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NL-16-035

April 5, 2016

U.S. Nuclear Regulatory Commission  
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SUBJECT: 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  
Indian Point Units 2 and 3  
Docket Nos. 50-247 and 50-286  
License Nos. DPR-26 and 64

REFERENCES: 1. Entergy Letter to NRC, NL-16-029, "Entergy 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," dated March 21, 2016.

Dear Sir or Madam:

The purpose of this letter is to supplement and clarify the information provided in reference 1 consistent with the discussions held with the NRC on March 24, 2016 and the information provided at that time. Please be advised as follows:

1. The value of "3.9 ft. (Wave)", listed in the column labeled "Wave Height/Runup" in the second row of data in Table 1 is a typographical error. The correct value is "3.0 ft. (Wave)". The Reevaluated Hazard Elevation of 21.0 ft. is correct and does not change.
2. In the first two data rows of Table 1, as submitted, the values for "Stillwater Elevation" plus "Wave Height/Runup" did not sum to the "Reevaluated Hazard Elevation" value presented in the fourth column. The reason is that in these two rows, the values presented in the "Wave Height/Runup" column represent the total wave heights (full amplitude) for these locations. The total wave heights were provided for these locations to represent open areas without structures for waves to run up or reflect against. The Reevaluated Hazard Elevation values for these two columns represent the wave crest elevations, which are found by summing the stillwater elevation with the portion of the wave height which is above the stillwater level.

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3. The wave at Location A represents a deepwater wave (i.e., the wave condition within the river near the bulkhead). Fifty percent (50%) of the total height of this wave is above the stillwater level; therefore, the Reevaluation Hazard Elevation was found as follows:

$$18.9 \text{ ft. [stillwater elevation]} + (0.5 \times 5.7 \text{ ft. [total wave height]}) = 21.8 \text{ ft. NGVD29 [rounded up]}$$

4. The wave in the area Between A and B (i.e., the open area of the powerblock yard inboard of the river bulkhead) is a depth-limited wave. Depth-limited waves have a deformed wave form which results in seventy percent (70%) of the total wave height above the stillwater level; therefore the Reevaluation Hazard Elevation was found as follows:

$$18.9 \text{ ft. [stillwater elevation]} + (0.7 \times 3.0 \text{ ft. [total wave height]}) = 21.0 \text{ ft. NGVD29}$$

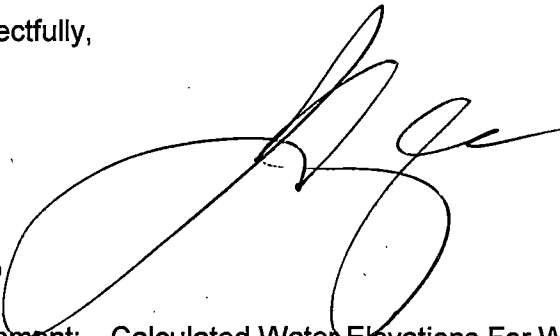
5. The Reevaluated Hazard Elevations for the first two data rows, representing the wave crest elevations for these locations, are reported correctly in Table 1. For all other data rows, the values in the "Wave Height/Runup" represent the height of wave run-up above stillwater level (wave runup or reflection; collectively referred to as runup) on a vertical surface such as a building wall.
- a. The terms "Wave Height" and "Runup" were used in the column heading above the individual table cells to distinguish where information on total wave height or runup was provided in Table 1, as submitted.
  - b. The Reevaluated Hazard Elevations presented in the first two data rows are for areas in or nearer to the river. The Reevaluated Hazard Elevations are lower than the elevations at the Turbine Buildings, which are farther inland, because the elevations reported for the first two data rows are only wave crest elevations whereas the elevations reported at the turbine buildings are the result of wave runup on the vertical walls of the buildings.
6. The Location Between A and B was described as "landward" of the U2 Intake Structure. This was intended to describe the open area of the powerblock yard located inboard of the river bulkhead and generally between the U2 service water pumps and the U2 Turbine Building. The term "riverward," when used to describe Locations B and D, was intended to identify the river-facing (west) portions of the U2 and U3 Turbine Buildings which are exposed to wave action, as opposed to the east sides of the Turbine Buildings which are sheltered from wave action.

