

**From:** Samson Lee  
**Sent:** Tuesday, July 2, 2024 4:21 PM  
**To:** Schrader, Kenneth  
**Cc:** 'Richardson, Michael'  
**Subject:** Request for Additional Information: Diablo Canyon 50.69 risk-informed categorization (EPID: L-2023-LLA-0137)  
**Attachments:** RAI to Diablo Canyon 50.69 7-2-2024.docx

By letter dated September 27, 2023, Pacific Gas and Electric Company (the licensee) requested an amendment to its license for Diablo Canyon Nuclear Power Plant, Units 1 and 2, (Diablo Canyon). The licensee's proposed amendment would add license conditions for each unit to allow Diablo Canyon to implement Title 10 of the *Code of Federal Regulations* section 50.69, "Risk-informed categorization and treatment of structures, systems and components for nuclear power reactors." The U.S. Nuclear Regulatory Commission (NRC) staff has reviewed the information in the license amendment request and determined that additional information is required to complete its review. The NRC staff's requests for additional information (RAIs) are attached. The licensee staff agreed to an RAI response by August 8, 2024.

Docket Nos. 50-275 and 50-323

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**REQUEST FOR ADDITIONAL INFORMATION**  
**BY THE OFFICE OF NUCLEAR REACTOR REGULATION**  
DIABLO CANYON 50.69 RISK-INFORMED CATEGORIZATION  
PACIFIC GAS AND ELECTRIC COMPANY  
DIABLO CANYON, UNITS 1 and 2  
Docket Nos. 50-275 and 50-323

July 2, 2024

**1. Background**

In a letter dated September 27, 2023, Pacific Gas and Electric Company (the licensee) requested an amendment to its license for Diablo Canyon Nuclear Power Plant, Units 1 and 2 (Diablo Canyon).<sup>1</sup> The licensee's proposed amendment would add license conditions for each unit to allow Diablo Canyon to implement Title 10 of the *Code of Federal Regulations* (10 CFR) section 50.69, "Risk-informed categorization and treatment of structures, systems and components [SSCs] for nuclear power reactors."

The provisions of 10 CFR 50.69 allow licensees to use an integrated, systematic, risk-informed process for categorizing SSCs according to their safety significance. A licensee that has adopted 10 CFR 50.69 may specify alternative treatments for SSCs that have low safety significance.

The U.S. Nuclear Regulatory Commission (NRC) staff has reviewed the information in the license amendment request (LAR) and determined that additional information is required to complete its review. The NRC staff's requests for additional information (RAIs) are provided in section 3 below. The NRC staff may have additional RAIs. The licensee staff determined that a draft RAI clarification call was unnecessary. The licensee staff requested, and NRC agreed, to an RAI response by August 8, 2024.

The NRC staff considers that timely responses to RAIs help ensure sufficient time is available for staff review and contribute toward the NRC's goal of efficient and effective use of staff resources. Please note that if the licensee does not respond to this request by the agreed upon date or provide an acceptable alternate date, the NRC staff may deny the licensee's application for amendment under the provisions of 10 CFR 2.108. If circumstances result in the need to revise the agreed upon response date, please contact Samson Lee, NRC Project Manager, at (301) 415-3168 or via e-mail [Samson.Lee@nrc.gov](mailto:Samson.Lee@nrc.gov).

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<sup>1</sup> Accession No. ML23270B909 in the Agencywide Documents Access and Management System (ADAMS).

## **2. Regulatory Basis**

Special treatment requirements are imposed on safety-related SSCs of a nuclear power plant to provide increased assurance (beyond normal industrial practices) that the SSCs are capable of meeting their functional requirements under design-basis conditions. These requirements go beyond the controls and measures typically applied to equipment classified as commercial grade. These additional requirements include design considerations, qualification, change control, documentation, reporting, maintenance, testing, surveillance, and other quality assurance requirements.

Licensees may voluntarily adopt 10 CFR 50.69 to implement an alternative regulatory framework with respect to requirements to provide adequate assurance that SSCs of low safety significance will perform their design-basis functions.

