 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 SWEs conducted the seismic walkdowns and area walk-bys. According to the signed seismic walkdown checklists (SWCs) and area walk-by checklists (AWCs), these activities were conducted from September to November 2012. Additionally, the licensee completed the walkdowns of 12 items during the month of October 2012 that were marked as inaccessible on the SWEL 1 table. The walkdown report states that all results were recorded on the SWC and signed and dated by two SWEs. Attachments C and D 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. 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. Any non-conforming items were entered into the CNS CAP for further evaluation and disposition. Table 6-1 of the walkdown report list the Condition Reports (CRs) for PASCs identified during the seismic walkdowns and the area walk-bys. The table describes how each condition was addressed (e.g., placement in the CAP), its resolution and its current status. 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 staff issued two questions in an 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 No. 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 No. 1, the licensee confirmed that when an unusual condition was observed by a SWE team in the field, the condition was noted on the SWC or AWC form and briefly discussed between the two SWEs to agree upon whether it was a PASC. These initial conclusions were based on conservative engineering judgment and the training required for SWE qualification. The walkdown sheets were annotated, where appropriate with supporting reference or justification for the basis of its acceptance. For conditions that were reasonably judged as insignificant to seismic response, the disposition was included on the SWC or AWC checklist and the appropriate question was marked "Y" indicating that a PASC was not observed. Unusual or uncertain conditions were reported for further resolution through the CNS CAP. The licensee referred to Section 6.1 of the walkdown report for a summary of the conditions determined to be PASCs, which includes a table summarizing the CRs generated for PASCs identified during the walkdowns and area walk-bys for CNS, including the status of the conditions at the time of report submission. PASCs were entered into the CAP directly. The licensee confirmed that the reported information supports the conclusion that CNS meets its CLB and all the PASCs identified were addressed and reported in the walkdown report.

After evaluating the licensee's response and reviewing Section 6.1 of the walkdown report, the NRC staff concludes that the licensee responded appropriately to RAI No. 1, PASCs were identified and documented properly, and summary Table 6-1 is considered complete.

In addition to the information provided above, the NRC staff notes that anchorage configurations were verified to be consistent with existing plant documentation for at least 50 percent of the SWEL items, in accordance with Section 4 of the walkdown guidance.

The walkdown report states that electrical cabinets were opened and visual inspections were performed for missing or loose fasteners on components brackets, as well as electrical connections and/or relays that appeared to not be seated properly. The NRC staff reviewed the seismic walkdown checklists and confirmed that cabinets were opened to determine if any adverse conditions existed of internal equipment.

The equipment that were inaccessible during the 180-day period are listed in Section 5.7 of the walkdown report. This section also includes the condition which caused the delay of the

walkdowns. A total of three SWEL items that remained inaccessible during the initial walkdowns are scheduled to be completed during refueling outage RE28 scheduled for the fall of 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 of the walkdown guidance, Seismic Licensing Basis Evaluations, provides information to licensees regarding the conduct of licensing basis evaluations for items identified during the seismic walkdowns as degraded, nonconforming, or unanalyzed that might have potential seismic significance.

The NRC staff reviewed Section 7 of the CNS 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 in lieu of the licensing basis evaluation process as explained in the walkdown guidance, the CAP was utilized to evaluate each potential condition. The licensee states this is permissible because CNS's CAP adheres to the evaluation process described in the walkdown guidance. All PASCs found during the walkdowns were initially compared to easily available plant licensing design basis documents. If it was determined to be an adverse seismic condition or a determination could not be easily made from the information available, the condition was input into the CAP process. The CAP process is responsible for completing a licensing basis evaluation. Attachment E of the seismic walkdown report includes all initiated CRs. Table 6-1 of the walkdown report lists the PASCs identified during the seismic walkdowns and the area walk-bys. The table describes how each condition was addressed (e.g., placement in the CAP), its resolution and its current status. Based on the review of the checklists, the staff was able to confirm that the generated CRs were included in the table.

