



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

April 12, 2016

Site Vice President  
Entergy Operations, Inc.  
Waterford Steam Electric Station,  
Unit 3  
17265 River Road  
Killona, LA 70057-3093

SUBJECT: WATERFORD STEAM ELECTRIC STATION, UNIT 3 – INTERIM STAFF  
RESPONSE TO REEVALUATED FLOOD HAZARDS SUBMITTED IN  
RESPONSE TO 10 CFR 50.54(f) INFORMATION REQUEST – FLOOD-  
CAUSING MECHANISM REEVALUATION (CAC NO. MF7125)

Dear Sir or Madam:

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 July 21, 2015 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML15204A321), flood hazard reevaluation report (FHRR) submitted by Entergy Operations, Inc. (Entergy, the licensee) for Waterford Steam Electric Station, Unit 3 (Waterford), 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.

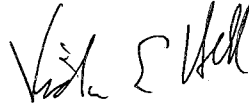
The NRC staff has concluded that the licensee's reevaluated flood hazards information, as summarized in the Enclosure, is suitable for the assessment of mitigating strategies developed in response to Order EA-12-049 (i.e., defines the mitigating strategies flood hazard information described in Nuclear Energy Institute (NEI) guidance document NEI 12-06, "Diverse and Flexible Coping Strategies (FLEX) Implementation Guide") for Waterford, Unit 3. 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 Waterford, Unit 3 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).

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 No. 50-382

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**

<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>  Nuclear Plant Island Structure Internal Ponding Depth at Dry Cooling Tower	1.6 ft Depth	Minimal	1.6 ft Depth	FHRR Sections 2.2, 2.3.1, & Table 4-1
<b>Streams and Rivers</b>  Probable Maximum Flood on Mississippi River  Combined Event: Probable Maximum Flood and Probable Maximum Hurricane coincident with a levee failure at the Mississippi River	27.0 ft MSL  27.6 ft MSL	Not applicable  Not applicable	27.0 ft MSL  27.6 ft MSL	FHRR Section 2.3.1 & Table 4-1  FHRR Sections 2.2, 2.3.1 & Table 4-1
<b>Failure of Dams and Onsite Water Control/Storage Structures</b>  Probable Upstream Dam Failures - Seismically Induced	No Impact on the Site Identified	No Impact on the Site Identified	No Impact on the Site Identified	FHRR Section 2.3.1 & Table 4-1
<b>Storm Surge</b>  Probable Maximum Storm Surge from Gulf of Mexico	18.1 ft MSL	5.6 ft	23.7 ft MSL	FHRR Section 2.3.1 & Table 4-1 FSAR (Rev. 13) Section 2.4
<b>Seiche</b>	No Impact on the Site Identified	No Impact on the Site Identified	No Impact on the Site Identified	FHRR Section 2.3.1 & Table 4-1
<b>Tsunami</b>	No Impact on the Site Identified	No Impact on the Site Identified	No Impact on the Site Identified	FHRR Section 2.3.1 & Table 4-1
<b>Ice-Induced Flooding</b>	No Impact on the Site Identified	No Impact on the Site Identified	No Impact on the Site Identified	FHRR Section 2.3.1 & Table 4-1

**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>Channel Migrations/Diversions</b>				
Cooling Water Canals	No Impact on the Site Identified	No Impact on the Site Identified	No Impact on the Site Identified	FHRR Section 2.3.1 & Table 4-1

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

Note 2: For flooding hazards within the Nuclear Plant Island Structure (NPIS), the licensee reported some flooding hazard levels in terms of ponding depth rather than water surface elevation. The NRC staff accepted the licensee's convention and present this information in terms of ponding depth, where applicable.

**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>				
Waterford Steam Electric Station Yard (Outside of Nuclear Plant Island Structure)	20.5 ft MSL	Minimal	20.5 ft MSL	FHRR 3.1.1.2.4 & Table 4-1
Local Intense Precipitation in Dry Cooling Tower Basins (Ponding)	1.6 ft Depth	Minimal	1.6 ft Depth	FHRR Section 3.1.3 & Table 4-1
<b>Streams and Rivers</b>				
Probable Maximum Flood on Mississippi River	29.9 ft MSL	Not applicable	29.9 ft MSL	FHRR Section 3.2.3 & Table 4-1
<b>Failure of Dams and Onsite Water Control/Storage Structures</b>				
Probable Maximum Flood + Hypothetical Dam Break within the Mississippi River	29.9 ft MSL	Not applicable	29.9 ft MSL	FHRR Section 3.3.2 & Table 4-1
Probable Maximum Flood + Hypothetical Dam Break at WSES Site	20.6 ft MSL	Not applicable	20.6 ft MSL	FHRR Section 3.3.2 & Table 4-1
Probable Maximum Flood + Hypothetical Dam Break within the Mississippi River and Levee Failure (Scenario H.1 at East NPIS)	22.8 ft MSL	4.9 ft	27.7 ft MSL	FHRR Section 3.9.3.1 & Tables 3-30 & 3-31
Probable Maximum Flood + SSE Seismic Dam Failure, Levee Failure, and Induced Wind Waves (Scenario H.2 for Northwest NPIS)	20.8 ft MSL	Not applicable	20.8 ft MSL	FHRR Section 3.9.3.2 & Table 3-31
Probable Maximum Flood + SSE Seismic Dam Failure, Levee Failure, and Induced Wind Waves (Scenario H.2 for East NPIS)	18.9 ft MSL	1.9 ft	20.8 ft MSL	FHRR Section 3.9.3.2 & Table 3-31

**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>Storm Surge</b>				
Probable Maximum Storm Surge from Gulf of Mexico at WSES	21.6 ft MSL	Not applicable	21.6 ft MSL	FHRR Section 3.4.5 & Table 4-1
Combined Event H.3 (Alternative 3): 25-Year Flood in the Mississippi River, Probable Maximum Storm Surge Including Antecedent Water Level, Levee Failure, and Coincident Wind-Generated Waves at Site	26.0 ft MSL	5.8 ft	31.8 ft MSL	FHRR Sections 3.9.3.3 & 3.9.4 & Table 4-1

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: For flooding hazards within the Nuclear Plant Island Structure (NPIS), the licensee reported some flooding hazard levels in terms of ponding depth rather than water surface elevation. The NRC staff accepted the licensee's convention and present this information in terms of ponding depth, where applicable.



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 No. 50-382

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

cc w/encl: Distribution via Listserv

DISTRIBUTION:

PUBLIC	JLD R/F	RidsNRRJLD Resource
VHall, NRR	LQuinn-Willingham, NRO	RidsNroDsea Resource
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RidsRgn4MailCenter Resource	RidsNrrLASLent	RidsOgcMailCenter Resource
RidsOpaMail Resource	RidsAcrsAcnw_MailCtr Resource	CCook, NRO
ARivera-Varona, NRO	KErwin, NRO	ACampbell, NRO
MWillingham, NRO	LHibler, NRO	BHarvey, NRO
MShams, NRR		

ADAMS Accession Nos.: PKG ML16090A313 LTR: ML16090A327 ENCL: ML16091A398 \*via email

OFFICE	NRR/JLD/JHMB/PM	NRR/JLD/LA	NRO/DSEA/RHM1/TR*	NRO/DSEA/RHM1/BC*
NAME	VHall	SLent	LHibler	CCook
DATE	03/31/2016	03/31/2016	03/31/2016	03/31/2016
OFFICE	NRR/JLD/JHMB/BC	NRR/JLD/JHMB/PM		
NAME	MShams	VHall		
DATE	03/31/2016	04/12/2016		

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