The Nuclear Energy Institute (NEI) issued guidance for implementation of a process for categorizing SSCs: NEI 00-04, Revision 0, "10 CFR 50.69 SSC Categorization Guideline" (NEI 00-04).<sup>1</sup>

The NRC issued, for trial use, Regulatory Guide (RG) 1.201, Revision 1, "Guidelines for Categorizing Structures, Systems, and Components in Nuclear Power Plants According to their Safety Significance (RG 1.201).<sup>2</sup> It endorses NEI 00-04 with clarifications and limitations. RG 1.201 describes a method that the NRC staff considers acceptable for the categorization of SSCs that are considered in risk-informing special treatment requirements. Use of this method complies with the Commission's requirements in 10 CFR 50.69.

## **3. Additional Information Requests**

### **RAI 1**

The LAR states that the models used in the probabilistic risk assessment (PRA) were peer reviewed using ASME/ANS RA-Sa-2009 and RG 1.200, Revision 2, "An Approach for Determining the Technical Adequacy of Probabilistic Risk Assessment Results for Risk-Informed Activities."<sup>3</sup> For the seismic PRA, however, the LAR states that a full-scope seismic PRA peer review, which also included a review of the seismic hazard and fragility analyses, was conducted in June 2017, and it was performed consistent with this revision of RG 1.200, but using ASME/ANS RA-Sb-2013. The LAR states that an independent assessment of the finding-level facts and observations (F&Os) was conducted from October to December 2017 and the scope of the assessment included all finding-level F&Os resulting from the peer review. The LAR also states that a focused-scope peer review was conducted in conjunction with the closure review and that there are no remaining open peer review finding level F&Os.

The NRC staff notes that RG 1.200, Revision 2, endorses ASME/ANS RA-Sa-2009, but it does not endorse ASME/ANS RA-Sb-2013. Similarly, the NRC staff notes that RG 1.200, Revision 3, "Acceptability of Probabilistic Risk Assessment Results for Risk-Informed Activities,"<sup>4</sup> does not

endorse ASME/ANS RA-Sb–2013. As discussed in RG 1.200, Revision 2, a risk-informed submittal should contain discussions concerning peer review. If the peer review is not performed against the endorsed standards, RG 1.200, Revision 2, states that information needs to be included in the submittal that demonstrates that the different criteria used are consistent with the endorsed standards.

The NRC staff notes that this issue was discussed during the NRC staff’s audit for the Diablo Canyon LAR to adopt risk-informed completion times dated July 13, 2023.<sup>5</sup> The license provided a comparison of the criteria in ASME/ANS RA-Sb–2013 with the criteria in ASME/ANS RA-Sa–2009 in a letter dated January 15, 2024.<sup>6</sup>

Please address the following:

1. Confirm that the comparison of the criteria in ASME/ANS RA-Sb–2013 with the criteria in ASME/ANS RA-Sa–2009 in the letter dated January 15, 2024, is valid for this LAR.
2. If the comparison is not valid for this LAR, then provide a comparison of the criteria in ASME/ANS RA-Sb–2013, which has not been endorsed by the NRC for licensing applications, with the criteria in the endorsed ASME/ANS RA-Sa–2009, including an explanation that demonstrates that the analogous ASME/ANS RA-Sa–2009 supporting requirements have been met for instances where the criteria differ between the two standards.

## **RAI 2**

Paragraph (c)(1)(ii) of 10 CFR 50.69 requires that the SSC functional importance be determined using an integrated, systematic process. NEI 00-04, Section 5.6, “Integral Assessment,” discusses the need for an integrated computation using available importance measures. It further states that the “integrated importance measure essentially weighs the importance from each risk contributor (e.g., internal events, fire, seismic PRAs) by the fraction of the total core damage frequency [or large early release frequency] contributed by that contributor.” The guidance provides formulas to compute the integrated Fussel-Vesely importance (FV) and integrated Risk Achievement Worth (RAW).

Based on the information provided in the LAR, it is not clear to the NRC staff how the licensee proposes to address the integration of importance measures across all hazards (i.e., internal events, internal flooding, fire, and seismic).

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<sup>1</sup> ADAMS Accession No. ML052910035.

<sup>2</sup> ADAMS Accession No. ML061090627.

<sup>3</sup> ADAMS Accession No. ML090410014.

<sup>4</sup> ADAMS Accession No. ML20238B871.

<sup>5</sup> ADAMS Accession No. ML24081A046.

<sup>6</sup> ADAMS Accession No. ML24016A299.

