



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

March 30, 2016

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 – INTERIM STAFF
RESPONSE TO REEVALUATED FLOOD HAZARDS SUBMITTED IN
RESPONSE TO 10 CFR 50.54(f) INFORMATION REQUEST – FLOOD-
CAUSING MECHANISM REEVALUATION (CAC NOS. MF6039 AND MF6040)

Dear Mr. Halpin:

The purpose of this letter is to provide a summary of the U.S. Nuclear Regulatory Commission (NRC) staff's assessment of the re-evaluated flood-causing mechanisms described in the March 11, 2015 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML15071A045), flood hazard reevaluation report (FHRR) submitted by Pacific Gas and Electric Company (PG&E, the licensee) for Diablo Canyon Power Plant, Unit Nos. 1 and 2 (Diablo Canyon), as well as supplemental information resulting from requests for additional information and audits.

By letter dated March 12, 2012, the NRC issued a request for information pursuant to Title 10 of the *Code of Federal Regulations*, Section 50.54(f) (hereafter referred to as the 50.54(f) letter) (ADAMS Accession No. ML12053A340). The request was issued as part of implementing lessons-learned from the accident at the Fukushima Dai-ichi nuclear power plant. Enclosure 2 to the 50.54(f) letter requested licensees to re-evaluate flood-causing mechanisms using present-day methodologies and guidance. Concurrently with the reevaluation of flooding hazards, licensees were required to develop and implement mitigating strategies in accordance with NRC Order EA-12-049, "Requirements for Mitigation Strategies for Beyond-Design-Basis External Events" (ADAMS Accession No. ML12054A735). On March 30, 2015, the Commission provided Staff Requirements Memoranda (SRM) (ADAMS Accession No. ML15089A236) to COMSECY-14-0037, "Integration of Mitigating Strategies for Beyond-Design-Basis External Events and the Reevaluation of Flooding Hazards," dated November 21, 2014 (ADAMS Accession No. ML14309A256), affirming that licensees need to address the reevaluated flooding hazards within their mitigating strategies for beyond-design-basis external events.

The NRC staff has reviewed the information submitted by the licensee and has summarized the results of the review in the tables provided as an Enclosure to this letter. Table 1 provides the current design-basis flood hazard mechanisms. Table 2 provides the reevaluated flood hazard mechanisms; however, the reevaluated flood hazard mechanisms bounded by the current design-basis (Table 1) are not included.

The NRC staff has concluded that the licensee's reevaluated flood hazards information, as summarized in the Enclosure, is suitable for the assessment of mitigating strategies developed in response to Order EA-12-049 (i.e., defines the mitigating strategies flood hazard information described in Nuclear Energy Institute (NEI) guidance document NEI 12-06, "Diverse and Flexible Coping Strategies (FLEX) Implementation Guide") for Diablo Canyon. Further, the NRC staff has concluded that the licensee's reevaluated flood hazard information is a suitable input for other assessments associated with Near-Term Task Force Recommendation 2.1 "Flooding". The NRC staff plans to issue a staff assessment documenting the basis for these conclusions at a later time.

Revision 2 of NEI 12-06 includes a methodology to perform a Mitigating Strategies Assessment (MSA) with respect to the reevaluated flood hazards. On February 29, 2016, the NRC staff published Japan Lessons-Learned Division Interim Staff Guidance (ISG) JLD-ISG-2012-01, Revision 1, "Compliance with Order EA-12-049, Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events," (ADAMS Accession No. ML15357A142) in the *Federal Register* (81 FR 10283). This ISG endorses Revision 2 of NEI 12-06 (ADAMS Accession No. ML16005A625), dated December 2015. Based on the guidance provided in Revision 2 of the NEI 12-06 guidance document, flood event duration parameters and applicable flood associated effects should be considered as part of the Diablo Canyon MSA. The NRC staff will evaluate the flood event duration parameters (including warning time and period of inundation) and flood-related associated effects developed by the licensee during the NRC staff's review of the MSA.