The NRC also requested additional information regarding Reevaluated Hazard Elevations at the Intake Structures for Unit 2 and Unit 3. These structures are located adjacent to and inboard (i.e., on the land side) of the bulkhead. The top of the river bulkhead is nominally at elevation 15.0 feet NGVD29; therefore, the top of the bulkhead and surrounding land/paved areas are submerged when the stillwater elevation is at 18.9 ft. NGVD29. The portion of the deepwater wave spectrum with large heights (i.e., greater than the depth limited wave height) will break as they encroach the bulkhead and shallow water. The intake structures, systems, and components are set back from the edge of the bulkhead. The broken wave component of these waves may impact these structures as wave splash and hydrodynamic loads. The portions of the wave spectrum with waves equal to or less than the depth-limited wave height will propagate toward the buildings as unbroken waves and result in run-up at vertical structure faces and hydrostatic and hydrodynamic loads. The maximum runup on these vertical structures will be caused by the depth-limited waves, here with a total wave height of 3.0 feet, resulting in a total run-up of 4.7 feet and a Reevaluated Hazard Elevation of 23.6 feet NGVD29.

A revised version of Table 1, including a row describing the Reevaluated Hazard Elevation for the river-facing (i.e. west) side of any structure inboard of the river bulkhead, including the U2 and U3 Intake Structures, is presented in the Attachment.

There are no new commitments contained in this submittal. If you have any questions regarding this confirmation of receipt, please contact Mr. Robert Walpole, Manager, Regulatory Assurance at (914) 254-6710.

Respectfully,

LC/sp 

Attachment: Calculated Water Elevations For Wind – Wave Activity Effects

cc: Mr. Douglas Pickett, Senior Project Manager, NRC NRR DORL  
Mr. Daniel H. Dorman, Regional Administrator, NRC Region 1  
NRC Resident Inspector  
Mr. John B. Rhodes, President and CEO, NYSERDA  
Ms. Bridget Frymire, New York State Dept. of Public Service

ATTACHMENT 1 TO NL-16-035

CALCULATED WATER ELEVATIONS FOR  
WIND – WAVE ACTIVITY EFFECTS

ENTERGY NUCLEAR OPERATIONS, INC.  
INDIAN POINT NUCLEAR GENERATING UNIT NOS. 2 AND 3  
DOCKET NOS. 50-247 AND 50-286

Table 1: IPEC Hazard Evaluation Summary Table – River Flow of 150,000 cfs

Mechanism Storm Surge	Stillwater Elevation	Wave Height above Stillwater/ Runup above Stillwater	Reevaluated Hazard Elevation	Figure Location (see Reference 1)
H.3 Combined Flood Event - Open Water in River Outboard of River Bulkhead and U2 Intake Structure (See Note 1 below)	18.9 ft NGVD29	2.9 ft	21.8 ft NGVD29	A
H.3 Combined Flood Event - Open Areas of Powerblock Yard between U2 Intake Structure and U2 Turbine Building (See Notes 1 and 3 below)	18.9 ft NGVD29	2.1 ft	21.0 ft NGVD29	Between A and B
H.3 Combined Flood Event River-facing Sides of Structures between the River Bulkhead and the Turbine Buildings (See Notes 2 and 3 below)	18.9 ft NGVD29	4.7 ft	23.6 ft NGVD29	Includes West Sides of U2 and U3 Intake Structures
H.3 Combined Flood Event River-Facing (West) Side of U2 Turbine Building (See Notes 2 and 3 below)	18.9 ft NGVD29	4.7 ft	23.6 ft NGVD29	B
H.3 Combined Flood Event East of U2 Turbine Building (See Note 3 below)	18.9 ft NGVD29	Minimal	18.9 ft NGVD29	C
H.3 Combined Flood Event River-Facing (West) Side of U3 Turbine Building (See Notes 2 and 3 below)	18.9 ft NGVD29	4.7 ft	23.6 ft NGVD29	D
H.3 Combined Flood Event East of U3 Turbine Building (See Note 3 below)	18.9 ft NGVD29	Minimal	18.9 ft NGVD29	E

Notes:

1. Values for Reevaluated Hazard Elevations for Open Water in River Outboard of River Bulkhead and U2 Intake Structure and Open Areas of Powerblock Yard between U2 Intake Structure and U2 Turbine Building describe the top of wave elevations (wave crest elevation) in those open areas where there is no structure for the wave to impact upon.
2. Wave runup on the river-facing side (i.e. west side) structures inboard (i.e., to the east) of the river bulkhead is a result of run-up or reflection of that portion of the wave spectrum propagating inland which is equal to or less than the depth limited wave height.
3. Conservatively, only areas behind the turbine buildings have been designated as sheltered from waves. Other locations and systems may also be locally sheltered, partially or fully, by existing structures on the site. Examples include the Unit 2 and 3 Service Water Pumps.