



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

October 1, 2015

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

SUBJECT: DIABLO CANYON POWER PLANT, UNIT NOS. 1 AND 2 - REQUEST FOR  
ADDITIONAL INFORMATION ASSOCIATED WITH NEAR-TERM TASK  
FORCE RECOMMENDATION 2.1, SEISMIC REEVALUATIONS (TAC NOS.  
MF5275 AND MF5276)

Dear Mr. Halpin:

By letters<sup>1</sup> dated March 11, 2015, August 12, 2015, and September 16, 2015, to the U. S. Nuclear Regulatory Commission (NRC), Pacific Gas and Electric Company (the licensee), submitted for NRC review its Seismic Hazard and Screening Report, Pursuant to Title 10 of the *Code of Federal Regulations* Part 50, Section 50.54(f), Response for Information Regarding Recommendation 2.1 of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident for the Diablo Canyon Power Plant, Unit Nos. 1 and 2 .

Following the Regulatory Audit completed on September 11, 2015<sup>2</sup>, the staff determined that additional information is required to complete its review. Enclosed is a request for additional information (RAI) related to the site response evaluation. As discussed with your staff on September 17, 2015, it was agreed that a response to the RAI would be provided no later than November 6, 2015.

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<sup>1</sup> The letters can be found in Agencywide Documents Access and Management System (ADAMS) under Accession Nos. ML15071A046, ML15224B575, and ML15259A600, respectively.

<sup>2</sup> The NRC audit plan for the review of Recommendation 2.1 Seismic can be found in ADAMS under Accession No. ML15244B099.

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If you have any questions related to the enclosed RAIs or the requested submission date, please contact me at 301-415-1115 or via e-mail at [nicholas.difrancesco@nrc.gov](mailto:nicholas.difrancesco@nrc.gov).

Sincerely,

A handwritten signature in black ink, appearing to read "Nick DiFrancesco", with a long horizontal flourish extending to the right.

Nicholas J. DiFrancesco, Senior Project Manager  
Hazards Management Branch  
Japan Lessons-Learned Division  
Office of Nuclear Reactor Regulation

Docket Nos. 50-275 and 50-323

Enclosure:  
Request for Additional Information

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REQUEST FOR ADDITIONAL INFORMATION  
NEAR-TERM TASK FORCE RECOMMENDATION 2.1  
SEISMIC HAZARD AND SCREENING REPORT  
FOR DIABLO CANYON POWER PLANT, UNIT NOS. 1 AND 2

Review of Site Response Evaluation

By letter dated August 12, 2015, Pacific Gas and Electric Company (the licensee) sent a response to the U. S. Nuclear Regulatory Commission's (NRC's) June 29, 2015, request for additional information (RAI) for Diablo Canyon Power Plant, Unit Nos. 1 and 2 (DCPP, Diablo Canyon), which provides an estimate of the site amplification using the analytical site response modeling approach. As shown in Figure 1 of the RAI response, which compares the DCPP site term as developed from the observed ground motion or empirical approach with the site term from the analytical approach (i.e., SPID<sup>3</sup> methodology), there are notable differences in the site term from the two approaches particularly in the 1-3 Hertz, as well as the higher frequency ranges. The licensee attributes these differences to the analytical modeling approach using (1) a shallow velocity model that does not capture the effects of the site-specific deep velocity profile and (2) a broad range of site kappa values that far exceed the range of observed values for the site.

Commenting on the second factor, the RAI response states on page 4,

The broad uncertainty range for kappa is included in the response to the questions to be consistent with the SPID methodology, but, based on the high frequency content of the observed ground motions at DCPP, we consider this low kappa value to be not applicable to DCPP.

The NRC staff notes that the guidance in Appendix B of the SPID was developed to systematically capture the uncertainty in the properties of the near-surface materials in the site-amplification functions and the subsequent control point seismic hazard curves using a probabilistic methodology. Broad uncertainty ranges for the subsurface material properties are necessary for sites for which the level of detail and scope of geological and geotechnical investigations are limited; however, the DCPP site has abundant subsurface data that can be used to constrain the range of uncertainty for these properties.

- a) Please provide an updated analytical site response analysis which reflects the uncertainties in the material properties specific to the Diablo Canyon site, with respect to the shear-wave velocity profiles, low-strain damping or kappa, and capturing the potential nonlinear behavior of the soil and rock. In addition, provide an evaluation of the

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<sup>3</sup> The NRC endorsement of the industry issued SPID Guidance 'Screening, Prioritization and Implementation Details (SPID) for Resolution of Fukushima Near-Term Task Force Recommendation 2.1'. Appendix B – contains an approach to develop site-specific amplification factors (Agencywide Documents Access and Management System (ADAMS) Accession No. ML12333A170).

Enclosure

differences in the site terms as developed from both the empirical and analytical approaches.

The RAI response cites an updated 3-D velocity model (Reference 3<sup>4</sup>) for development of the base case shear wave velocity profiles. The NRC staff review of the 3-D velocity model provided in Reference 3 indicates that the near-surface shear wave velocities beneath seismic station ESTA27 are higher than previous estimates used to develop the empirical site term for the March 11, 2015, Seismic Hazard and Screening Report (SHSR).

- b) Please update the SHRS to reflect the empirical site response analysis that incorporates the higher near-surface shear wave velocities for station ESTA27, shown in Reference 3. In addition, provide updated control point seismic hazard curves, uniform hazard response spectra, and ground motion response spectrum that incorporate any changes to the DCPD site term. Also, please provide any updates and refinements to the empirical site response approach in an Appendix to the revised SHSR.

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<sup>4</sup> Fugro (2015). Updated of the Three-Dimensional Velocity Model for the DCPD Foundation Area, May 2015.

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If you have any questions related to the enclosed RAIs or the requested submission date, please contact me at 301-415-1115 or via e-mail at [nicholas.difrancesco@nrc.gov](mailto:nicholas.difrancesco@nrc.gov).

Sincerely,

**/RA/**

Nicholas J. DiFrancesco, Senior Project Manager  
Hazards Management Branch  
Japan Lessons-Learned Division  
Office of Nuclear Reactor Regulation

Docket Nos. 50-275 and 50-323

Enclosure:  
Request for Additional Information

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