As stated above, Table 2 of the enclosure to this letter describes the reevaluated flood hazards that exceed the current design-basis. In order to complete its response to the information requested by Enclosure 2 to the 50.54(f) letter, the licensee is expected to submit an integrated assessment or a focused evaluation, as appropriate, to address these reevaluated flood hazards, as described in the NRC letter, "Coordination of Request for Information Regarding Flooding Hazard Reevaluation and Mitigating Strategies for Beyond-Design-Basis External Events" (ADAMS Accession No. ML15174A257). This letter describes the changes in the NRC's approach to the flood hazard reevaluations that were approved by the Commission in its SRM to COMSECY-15-0019, "Closure Plan for the Reevaluation of Flooding Hazards for Operating Nuclear Power Plants" (ADAMS Accession No. ML15209A682).

E. Halpin

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If you have any questions, please contact me at (301) 415-2915 or e-mail at Victor.Hall@nrc.gov.

Sincerely,

A handwritten signature in black ink, appearing to read "Victor Hall", written in a cursive style.

Victor Hall, Senior Project Manager
Hazards Management Branch
Japan Lessons-Learned Division
Office of Nuclear Reactor Regulation

Docket Nos. 50-275 and 50-323

Enclosure:
Summary of Results of Flooding
Hazard Re-Evaluation Report

cc w/encl: Distribution via Listserv

ENCLOSURE:

SUMMARY TABLES OF
REEVALUATED FLOOD HAZARD LEVELS

Table 1. Current Design Basis Flood Hazards for Use in the MSA

| Mechanism | Stillwater Elevation | Waves/ Runup | Design Basis Hazard Elevation | Reference |
|--|----------------------------------|----------------------------------|--------------------------------------|---|
| Local Intense Precipitation | No Impact on the Site Identified | No Impact on the Site Identified | No Impact on the Site Identified | FHRR Section 2.3.2.1 |
| Streams and Rivers Diablo Creek | 81.9 ft. NAVD88 | Not applicable | 81.9 ft. NAVD88 | FHRR Section 2.3.2.2 |
| Failure of Dams and Onsite Water Control/Storage Structures | No Impact on the Site Identified | No Impact on the Site Identified | No Impact on the Site Identified | FHRR Section 2.3.2.3 |
| Storm Surge Storm Surge | No Impact on the Site Identified | No Impact on the Site Identified | No Impact on the Site Identified | FHRR Section 2.3.2.4 |
| Seiche | No Impact on the Site Identified | No Impact on the Site Identified | No Impact on the Site Identified | FHRR Section 2.3.2.5 |
| Tsunami Distantly-Generated Tsunamis | 20.0 ft. NAVD88 | 10.3 ft | 30.3 ft. NAVD88 | FHRR Section 2.3.2.6.1 FHRR Section 2.3.2.13 |
| Near-Shore Tsunamis | 9.2 ft. NAVD88 | 25.7 ft | 34.9 ft. NAVD88 | FHRR Section 2.3.2.6.2 FHRR Section 2.3.2.13 |
| Ice-Induced Flooding | Not included in DB | Not included in DB | Not included in DB | FHRR Section 2.3.2.7 |

Table 1. Current Design Basis Flood Hazards for Use in the MSA

| Mechanism | Stillwater Elevation | Waves/ Runup | Design Basis Hazard Elevation | Reference |
|--------------------------------------|---------------------------------|-------------------------|--|----------------------|
| Channel Migrations/Diversions | Not included in DB | Not included in DB | Not included in DB | FHRR Section 2.3.2.8 |

Note 1: Reported values are rounded to the nearest one-tenth of a foot.

Table 2. Reevaluated Flood Hazards for Flood-Causing Mechanisms for Use in the MSA