Please address the following:

1. Explain how the integration of importance measures across hazards for the 10 CFR 50.69 categorization process will be performed.
2. Discuss how the importance measures for the PRA models (e.g., FV and RAW) are derived and justify why the importance measures generated do not deviate from the NEI guidance or Table 3-1 of the LAR. If the practice or method used to generate the integrated importance measures is determined to deviate from the NEI guidance, then provide justification to support why the integrated importance measures computed are appropriate for use in the categorization process.
3. Describe how the importance measures for the seismic PRA (e.g., FV and RAW) are derived considering that the seismic hazard is discretized into bins. The discussion should include how the same basic events, which were discretized by binning during the development of the seismic PRA, are then combined (i.e., combined across bins as well as across failure modes such as seismic and random failure modes) to develop representative importance measures. Further, discuss how they are compared to the importance measure thresholds in NEI 00-04. Provide justification to support the determined impact on the categorization results and describe how the approach is consistent with the guidance in NEI 00-04.
4. In the context of the integral assessment described in NEI 00-04, Section 5.6, it is understood that importance evaluations performed in accordance with the process in NEI 00-04 are determined on a component basis. However, the LAR and NEI 00-04 guidance does not make clear how the integrated importance measures are calculated for certain components. Specifically, in the seismic PRA, basic events that represent different failure modes for a component may not align with basic events in other PRA models. Examples of such basic events include those that are specific to the seismic PRA (including implicitly modeled components) or basic events that represent a subcomponent modeled within the boundary of a component in the internal events PRA.

Provide details and justification to support how the integrated importance measures will be calculated for the basic events modeled in the seismic PRA that may not align directly with basic events modeled in the PRA for other hazards. Include discussion for any mapping that will be performed across the seismic PRA basic events and those in other PRA modeled hazards where additional modelling is determined to be necessary.

### **RAI 3**

In 10 CFR 50.69(c)(1)(i) and (ii), the regulations require that a licensee's PRA be "of sufficient quality and level of detail to support the SSC categorization process" and "all aspects of the integrated, systematic process used to characterize SSC importance must reasonably reflect the current plant configuration and operating practices, and applicable plant and industry operational experience."

Industry guidance (NEI 00-04) states that sensitivity studies should be conducted to address key assumptions. Sensitivity studies on human error rates, common-cause failures, and

maintenance unavailabilities are performed to “ensure that assumptions of the PRA are not masking the importance of an SSC.” The guidance also recommends the use of sensitivity studies identified in the characterization of PRA adequacy if they apply.

The LAR states that assumptions and sources of uncertainty were reviewed to identify those that would be significant in the risk-informed categorization process. In attachment 5 to the enclosure, the licensee provided a table that summarized key assumptions and sources of uncertainty with a discussion of how each one was or will be addressed. In several cases, additional information is needed for the staff to confirm that the documented dispositions will satisfy the requirements of 10 CFR 50.69.

1. The LAR states that dual unit trips (except for seismic events) are not considered in the single unit model, and crosstie to the other unit's resources may be unavailable. Moreover, it states that sensitivity studies will be performed for the affected SSCs.

Describe how the interdependence of structures and systems of the opposite unit will be addressed when conducting sensitivity analysis of shared components. Justify the adequacy of this approach for the categorization results.

2. The LAR states that for charging and safety injection pumps credited in a medium loss-of-coolant accident, it was assumed that 2 out of 4 high-pressure pumps are required for success. It further states that this was conservatively modeled as 1 out of 2 charging pumps and 1 out of 2 safety injection pumps.
  - a. Confirm that any two of the four high-pressure pumps are sufficient or explain the actual success criteria in more detail.
  - b. Explain why 2 of 2 charging pumps might be required and justify the method used to preserve conservatism in this case.

Explain why this approach does not affect the categorization results.

3. The LAR states that reduction of the mission time from 24 to 6 hours for the diesel generators does not have a significant impact in the baseline PRA.

Justify the conclusion that this has no significant impact on the categorization results.

4. The LAR states an assumption that vacuum breakers cannot fail in a manner that has an adverse impact on Auxiliary Salt Water (ASW) function.

It also states that the uncertainty attributable to this this nonconservative assumption is not known. Justify the expectation that the contribution of this assumption is small and does not significantly affect the categorization results.

5. The LAR states that certain SSCs are always failed in the fire PRA and seismic PRA models. Briefly identify which systems are handled in this manner and why treating them conservatively will not adversely affect SSC categorization.