



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

March 14, 2014

Mr. Edward D. Halpin
Senior Vice President and
Chief Nuclear Officer
Pacific Gas and Electric Company
Diablo Canyon Power Plant
P.O. Box 56, Mail Code 104/6
Avila Beach, CA 93424

SUBJECT: DIABLO CANYON POWER PLANT, UNITS 1 AND 2 - STAFF ASSESSMENT OF THE SEISMIC WALKDOWN REPORTS SUPPORTING IMPLEMENTATION OF NEAR-TERM TASK FORCE RECOMMENDATION 2.3 RELATED TO THE FUKUSHIMA DAI-ICHI NUCLEAR POWER PLANT ACCIDENT (TAC NOS. MF0117 AND MF0118)

Dear Mr. Halpin:

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

By two letters dated November 27, 2012, Pacific Gas and Electric Company (PG&E) submitted its Seismic Walkdown Reports as requested in Enclosure 3 of the 50.54(f) letter for Diablo Canyon Power Plant, Units 1 and 2. By letter dated December 2, 2013, PG&E provided a response to the NRC's request for additional information for the staff to complete its assessments and committed to initiate a corrective action program item to address the staff's concerns documented in the request for additional information.

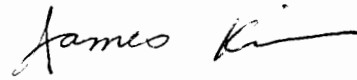
The NRC staff acknowledges that a supplemental letter will be provided 60 days following the completion of the next refueling outage (March 2014) addressing the remaining inaccessible items consistent with the regulatory commitment. The NRC staff reviewed the information provided and, as documented in the enclosed staff assessments, Enclosure 1 for Unit 1 and Enclosure 2 for Unit 2, determined that sufficient information was provided to be responsive to Enclosure 3 of the 50.54(f) letter.

E. Halpin

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If you have any questions, please contact me at 301-415-4125 or by e-mail at James.kim@nrc.gov.

Sincerely,

A handwritten signature in black ink that reads "James Kim". The signature is written in a cursive style with a long horizontal stroke at the end.

James Kim, Project Manager
Plant Licensing Branch IV-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-275 and 50-323

Enclosures:

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

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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
PACIFIC GAS AND ELECTRIC COMPANY
DIABLO CANYON POWER PLANT, UNIT 1
DOCKET NO. 50-275

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.

¹ Agencywide Documents Access and Management System (ADAMS) Accession No. ML12053A340.

² ADAMS Accession No. ML12056A049.

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 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 Pacific Gas and Electric Company (PG&E, the licensee) provided a response to Enclosure 3 of the 50.54(f) letter Required Response Item 2, for Diablo Canyon Power Plant, Unit 1 (DCPP-1). 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 by letter dated December 2, 2013,⁷ and committed to initiate a new CAP item to address the staff's concerns documented in the request for additional information (RAI).

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

2.0 REGULATORY EVALUATION

The structures, systems, and components (SSCs) important to safety in operating nuclear power plants are designed either in accordance with, or meet the intent of Appendix A to 10 CFR Part 50, General Design Criteria (GDC) 2, "Design Bases for Protection Against Natural Phenomena," and Appendix A to 10 CFR Part 100, "Reactor Site Criteria." GDC 2 states that SSCs important to safety at nuclear power plants shall be designed to withstand the effects of natural phenomena such as earthquakes, tornadoes, hurricanes, floods, tsunamis, and seiches without loss of capability to perform their safety functions.

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

GDC 2 states that the design bases for the SSCs shall reflect appropriate consideration of the most severe natural phenomena that have been historically reported for the site and surrounding area with sufficient margin for the limited accuracy, quantity, and period of time in which the historical data have been accumulated.

³ ADAMS Package Accession No. ML121640872.

⁴ ADAMS Accession No. ML12145A529.

⁵ ADAMS Accession No. ML123330362.

⁶ ADAMS Accession No. ML13304B418.

⁷ ADAMS Accession No. ML13337A449.

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.

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 DCP-1 in Enclosure 1, pages 1 to 3, of the 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 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 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 June 7, 2012,⁸ the licensee confirmed that it would utilize the walkdown guidance in the performance of the seismic walkdowns at DCP-1. The walkdown report dated November 27, 2012, did not identify deviations from the walkdown guidance.