| Mechanism | Stillwater Elevation | Waves/ Runup | Reevaluated Hazard Elevation | Reference |
|------------------------------------|-----------------------------|---------------------|-------------------------------------|----------------------------|
| Local Intense Precipitation | | | | |
| Door/Unit No. A2.1 | 87.4 ft. NAVD88 | Minimal | 87.4 ft. NAVD88 | FHRR Enclosure 1 Table 3-5 |
| Door/Unit No. BU102 | 87.4 ft. NAVD88 | Minimal | 87.4 ft. NAVD88 | FHRR Enclosure 1 Table 3-5 |
| Door/Unit NoBU103 | 87.3 ft. NAVD88 | Minimal | 87.3 ft. NAVD88 | FHRR Enclosure 1 Table 3-5 |
| Door/Unit NoA3.1 | 87.4 ft. NAVD88 | Minimal | 87.4 ft. NAVD88 | FHRR Enclosure 1 Table 3-5 |
| Door/Unit NoA3.2 | 87.4 ft. NAVD88 | Minimal | 87.4 ft. NAVD88 | FHRR Enclosure 1 Table 3-5 |
| Door/Unit NoA3.3 | 87.3 ft. NAVD88 | Minimal | 87.3 ft. NAVD88 | FHRR Enclosure 1 Table 3-5 |
| Door/Unit NoBU104/5 | 87.3 ft. NAVD88 | Minimal | 87.3 ft. NAVD88 | FHRR Enclosure 1 Table 3-5 |
| Door/Unit No.101-1 | 87.7 ft. NAVD88 | Minimal | 87.7 ft. NAVD88 | FHRR Enclosure 1 Table 3-5 |
| Door/Unit No.102-1 | 87.7 ft. NAVD88 | Minimal | 87.7 ft. NAVD88 | FHRR Enclosure 1 Table 3-5 |
| Door/Unit No.119-1 | 87.9 ft. NAVD88 | Minimal | 87.9 ft. NAVD88 | FHRR Enclosure 1 Table 3-5 |
| Door/Unit No.122-1 | 88.1 ft. NAVD88 | Minimal | 88.1 ft. NAVD88 | FHRR Enclosure 1 Table 3-5 |

Table 2. Reevaluated Flood Hazards for Flood-Causing Mechanisms for Use in the MSA

| Mechanism | Stillwater Elevation | Waves/ Runup | Reevaluated Hazard Elevation | Reference |
|----------------------|-----------------------------|---------------------|-------------------------------------|----------------------------|
| Door/Unit No.C1.1 | 87.6 ft. NAVD88 | Minimal | 87.6 ft. NAVD88 | FHRR Enclosure 1 Table 3-5 |
| Door/Unit No.129 | 87.6 ft. NAVD88 | Minimal | 87.6 ft. NAVD88 | FHRR Enclosure 1 Table 3-5 |
| Door/Unit No.130 | 87.5 ft. NAVD88 | Minimal | 87.5 ft. NAVD88 | FHRR Enclosure 1 Table 3-5 |
| Door/Unit No.C1.2 | 87.7 ft. NAVD88 | Minimal | 87.7 ft. NAVD88 | FHRR Enclosure 1 Table 3-5 |
| Door/Unit No.BU108-2 | 87.3 ft. NAVD88 | Minimal | 87.3 ft. NAVD88 | FHRR Enclosure 1 Table 3-5 |
| Door/Unit No.BU105-2 | 87.3 ft. NAVD88 | Minimal | 87.3 ft. NAVD88 | FHRR Enclosure 1 Table 3-5 |
| Door/Unit No.BU106-2 | 87.5 ft. NAVD88 | Minimal | 87.5 ft. NAVD88 | FHRR Enclosure 1 Table 3-5 |
| Door/Unit No.B2.1 | 87.6 ft. NAVD88 | Minimal | 87.6 ft. NAVD88 | FHRR Enclosure 1 Table 3-5 |
| Door/Unit No. BU101 | 87.3 ft. NAVD88 | Minimal | 87.3 ft. NAVD88 | FHRR Enclosure 1 Table 3-5 |
| Door/Unit No.B1.1 | 87.6 ft. NAVD88 | Minimal | 87.6 ft. NAVD88 | FHRR Enclosure 1 Table 3-5 |
| Door/Unit No.B1.2 | 87.6 ft. NAVD88 | Minimal | 87.6 ft. NAVD88 | FHRR Enclosure 1 Table 3-5 |
| Door/Unit No.101-2 | 87.8 ft. NAVD88 | Minimal | 87.8 ft. NAVD88 | FHRR Enclosure 1 Table 3-5 |

