



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

April 25, 2016

Vice President, Operations  
Entergy Nuclear Operations, Inc.  
Indian Point Energy Center  
450 Broadway, GSB  
P.O. Box 249  
Buchanan, NY 10511-0249

SUBJECT: INDIAN POINT NUCLEAR GENERATING UNIT NOS. 2 AND 3 – INTERIM  
STAFF RESPONSE TO REEVALUATED FLOOD HAZARDS SUBMITTED IN  
RESPONSE TO 10 CFR 50.54(f) INFORMATION REQUEST – FLOOD-  
CAUSING MECHANISM REEVALUATION (CAC NOS. MF3313 AND MF3314)

Dear Mr. Coyle:

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 12, 2013, (Agencywide Documents Access and Management System (ADAMS) Accession No. ML13079A061), flood hazard reevaluation report (FHRR) submitted by Entergy Nuclear Operations, Inc. (Entergy, the licensee) for Indian Point Nuclear Generating Unit Nos. 2 and 3 (Indian Point), 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.

**Enclosure two transmitted herewith contains Security-Related Information. When separated from the Enclosure, this document is decontrolled.**

The NRC staff has reviewed the information submitted by the licensee and has summarized the results of the review in the tables provided as Enclosure 1 to this letter. Table 1 provides the current design-basis flood hazard mechanisms. Table 2 provides reevaluated flood hazard mechanisms; however, reevaluated hazard mechanisms bounded by the current design-basis (Table 1) are not included. Because Table 2 includes security-related information, Enclosure 1 contains the redacted version of Table 2. Enclosure 2 is withheld from public disclosure and restores the security-related information to Table 2.

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 Indian Point. 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 Indian Point 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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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 E. Hall". The signature is written in a cursive style with some loops and flourishes.

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

Docket Nos. 50-247 and 50-286

Enclosures:

1. Summary of Results of Flooding  
Hazard Re-Evaluation Report (Redacted Version)
2. Summary of Results of Flooding  
Hazard Re-Evaluation Report (Non-Public Version)

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ENCLOSURE 1:

SUMMARY TABLES OF  
REEVALUATED FLOOD HAZARD LEVELS

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

<b>Mechanism</b>	<b>Stillwater Elevation</b>	<b>Waves/Runup</b>	<b>Design Basis Hazard Elevation</b>	<b>Reference</b>
<b>Local Intense Precipitation</b>	Not included in DB	Not included in DB	Not included in DB	Flood Hazard Reevaluation Report (FHRR) Revision 2, Section 4.1.1
<b>Streams and Rivers</b>				
Probable Maximum Flood (PMF) on the Hudson River	12.7 ft NGVD29	1.0 ft	13.7 ft NGVD29	FHRR Revision 2, Section 2.3.1 and Table 4.1-1
PMF with Low Tide on the Hudson River	13.0 ft NGVD29	1.0 ft	14.0 ft NGVD29	FHRR Revision 2, Section 2.3.1 and Table 4.1-1
PMF with High Tide on the Hudson River	12.4 ft NGVD29	1.0 ft	13.4 ft NGVD29	FHRR Revision 2, Section 2.3.1 and Table 4.1-1
<b>Failure of Dams and Onsite Water Control/Storage Structures</b>				
REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
<b>Storm Surge</b>				
Probable Maximum Hurricane (PMH) with Spring High Tide on the Hudson River	13.5 ft NGVD29	1.0 ft	14.5 ft NGVD29	FHRR Revision 2, Section 2.3.1 and Table 4.1-1
Standard Project Hurricane and Standard Project Flood on the Hudson River	13.0 ft NGVD29	1.0 ft	14.0 ft NGVD29	FHRR Revision 2, Section 2.3.1 and Table 4.1-1
REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
REDACTED	REDACTED	REDACTED	REDACTED	REDACTED

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

<b>Mechanism</b>	<b>Stillwater Elevation</b>	<b>Waves/ Runup</b>	<b>Design Basis Hazard Elevation</b>	<b>Reference</b>
<b>Seiche</b>	Not included in DB	Not included in DB	Not included in DB	FHRR Revision 2, Section 4.1.5
<b>Tsunami</b>	Not included in DB	Not included in DB	Not included in DB	FHRR Revision 2, Section 4.1.6
<b>Ice-Induced Flooding</b>	Not included in DB	Not included in DB	Not included in DB	FHRR Revision 2, Section 4.1.7
<b>Channel Migrations/Diversions</b>	Not included in DB	Not included in DB	Not included in DB	FHRR Revision 2, Section 4.1.8