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

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

⁸ ADAMS Accession No. ML12159A582.

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 Attachment A and pages 4 and 5 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 DCP-1 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 Attachments C and F of the walkdown report, DCP-1 SWELs 1 and 2 meet the inclusion requirements of the walkdown guidance. Specifically, the following attributes were considered in the sample selection:

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

Due to individual plant configurations and the walkdown guidance screening process followed to select the final SWEL equipment, it is possible that some classes of equipment will not be represented on the SWEL. The walkdown guidance recognizes this is due to the equipment not being present in the plant (e.g., some plants generate direct current power using inverters and therefore do not have motor generators) or the equipment being screened out during the screening process (the screening process is described in Section 3 of the walkdown guidance). The NRC staff noted that a detailed explanation was provided justifying cases where specific

classes of equipment were not included as part of the SWEL, and concludes that these exclusions are acceptable.

The licensee discussed the approach to identify all items that can lead to rapid drain-down in Enclosure 1, pages 8 and 9, of the walkdown report. The licensee indicated that the DCP-1 SFP does not contain penetrations below about 10 feet above the top of the fuel assemblies. Also, the licensee indicated that all the piping entering into the SFP was added to the SWEL 2 to verify that siphoning of water from the SFP was not possible. The licensee also considered other SFP drain-down flow paths. As a result, the licensee provided the SFP rapid drain-down equipment list in Attachment E of the walkdown report. The NRC staff reviewed Attachment E and the specific checklists for each item and noted that sufficient information was provided to explain the reasons for inclusion /exclusion of these items in the SWEL 2. As stated above, the licensee also considered other rapid drain-down paths, in addition to the guidance, associated with the fuel transfer tube. No seismic adverse condition was identified as part of the walkdown performed for this item. Based on the information provided, the staff concludes that potential rapid drain-down components were appropriately identified, assessed, and included in the SWEL 2.

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.

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 Enclosure 1, pages 11 and 12, 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 the seismic walkdowns and area walk-bys were completed by a team of at least two qualified Seismic Walkdown Engineers (SWEs). According to the signed seismic walkdown checklists (SWCs) and area walk-by checklists (AWCs), these activities were conducted during the weeks of August 23, 2012, and October 25, 2012. Attachments I and J 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. In Attachment G of the walkdown report, the licensee included a table listing the identified PASCs entered into the CAP. The table describes the condition 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.

By letter dated November 1, 2013, the NRC staff issued two RAIs in order to obtain clarification regarding the process followed by the licensee when evaluating conditions identified in the field

during the walkdowns and walk-bys. Specifically, in RAI-1, the 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 provided a summary of the overall process used to evaluate observations identified in the field by the SWEs. The licensee stated that those field observations marked with an "N" (No) or "U" (unknown) in the checklists by the SWEs were further evaluated by a team composed of licensing basis reviewers, SWEs, and DCPD engineering personnel. This group was responsible to determine the appropriate disposition of each issue. If a field observation could not be judged readily to be acceptable with respect to its current licensing basis based on engineering judgment or informal calculation, then the condition was documented in the plant's CAP for further evaluation. For these conditions, the field markings in the checklist would change from "U" to "N". If a field observation was found to be in accordance with design and licensing basis, then the field marking in the checklist for this observation would change to "Y". The licensee stated that the evaluations that led to these changes were properly documented in the checklists. The licensee stated that it used a tracking spreadsheet called "Tracker" to track the dispositioning process and result for each condition. The licensee confirmed that a licensing basis evaluation was performed for each of the PASCs to determine the component's ability to perform its required function. Attachment G of the walkdown report describes the PASC, provides a description of the condition and its resolution (e.g., CAP entry) status.

In addition, by letter dated December 2, 2013, the licensee committed to initiate a CAP item to verify if appropriate actions were taken when reporting and dispositioning identified PASCs (including conditions for which a calculation, analysis (if more than a simple analysis), or evaluation was used for a determination) to ensure that the reported information supports concluding that the plant meets the current licensing basis.

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

While reviewing the walkdown checklists, the NRC staff noted that for non-line mounted equipment, the 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 NRC staff noted that walkdown report does not clearly state whether the licensee opened cabinets as part of the seismic walkdowns. Based on a detailed review of SWCs and AWCs, the NRC staff confirmed that accessible cabinets and panels were opened by the seismic walkdown team to verify their internal components.

