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

July 25, 2016

Mr. David B. Hamilton
FirstEnergy Nuclear Operating Company
Perry Nuclear Power Plant
PO Box 97, A290
Perry, OH 44081

SUBJECT: PERRY NUCLEAR POWER PLANT, UNIT 1– INTERIM STAFF RESPONSE TO REEVALUATED FLOOD HAZARDS SUBMITTED IN RESPONSE TO 10 CFR 50.54(f) INFORMATION REQUEST – FLOOD-CAUSING MECHANISM REEVALUATION (CAC NO. MF6099)

Dear Mr. Hamilton:

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 10, 2015, and March 24, 2016 (Agencywide Documents Access and Management System (ADAMS) Accession Nos. ML15069A056 and ML16084A871, respectively), flood hazard reevaluation reports (FHRRs) submitted by FirstEnergy Nuclear Operating Company (FENOC, the licensee) for Perry Nuclear Power Plant, Unit 1 (Perry), as well as supplemental information resulting from requests for additional information and audits, as applicable.

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 that licensees reevaluate flood-causing mechanisms using present-day methodologies and guidance. Concurrent 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 that are bounded by the current design-basis (Table 1) are not included[1].

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 Perry. 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 the NEI 12-06 guidance document, flood event duration parameters and applicable flood associated effects should be considered as part of the Perry 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).

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[1] The staff is aware that the licensee has made a number of site modifications to improve the ability to respond to unbounded, beyond-design-basis flooding events. Because these modifications are not included in the current licensing basis of the plant, they are not reflected on Table 1. The staff plans to evaluate the site modifications and improvements as part of the licensee's mitigating strategies assessment and as part of the focused evaluation or integrated assessment.

If you have any questions, please contact me at (301) 415-3809 or e-mail at Juan.Uribe@nrc.gov

Sincerely,

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

Docket No. 50-440

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	620.5 ft NGVD29	Minimal	620.5 ft NGVD29	FHRR Rev. 0 Section 2.1.1 & Table 2
Streams and Rivers				
Major Stream	624.0 ft NGVD29	Not applicable	624.0 ft NGVD29	FHRR Rev. 0 Section 2.1.2 & Table 2
Minor Stream	619.5 ft NGVD29	Not applicable	619.5 ft NGVD29	FHRR Rev. 0 Section 2.1.2 & Table 2
Failure of Dams and Onsite Water Control/Storage Structures	Not included in DB	Not included in DB	Not included in DB	FHRR Rev. 0 Section 2.1.3 & Table 2
Storm Surge				
High Water	580.5 ft NGVD29	27.4 ft	607.9 ft NGVD29	FHRR Rev. 0 Section 2.1.4 & Table 2 FHRR Rev. 0 Section 2.1.8 & Table 2
Seiche				
Seiche is Combined with Storm Surge in CDB	Not included in DB	Not included in DB	Not included in DB	FHRR Rev. 0 Section 2.1.4 & Table 2
Tsunami	Not included in DB	Not included in DB	Not included in DB	FHRR Rev. 0 Section 2.1.5 & Table 2
Ice-Induced Flooding	No Impact on the Site Identified	No Impact on the Site Identified	No Impact on the Site Identified	FHRR Rev. 0 Section 2.1.6 & Table 2

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 Rev. 0 Section 2.1.7 & Table 2

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				
Power Block	621.3 ft NGVD29	Minimal	621.3 ft NGVD29	FHRR Rev 1 Section 3.8.4 & Table 5
North of Power Block at the Service Water Pumphouse Building and the Emergency Service Water Pumphouse Building	620.5 ft NGVD29	Minimal	620.5 ft NGVD29	FHRR Rev 1 Section 3.8.4
Streams and Rivers				
Major Stream	628.5 ft NGVD29	Not applicable	628.5 ft NGVD29	FHRR Rev. 1 Section 3.1.4 & Table 5
Minor Stream	619.7 ft NGVD29	Not applicable	619.7 ft NGVD29	FHRR Rev. 1 Section 3.1.4 & Table 5
Storm Surge				
High Water: East of the Power Block Along the Shoreline Bluff Slopes (Probable Maximum Storm Surge Resulting from a Probable Maximum Wind Storm)	581.9 ft NGVD29	27.6 ft	609.5 ft NGVD29	FHRR Rev. 1 Section 3.7.4 & Table 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.

Note 4: "The Perry Local datum is originally based on and within the tolerance levels of the NGVD 29 datum." (Reference: FHRR Rev. 1 Section 3)

If you have any questions, please contact me at (301) 415-3809 or e-mail at Juan.Uribe@nrc.gov

Sincerely,

/RA/

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

Docket No. 50-440

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

cc w/encl: Distribution via Listserv

DISTRIBUTION:

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ARivera-Varona, NRO	KErwin, NRO	ACampbell, NRO
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ADAMS Accession No.: PKG ML16202A350; LTR: ML16202A348; ENCL: ML16202A417 *via email

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