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**

<b>Mechanism</b>	<b>Stillwater Elevation</b>	<b>Waves/Runup</b>	<b>Reevaluated Hazard Elevation</b>	<b>Reference</b>
<b>Local Intense Precipitation</b>				
Unit 2 Transformer Yard Doors Maximum Water-Surface Elevation - Door ID U2-ABFP-2	18.8 ft NGVD29	Minimal	18.8 ft NGVD29	Letter dated August 18, 2014, entitled "Revised FLO-2D Analysis to Address the Current LIP Regarding the Flooding Aspects of Recommendations 2.1 of the Near-Term Task Force Review of the Insights from the Fukushima Dai-ichi Accident Indian Point Units Nos. 2 and 3." ADAMS Accession No. ML16116A060
Unit 2 Transformer Yard Doors Maximum Water-Surface Elevation - Door ID U2-ABFP-3	18.8 ft NGVD29	Minimal	18.8 ft NGVD29	
Unit 2 Transformer Yard Doors Maximum Water-Surface Elevation - Door ID U2-CB-1	19.1 ft NGVD29	Minimal	19.1 ft NGVD29	
Unit 2 Transformer Yard Doors Maximum Water-Surface Elevation - Door ID U2-PAB-1	19.2 ft NGVD29	Minimal	19.2 ft NGVD29	
Unit 2 Transformer Yard Doors Maximum Water-Surface Elevation - Door ID U2-ABFP-1	19.0 ft NGVD29	Minimal	19.0 ft NGVD29	
Unit 3 Transformer Yard Doors Maximum Water-Surface Elevation - Door ID U3-ABFP-1	18.3 ft NGVD29	Minimal	18.3 ft NGVD29	
Unit 3 Transformer Yard Doors Maximum Water-Surface Elevation - Door ID U3-ABFP-2	18.5 ft NGVD29	Minimal	18.5 ft NGVD29	
Unit 3 Transformer Yard Doors Maximum Water-Surface Elevation - Door ID U3-ABFP-3	18.6 ft NGVD29	Minimal	18.6 ft NGVD29	
Unit 3 Transformer Yard Doors Maximum Water-Surface Elevation - Door ID U3-PAB-1	18.8 ft NGVD29	Minimal	18.8 ft NGVD29	
Unit 3 Transformer Yard Doors Maximum Water-Surface Elevation - Door ID U3-PAB-2	18.9 ft NGVD29	Minimal	18.9 ft NGVD29	
Unit 3 Transformer Yard Doors Maximum Water-Surface Elevation - Door ID U3-CB-1	19.2 ft NGVD29	Minimal	19.2 ft NGVD29	

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

<b>Mechanism</b>	<b>Stillwater Elevation</b>	<b>Waves/Runup</b>	<b>Reevaluated Hazard Elevation</b>	<b>Reference</b>
<p><b>Streams and Rivers</b></p> <p>Cool Season on Hudson River PMF with Snow Pack Coincident with 25-year Surge and 10% Exceedance High Tide</p>	16.5 ft NGVD29	2.1 ft	18.6 ft NGVD29	FHRR Rev. 2 (12/9/2014) Sections 3.4.2.5.1, 3.4.2.5.2, and FHRR (Rev. 12/10/2015) Section 6.2.2
<p><b>Failure of Dams and Onsite Water Control/Storage Structures</b></p> <p>REDACTED</p>	REDACTED	REDACTED	REDACTED	REDACTED
<p><b>Storm Surge</b></p> <p>Combined Event with 150,000 cfs Flow in Hudson River Coincident with the Probable Maximum Storm Surge (PMSS), Including Antecedent Water Level (AWL) and Coincident Wind-Generated Waves (CWGW) – Values Reported in Open Water in River Outboard of River Bulkhead and U2 Intake Structure</p> <p>Combined Event with 150,000 cfs Flow in Hudson River Coincident with PMSS, Including AWL and CWGW – Values Reported in Open Areas of Powerblock Yard Between U2 Intake Structure and U2 Turbine Building</p> <p>Combined Event with 150,000 cfs Flow in Hudson River Coincident with PMSS, Including AWL and CWGW – Values Reported at River-facing Sides of Structures Between the River Bulkhead and the Turbine Buildings (Including West Sides of U2 and U3 Intake Structures) and River-facing (West) Side of U2 and U3 Turbine Buildings</p>	18.9 ft NGVD29	2.9 ft	21.8 ft NGVD29	Letter dated April 5, 2016, entitled "Entergy Supplement to Basis for Performance of the Mitigating Strategies Assessment with the Flood Hazard Information and Report for Recommendations 2.1 of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident" ADAMS Accession No. ML16104A041
	18.9 ft NGVD29	2.1 ft	21.0 ft NGVD29	
	18.9 ft NGVD29	4.7 ft	23.6 ft NGVD29	



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

Mechanism	Stillwater Elevation	Waves/ Runup	Reevaluated Hazard Elevation	Reference
<p><b>Storm Surge</b> (continued)</p> <p>Combined Event with 150,000 cfs Flow in Hudson River Coincident with PMSS, Including AWL and CWGW – Values Reported at Location East of U2 and U3 Turbine Buildings</p>	<p>18.9 ft NGVD29</p>	<p>0.0 ft</p>	<p>18.9 ft NGVD29</p>	<p>Letter dated April 5, 2016, entitled "Energy Supplement to Basis for Performance of the Mitigating Strategies Assessment with the Flood Hazard Information and Report for Recommendations 2.1 of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident" ADAMS Accession No. ML16104A041</p>

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.

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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,

*/RA/*

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

Docket Nos. 50-247 and 50-286

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ADAMS Accession No.: PKG ML16112A152; LTR: ML16112A172 (PUBLIC); ENCL1: ML16112A368  
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