The equipment and areas that were inaccessible during the 180-day period are listed in Attachment H of the walkdown report. The list of inaccessible items does not include the condition which caused the delay of the walkdown. A limited number of SWEL components (total of 19) were inaccessible at the time of the initial walkdowns. By letter dated May 22, 2013, the licensee committed to complete the walkdowns for all of the remaining inaccessible items by the end of the next scheduled refueling outage (March 2014). The licensee also

committed to provide a supplemental submittal with the results of these walkdown items 60 days following the completion of the next refueling outage.

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 Enclosure 1, page 12, of the DCP-1 walkdown report and the licensee's response to RAI-1. In response to RAI-1, the licensee provided additional clarification regarding the process for conducting the seismic licensing basis evaluations of the PASCs identified during the seismic walkdowns and area walk-bys. The licensee indicated that for each of the PASCs and observations, a licensing basis evaluation was performed to determine the component's ability to perform its required safety function. The licensee stated that if the evaluation concluded the identified condition was acceptable with respect to the current licensing basis no further action was necessary and the results were documented in the walkdown checklists. For seismic conditions or observations that challenged the current licensing basis, the licensee documented the condition or observation in the walkdown checklist and entered it into the CAP. The licensee also identified other non-seismic related items during the walkdowns and documented them on the checklists and entered them into the CAP. The licensee stated that the licensing basis evaluations were performed by DCP-1 cognizant engineers and were subject to a peer review.

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

3.2.5 Conclusion

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

3.3 Peer Review

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

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

The NRC staff reviewed the information provided in Attachment K of the DCP-1 walkdown report which describes the conduct of the peer review. In addition, the staff reviewed Attachment A, which includes a table of the walkdown activities performed by team members. 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 staff requested the licensee to confirm that the activities identified on page 6-1 of the walkdown guidance were assessed and documented in the report. The NRC also requested the licensee to confirm that any individual involved in performing any given walkdown activity was not a peer reviewer for that same activity. In response to RAI-2, the licensee referenced the walkdown report for the peer review process, peer review personnel, and its qualifications. The licensee indicated that it used a peer review team to review all SWCs, AWCs, and licensing basis evaluations and confirmed that no individual was the sole reviewer of their own work. The staff reviewed the licensee's summary of each of these activities, 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, IPEEE Vulnerabilities, of the walkdown guidance provides information to licensees regarding the reporting of the evaluations conducted and actions taken in response to seismic vulnerabilities identified during the IPEEE program. Through the IPEEE program and Generic

Letter 88-20, "Individual Plant Examination of External Events for Severe Accident Vulnerabilities," dated November 23, 1988,⁹ licensees previously had performed a systematic examination to identify any plant-specific vulnerabilities to severe accidents.

The licensee referenced PG&E letter DCL 94-133, "Response to Generic Letter 88-20 Supplement 4, 'Individual Plant Examination of External Events for Severe Accident Vulnerabilities,'" dated June 27, 1994 (not publicly available), to indicate that based on the results presented in the IPEEE study, no vulnerabilities with regards to seismic-induced core damage exist at DCCP. The licensee indicated that there were other completed plant improvements that have a beneficial impact on the PRA that were included as part of the SWEL development process.

Based on its review of page 12 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 DCCP-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. One finding of very low significance (green) was identified. The licensee entered this issue into the CAP for resolution. The inspection reports dated February 12, 2013,¹¹ and August 12, 2013,¹² documents the results of this inspection.

4.0 INACCESSIBLE ITEMS

The equipment and areas that were inaccessible during the 180-day period are listed in Attachment H of the walkdown report. In Enclosure 1, page 13, of the walkdown report, the licensee indicated that the inaccessible components will be inspected prior to the end of the next DCCP-1 refueling outage scheduled to occur on March 2014. Nineteen inspections were listed to be completed including inaccessible panels and cabinets. The licensee committed to

⁹ ADAMS Accession No. ML031150465.

¹⁰ ADAMS Accession No. ML12156A052.

¹¹ ADAMS Accession No. ML13043A160.