Table 2. Reevaluated Flood Hazards for Flood-Causing Mechanisms for Use in the MSA

| Mechanism | Stillwater Elevation | Waves/ Runup | Reevaluated Hazard Elevation | Reference |
|---------------------------|-----------------------------|---------------------|-------------------------------------|----------------------------|
| Door/Unit No.102-2 | 87.8 ft. NAVD88 | Minimal | 87.8 ft. NAVD88 | FHRR Enclosure 1 Table 3-5 |
| Door/Unit No.119-2 | 87.9 ft. NAVD88 | Minimal | 87.9 ft. NAVD88 | FHRR Enclosure 1 Table 3-5 |
| Door/Unit No.122-2 | 88.0 ft. NAVD88 | Minimal | 88.0 ft. NAVD88 | FHRR Enclosure 1 Table 3-5 |
| Door/Unit No.192-1 | 88.2 ft. NAVD88 | Minimal | 88.2 ft. NAVD88 | FHRR Enclosure 1 Table 3-5 |
| Door/Unit No.191-1 | 88.0 ft. NAVD88 | Minimal | 88.0 ft. NAVD88 | FHRR Enclosure 1 Table 3-5 |
| Door/Unit No.194-1 | 88.0 ft. NAVD88 | Minimal | 88.0 ft. NAVD88 | FHRR Enclosure 1 Table 3-5 |
| Door/Unit No.192-2 | 88.1 ft. NAVD88 | Minimal | 88.1 ft. NAVD88 | FHRR Enclosure 1 Table 3-5 |
| Door/Unit No.191-2/191A-2 | 88.0 ft. NAVD88 | Minimal | 88.0 ft. NAVD88 | FHRR Enclosure 1 Table 3-5 |
| Door/Unit No.194-2 | 87.9 ft. NAVD88 | Minimal | 87.9 ft. NAVD88 | FHRR Enclosure 1 Table 3-5 |
| Door/Unit No.363-1 | 117.6 ft. NAVD88 | Minimal | 117.6 ft. NAVD88 | FHRR Enclosure 1 Table 3-5 |
| Door/Unit No.361-1 | 117.9 ft. NAVD88 | Minimal | 117.9 ft. NAVD88 | FHRR Enclosure 1 Table 3-5 |
| Door/Unit No.360-1 | 117.9 ft. NAVD88 | Minimal | 117.9 ft. NAVD88 | FHRR Enclosure 1 Table 3-5 |

Table 2. Reevaluated Flood Hazards for Flood-Causing Mechanisms for Use in the MSA

| Mechanism | Stillwater Elevation | Waves/ Runup | Reevaluated Hazard Elevation | Reference |
|--------------------|-----------------------------|---------------------|-------------------------------------|----------------------------|
| Door/Unit No.355-1 | 117.9 ft. NAVD88 | Minimal | 117.9 ft. NAVD88 | FHRR Enclosure 1 Table 3-5 |
| Door/Unit No.354-1 | 117.9 ft. NAVD88 | Minimal | 117.9 ft. NAVD88 | FHRR Enclosure 1 Table 3-5 |
| Door/Unit No.360-2 | 117.9 ft. NAVD88 | Minimal | 117.9 ft. NAVD88 | FHRR Enclosure 1 Table 3-5 |
| Door/Unit No.361-2 | 117.9 ft. NAVD88 | Minimal | 117.9 ft. NAVD88 | FHRR Enclosure 1 Table 3-5 |
| Door/Unit No.363-2 | 117.5 ft. NAVD88 | Minimal | 117.5 ft. NAVD88 | FHRR Enclosure 1 Table 3-5 |

Note 1: The licensee is expected to develop flood event duration parameters and applicable flood associated effects to conduct the MSA. The staff will evaluate the flood event duration parameters (including warning time and period of inundation) and flood associated effects during its review of the MSA.

Note 2: Reevaluated hazard mechanisms bounded by the current design basis (see Table 1) are not included in this table

Note 3: Reported values are rounded to the nearest one-tenth of a foot.

E. Halpin

- 3 -

If you have any questions, please contact me at (301) 415-2915 or e-mail at Victor.Hall@nrc.gov.

Sincerely,

/RA/

Victor Hall, Senior Project Manager
Hazards Management Branch
Japan Lessons-Learned Division
Office of Nuclear Reactor Regulation

Docket Nos. 50-275 and 50-323

Enclosure:
Summary of Results of Flooding
Hazard Re-Evaluation Report

cc w/encl: Distribution via Listserv

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| NAME | VHall | SLent | KQuinlan | ARivera-Varona |
| DATE | 03/22/16 | 03/24/16 | 03/25/16 | 03/25/16 |
| OFFICE | NRR/JLD/JHMB/BC | NRR/JLD/JHMB/PM | | |
| NAME | MShams | VHall | | |
| DATE | 03/30/16 | 03/30/16 | | |

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