



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

August 4, 2016

Mr. John Dent, Jr.
Site Vice President
Entergy Nuclear Operations, Inc.
Pilgrim Nuclear Power Station
600 Rocky Hill Road
Plymouth, MA 02360-5508

SUBJECT: PILGRIM NUCLEAR POWER STATION – INTERIM STAFF RESPONSE TO
REEVALUATED FLOOD HAZARDS SUBMITTED IN RESPONSE TO
10 CFR 50.54(f) INFORMATION REQUEST – FLOOD-CAUSING MECHANISM
REEVALUATION (CAC NO. MF6112)

Dear Mr. Dent:

The purpose of this letter is to provide a summary of the U.S. Nuclear Regulatory Commission (NRC) staff's assessment of the reevaluated flood-causing mechanisms described in the March 12, 2015 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML15075A082), flood hazard reevaluation report (FHRR) submitted by Entergy Nuclear Operations, Inc. (Entergy, the licensee) for Pilgrim Nuclear Power Station (Pilgrim), as well as supplemental information resulting from 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 reevaluate 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 Pilgrim. 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 (JLD) 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 NEI 12-06, flood event duration parameters and applicable flood associated effects should be considered as part of the Pilgrim 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).

J. Dent

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If you have any questions, please contact me at (301) 415-22621 or e-mail at Robert.Bernardo@nrc.gov.

Sincerely,



Robert Bernardo
Hazards Management Branch
Japan Lessons-Learned Division
Office of Nuclear Reactor Regulation

Docket No. 50-293

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

cc w/encl: Distribution via Listserv

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 | | | | |
| South Side of the Plant Buildings | Not included in DB | Not included in DB | Not included in DB | FHRR Section 2.2 & Table 4-1 |
| North Side of the Plant Buildings | Not included in DB | Not included in DB | Not included in DB | FHRR Sections 2.2; 2.3.1.2; & Table 4-1 |
| Streams and Rivers | | | | |
| | Not included in DB | Not included in DB | Not included in DB | FHRR Section 2.5.1 & Table 4-1 |
| Failure of Dams and Onsite Water Control/Storage Structures | | | | |
| | Not included in DB | Not included in DB | Not included in DB | FHRR Section 2.5.1 & Table 4-1 |
| Storm Surge | | | | |
| Storm Surge With High Tide | 13.5 ft MSL | Not applicable | 13.5 ft MSL | FHRR Section 2.3.1.1 & Table 4-1 |
| Seiche | | | | |
| | Not included in DB | Not included in DB | Not included in DB | FHRR Table 4-1 |
| Tsunami | | | | |
| | Not included in DB | Not included in DB | Not included in DB | FHRR Table 4-1 |
| Ice-Induced Flooding | | | | |
| | Not included in DB | Not included in DB | Not included in DB | FHRR Table 4-1 |

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 Table 4-1 |

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

Note 2: For the Local Intense Precipitation flooding mechanism, the licensee reports still water elevations obtained during the IPEEE studies, as this mechanism is not part of the plant's Current Licensing Basis.

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 | | | | |
| South Side of the Plant | 25.2 ft MSL | Minimal | 25.2 ft MSL | FHRR Sections 3.1.2; 3.1.3 & Tables 3-1; 4-1; 4-2 & 4-3 |
| North Side of the Plant | 23.5 ft MSL | Minimal | 23.5 ft MSL | FHRR Tables 3-1; 4-1 & 4-3 |
| West Side of the Plant | 23.3 ft MSL | Minimal | 23.3 ft MSL | FHRR Tables 3-1; 4-1 & 4-3 |
| Storm Surge | | | | |
| Probable Maximum Hurricane Plus Wind Wave Effects at Upstream Face of Intake Structure | 15.8 ft MSL | 4.0 ft | 19.8 ft MSL | FHRR Sections 3.4.2.2.3 & Tables 3-8; 3-16 & 4-1 FHRR Section 3.9.2.1.8; 3.9.3 & Tables 4-1 & 4-4 |
| Probable Maximum Hurricane Plus Wind Wave Effects Near Reactor Building | 15.8 ft MSL | 6.3 ft | 22.1 ft MSL | FHRR Section 3.4.3 & Tables 3-8 & 4-1 FHRR Section 3.9.2.1.6; 3.9.2.1.7 & Tables 4-1 & 4-4 |
| Probable Maximum Wind Storm Plus Wind Wave Effects Near the Reactor Building | 15.3 ft MSL | 7.1 ft | 22.4 ft MSL | FHRR Section 3.9.2.1.4 Memo on Probable Maximum Wind Storm for Pilgrim Nuclear Power Station (ADAMS Accession No. ML16210A013) |

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.

J. Dent

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If you have any questions, please contact me at (301) 415-22621 or e-mail at Robert.Bernardo@nrc.gov.

Sincerely,

/RA/

Robert Bernardo, Project Manager
Hazards Management Branch
Japan Lessons-Learned Division
Office of Nuclear Reactor Regulation

Docket No. 50-293

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

cc w/encl: Distribution via Listserv

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ADAMS Accession Nos.: PKG ML16215A076 LTR: ML16215A086 ENCL: ML16211A447 *via email

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| NAME | RBernardo | SLent | SBreithaupt* |
| DATE | 08/1/2016 | 08/2/2016 | 07/29/2016 |
| OFFICE | NRO/DSEA/RHM1/BC* | NRR/JLD/JHMB/BC | NRR/JLD/JHMB/PM |
| NAME | CCook | GBowman | RBernardo |
| DATE | 07/29/2016 | 08/3/2016 | 08/4/2016 |

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