¹² ADAMS Accession No. ML13224A314.

provide a supplemental submittal with the results of these delayed walkdown items within 60 days following the completion of the next DCCP-1 refueling outage.

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 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 staff notes that no immediate safety concerns were identified. The staff acknowledges that a supplemental letter will be provided 60 days following the completion of the next refueling outage (March 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.

STAFF ASSESSMENT OF SEISMIC WALKDOWN REPORT
NEAR-TERM TASK FORCE RECOMMENDATION 2.3 RELATED TO
THE FUKUSHIMA DAI-ICHI NUCLEAR POWER PLANT ACCIDENT

PACIFIC GAS AND ELECTRIC COMPANY

DIABLO CANYON POWER PLANT, UNIT 2

DOCKET NO. 50-323

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] and a description of the actions taken to eliminate or reduce them...
- d. Results of the walkdown including key findings and identified degraded, nonconforming, or unanalyzed conditions...
- e. Any planned or newly installed protection and mitigation features.
- f. Results and any subsequent actions taken in response to the peer review.

In accordance with the 50.54(f) letter, Enclosure 3, Required Response Item 2, licensees were required to submit a response within 180 days of the NRC's endorsement of the seismic

¹ Agencywide Documents Access and Management System (ADAMS) Accession No. ML12053A340.

² ADAMS Accession No. ML12056A049.

walkdown process. By letter dated May 29, 2012,³ the Nuclear Energy Institute (NEI) staff 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 Pacific Gas and Electric Company (PG&E, the licensee) provided a response to Enclosure 3 of the 50.54(f) letter Required Response Item 2, for Diablo Canyon Power Plant, Unit 2 (DCPP-2). In addition to the aforementioned letter, the licensee, by letter dated May 22, 2013,⁶ provided an amendment to its initial walkdown report. The purpose of the latter submittal was to provide walkdown results for those components that were inaccessible during the initial walkdowns.

The NRC staff reviewed the walkdown report and determined that additional supplemental information would assist the staff in completing its review. By letter dated November 1, 2013,⁷ the NRC staff requested additional information to gain a better understanding of the processes and procedures used by the licensee in conducting the walkdowns and walk-bys. The licensee responded to the NRC staff's request by letter dated December 2, 2013,⁸ and committed to initiate a CAP item to address the staff's concerns documented in the request for additional information (RAI).

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.

³ ADAMS Package Accession No. ML121640872.

⁴ ADAMS Accession No. ML12145A529.

⁵ ADAMS Accession No. ML123330375.

⁶ ADAMS Package Accession No. ML13143A168.

⁷ ADAMS Accession No. ML13304B418.

⁸ ADAMS Accession No. ML13337A449.

GDC 2 states that the design bases for the SSCs shall reflect appropriate consideration of the most severe natural phenomena that have been historically reported for the site and surrounding area with sufficient margin for the limited accuracy, quantity, and period of time in which the historical data have been accumulated.

The current licensing basis is the set of NRC requirements applicable to a specific plant, including the licensee's docketed commitments for ensuring compliance with, and operation 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 DCP-2 in pages 1 to 4 of the 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 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 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 June 7, 2012,⁹ the licensee confirmed that it would utilize the walkdown guidance in the performance of the seismic walkdowns at DCP-2.

The walkdown report dated November 27, 2012, and supplemented by letter dated May 22, 2013, did not identify deviations from the walkdown guidance.

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

- Personnel Qualifications
- Development of the Seismic Walkdown Equipment Lists (SWELs)

⁹ ADAMS Accession No. ML12159A582.

- 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 Attachment A and pages 4 and 5 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 DCP-2 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 Attachments C and F of the walkdown report, DCP-2 SWELs 1 and 2 meet the inclusion requirements of the walkdown guidance. Specifically, the following attributes were considered in the sample selection:

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

Due to individual plant configurations and the walkdown guidance screening process followed to select the final SWEL equipment, it is possible that some classes of equipment will not be represented on the SWEL. The walkdown guidance recognizes this is due to the equipment not being present in the plant (e.g., some plants generate direct current power using inverters and therefore do not have motor generators) or the equipment being screened out during the

screening process (the screening process is described in Section 3 of the walkdown guidance). The NRC staff noted that a detailed explanation was provided justifying cases where specific classes of equipment were not included as part of the SWEL, and concludes that these exclusions are acceptable.