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

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

The NRC staff reviewed the information provided in Section 9 of the CNS Walkdown Report which describes the conduct of the peer review. In addition, the staff reviewed the response to RAI No. 2. In RAI No. 2, the staff requested the licensee to provide additional information on the overall peer review process that was followed as part of the walkdown activities. Specifically, the staff requested the licensee to confirm that the activities identified in page 6-1 of the walkdown guidance were assessed and documented in the report. The licensee was also requested to confirm that any individual involved in performing any given walkdown activity was not a peer reviewer for that same activity. In response to RAI No. 2, the licensee confirmed that all the activities identified on page 6-1 of the walkdown guidance were assessed as part of the peer review process and referred to the summary of the peer review activities provided in Section 9 of the walkdown report. In addition, the licensee provided additional information on the level of involvement of the peer review team in order to further demonstrate the independence of the peer review process.

The NRC staff reviewed the licensee's summary for each of these activities, which included the peer review team members' backgrounds, 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 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 of the walkdown guidance, IPEEE Vulnerabilities, 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 (GL) 88-20, "Individual Plant Examination of External Events (IPEEE) for Severe Accident Vulnerabilities," dated November 23, 1988,⁹ licensees previously had performed a systematic examination to identify plant-specific vulnerabilities to severe accidents.

In Section 8 of the seismic walkdown report, the licensee explained that the response to GL 88-20, Supplement 4, identified six items as vulnerabilities. Five of the six identified items are on the A-46 SSEL and the resolution of these items has been completed. The sixth item, which is the fan coil unit in the SE and the NE quads, is not on the A-46 SSEL because the licensee reasoned that these fan coil units are not needed for safe plant shutdown.

Based on its review of Section 8 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, 2012,¹⁰ the NRC issued Temporary Instruction (TI) 2515/188, "Inspection of Near-Term Task Force Recommendation 2.3 Seismic Walkdowns." In accordance with the TI, NRC inspectors independently verified that the CNS licensee implemented the seismic walkdowns in accordance with the walkdown guidance. Additionally, the inspectors independently performed walkdowns of a sample of seismic protection features. The inspection report dated February 14, 2013,¹¹ documents the results of this inspection and states that no findings were identified.

4.0 INACCESSIBLE ITEMS

The equipment and areas that were inaccessible during the 180-day period are listed in Section 5.7 of the seismic walkdown report. The section also describes the condition that caused the delay of the walkdown. As discussed above, a limited number of SWEL components (total of three) remain inaccessible. The walkdowns for the remaining inaccessible items were committed to be completed during the refueling outage RE28, planned for fall 2014. By letter dated November 27, 2012, the licensee committed to provide a supplemental submittal with the results of these walkdown items within 90 days after startup from the refueling outage.

⁹ ADAMS Accession No. ML031150465.

¹⁰ ADAMS Accession No. ML12156A052.

¹¹ ADAMS Accession No. ML13045A297.

5.0 CONCLUSION

The NRC staff concludes that the licensee's implementation of seismic walkdown methodology meets the intent of the walkdown guidance. The staff concludes that the licensee, through the implementation of the walkdown guidance activities and in accordance with plant processes and procedures, verified the plant configuration with the current seismic licensing basis; addressed degraded, nonconforming, or unanalyzed seismic conditions; and verified the adequacy of monitoring and maintenance programs for protective features. Furthermore, the staff notes that no immediate safety concerns were identified. The NRC staff acknowledges that the licensee will complete the delayed walkdowns of the inaccessible items during the refueling outage, RE28, planned for the fall of 2014 and will submit an updated seismic walkdown report within 90 days after startup from the same refueling outage, 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.

O. Limpas

- 2 -

If you have any questions, please contact me at 301-415-1132 or by e-mail at Joseph.Sebrosky@nrc.gov

Sincerely,

/RA/

Joseph M. Sebrosky, Senior Project Manager
Plant Licensing Branch 4-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-298

Enclosure:
Staff Assessment of Seismic
Walkdown Report

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ADAMS Accession No. ML14098A170

***concurrence by e-mail**

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