The licensee discussed the approach to identify all items that can lead to rapid drain-down in pages 8 and 9 of the walkdown report. The licensee indicated that the DCP-2 SFP does not contain penetrations below about 10 feet above the top of the fuel assemblies. Also, the licensee indicated that all the piping entering into the SFP was added to the SWEL 2 to verify that siphoning of water from the SFP was not possible. The licensee also considered other SFP drain-down flow paths. As result, the licensee provided the SFP rapid drain-down equipment list in Attachment E of the walkdown report. The NRC staff reviewed Attachment E and the specific checklists for each item and noted that sufficient information was provided to explain the reasons for inclusion / exclusion of these items in the SWEL 2. As stated above, the licensee also considered other rapid drain-down paths, in addition to the guidance, associated with the fuel transfer tube. No seismic adverse condition was identified as part of the walkdown performed for this item. Based on the information provided, the staff concludes that potential rapid drain-down components were appropriately identified, assessed and included in the SWEL 2.

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.

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 pages 12 and 13 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 the seismic walkdowns and area walk-bys, were completed by a team of at least two qualified Seismic Walkdown Engineers (SWEs). According to the signed seismic walkdown checklists (SWCs) and area walk-bys checklists (AWCs), these activities were conducted during the weeks of August 24, 2012 and October 24, 2012. In addition, a subsequent set of walkdowns were performed during the weeks of February 3, 2013, and May 2, 2013, to complete a number of components that were inaccessible during the initial walkdowns. Attachment I and J of the initial and amended walkdown reports 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. In Attachment G of the amended walkdown report, the licensee included a table listing the identified PASCs entered into the CAP. The table describes the

condition and its current status. Based on the initial review of the checklists, the NRC staff was unable to confirm that all the PASCs identified during the walkdowns were included in this table.

By letter dated November 1, 2013, the NRC staff issued two RAIs in order to obtain clarification regarding the process followed by the licensee when evaluating conditions identified in the field during the walkdowns and walk-bys. Specifically, in RAI-1, the staff requested the licensee to provide further explanation regarding how a field observation was determined to be PASC, and to ensure that the basis for determination was addressed using normal plant processes and documented in the walkdown report. In response to RAI-1, the licensee provided a summary of the overall process used to evaluate observations identified in the field by the SWEs. The licensee stated that those field observations marked with an "N" (No) or "U" (unknown) in the checklists by the SWEs were further evaluated by a team composed of licensing basis reviewers, SWEs, and DCPD engineering personnel. This group was responsible to determine the appropriate disposition of each issue. If a field observation could not be judged readily to be acceptable with respect to its current licensing basis based on engineering judgment or informal calculation, then the condition was documented in the plant's CAP for further evaluation. For these conditions, the field markings in the checklist would change from "U" to "N". If a field observation was found to be in accordance with design and licensing basis, then the field marking in the checklist for this observation would change to "Y". The licensee stated that the evaluations that led to these changes were properly documented in the checklists. The licensee stated that it used a tracking spreadsheet called "Tracker" to track the dispositioning process and result for each condition. The licensee confirmed that a licensing basis evaluation was performed for each of the PASCs to determine the component's ability to perform its required function. Attachment G of the walkdown report describes the PASC, provides a description of the condition and its resolution (e.g., CAP entry) status.

In addition, by letter dated December 2, 2013, the licensee committed to initiate a CAP item to verify if appropriate actions were taken when reporting and dispositioning identified PASCs (including conditions for which a calculation, analysis (if more than a simple analysis), or evaluation was used for a determination) to ensure that the reported information supports concluding that the plant meets the current licensing basis.

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

While reviewing the walkdown checklists, the NRC staff noted that, for non-line mounted equipment, the 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 NRC staff noted that the walkdown report does not clearly state whether the licensee opened cabinets as part of the seismic walkdowns. The NRC staff performed a detailed review of SWCs and AWCs and confirmed that accessible cabinets and panels were opened to determine if any adverse conditions existed in the internal components. In addition, the NRC staff reviewed the amended walkdown report and confirmed that all the inaccessible items were inspected.

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 page 12 of the DCP-2 walkdown report and the licensee's response to RAI-1. In response to RAI-1, the licensee provided additional clarification regarding the process for conducting the seismic licensing basis evaluations of the PASCs identified during the seismic walkdowns and area walk-bys. The licensee indicated that for each of the PASCs and observations a licensing basis evaluation was performed to determine the component's ability to perform its required safety function. The licensee stated that if the evaluation concluded the identified condition was acceptable with respect to the current licensing basis, no further action was necessary and the results were documented in the walkdown checklists. For seismic conditions or observations that challenged the current licensing basis, the licensee documented the condition or observation in the walkdown checklist and entered it into the CAP. The licensee also identified other non-seismic related items during the walkdowns and documented them on the checklists and entered them into the CAP. The licensee stated that the licensing basis evaluations were performed by DCP-2 cognizant engineers and were subject to a peer review.

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

3.2.5 Conclusion

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

3.3 Peer Review

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

- Review the selection of the SSCs included on the SWELs
- Review a sample of the checklists prepared for the seismic walkdowns and area walk-bys

- Review the licensing basis evaluations
- Review the decisions for entering the potentially adverse conditions into the CAP
- Review the walkdown report
- Summarize the results of the peer review process in the walkdown report

The NRC staff reviewed the information provided in Attachment K of the DCCP-2 walkdown report which describes the conduct of the peer review. In addition, the staff reviewed Attachment A, which includes a table of the walkdown activities performed by team members. In RAI-2, the staff requested the licensee to provide additional information on the overall peer review process that was followed as part of the walkdown activities. Specifically, the staff requested the licensee to confirm that the activities identified on page 6-1 of the walkdown guidance were assessed and documented in the report. The NRC also requested the licensee to confirm that any individual involved in performing any given walkdown activity was not a peer reviewer for that same activity. In response to RAI-2, the licensee referenced the walkdown report for the peer review process, peer review personnel and its qualifications. The licensee indicated that it used a peer review team to review all SWCs, AWCs, and licensing basis evaluations and confirmed that no individual was the sole reviewer of their own work. The staff reviewed the licensee's summary of each of these activities, 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, IPEEE Vulnerabilities, of the walkdown guidance provides information to licensees regarding the reporting of the evaluations conducted and actions taken in response to seismic vulnerabilities identified during the IPEEE program. Through the IPEEE program and Generic Letter 88-20, "Individual Plant Examination of External Events for Severe Accident Vulnerabilities," dated November 23, 1988,¹⁰ licensees previously had performed a systematic examination to identify any plant-specific vulnerabilities to severe accidents.

The licensee referenced PG&E letter DCL 94-133, "Response to Generic Letter 88-20 Supplement 4, 'Individual Plant Examination of External Events for Severe Accident Vulnerabilities,' dated June 27, 1994 (not publicly available), to indicate that based on the results presented in the IPEEE study, no vulnerabilities with regards to seismic induced core damage exist at DCCP. The licensee indicated that there were other completed plant

¹⁰ ADAMS Accession No. ML031150465.

improvements that have a beneficial impact on the PRA that were included as part of the SWEL development process.

Based on its review of page 12 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, 2012,¹¹ the NRC issued Temporary Instruction (TI) 2515/188, "Inspection of Near-Term Task Force Recommendation 2.3 Seismic Walkdowns." In accordance with the TI, NRC inspectors independently verified that the DCCP-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. One finding of very low significance (green) was identified. The licensee entered this issue into the CAP for resolution. The inspection reports dated February 12, 2013,¹² and August 12, 2013,¹³ 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 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 staff notes that no immediate safety concerns were identified. The NRC staff reviewed the information provided and determined that sufficient information was provided to be responsive to Enclosure 3 of the 50.54(f) letter.

¹¹ ADAMS Accession No. ML12156A052.

¹² ADAMS Accession No. ML13043A160.

¹³ ADAMS Accession No. ML13224A314.

E. Halpin

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If you have any questions, please contact me at 301-415-4125 or by e-mail at James.kim@nrc.gov.

Sincerely,

/RA/

James Kim, Project Manager
Plant Licensing Branch IV-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-275 and 50-323

Enclosures:

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

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