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

July 26, 2016

Mr. Robert Coffey
Site Vice President
NextEra Energy Point Beach, LLC
6610 Nuclear Road
Two Rivers, WI 54241-9516

SUBJECT: NUCLEAR REGULATORY COMMISSION REPORT FOR THE AUDIT OF NEXTERA ENERGY POINT BEACH, LLC'S FLOOD HAZARD REEVALUATION REPORT SUBMITTALS RELATING TO THE NEAR-TERM TASK FORCE RECOMMENDATION 2.1-FLOODING FOR: POINT BEACH NUCLEAR PLANT, UNITS 1 AND 2 (CAC NOS. MF6100 AND MF6101)

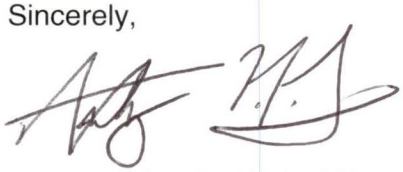
Dear Mr. Coffey:

By letter dated June 4, 2015 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML15153A152), the U.S. Nuclear Regulatory Commission (NRC) informed you of the staff's plan to conduct a regulatory audit of NextEra Energy Point Beach, LLC's (NextEra, the licensee) Flood Hazard Reevaluation Report (FHRR) submittal for Point Beach Nuclear Plant, Units 1 and 2 (Point Beach). The audit was intended to support the NRC staff review of the licensee's FHRR and the subsequent issuance of a staff assessment.

The audit was conducted remotely during the months of June 2015 – November 2015, with one meeting to discuss NRC staff information needs. The NRC staff and NextEra held an exit meeting on November 5, 2015, during which the remaining documentation needs were discussed. The audit was performed consistent with NRC Office of Nuclear Reactor Regulation, Office Instruction LIC-111, "Regulatory Audits," dated December 29, 2008, (ADAMS Accession No. ML082900195). The details of this audit have been discussed with Mr. Jerry Philabaum of your staff.

If you have any questions, please contact me at (301) 415-6185 or by e-mail at Anthony.Minarik@nrc.gov.

Sincerely,



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

Docket Nos. 50-266 and 50-331

Enclosure:
Audit Report

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

NUCLEAR REGULATORY COMMISSION REPORT

FOR THE AUDIT OF NEXTERA ENERGY POINT BEACH, LLC.'S

FLOOD HAZARD REEVALUATION REPORT SUBMITTAL

RELATING TO THE NEAR-TERM TASK FORCE RECOMMENDATION 2.1-FLOODING

FOR POINT BEACH NUCLEAR PLANT, UNITS 1 AND 2

BACKGROUND AND AUDIT BASIS

By letter dated March 12, 2012, the U.S. Nuclear Regulatory Commission (NRC) issued a request for information to all power reactor licensees and holders of construction permits in active or deferred status, pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR), Section 50.54(f), "Conditions of license" (hereafter referred to as the "50.54(f) letter"). The request was issued in connection with implementing lessons-learned from the 2011 accident at the Fukushima Dai-ichi nuclear power plant, as documented in the NRC's Near-Term Task Force report. Recommendation 2.1 in that document recommended that the staff issue orders to all licensees to reevaluate seismic and flooding hazards for their sites against current NRC requirements and guidance. Subsequent staff requirements memoranda associated with SECY-11-0124 and SECY-11-0137, instructed the NRC staff to issue requests for information to licensees pursuant to 10 CFR 50.54(f).

By letter dated March 12, 2015 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML15071A413), NextEra Energy Point Beach, LLC. (NextEra, the licensee) submitted its Flood Hazard Reevaluation Report (FHRR) for Point Beach Nuclear Plant, Units 1 and 2 (Point Beach). The NRC is reviewing the aforementioned submittal and has completed a regulatory audit of NextEra to better understand the development of the submittal, identify any similarities/differences with past work completed, and ultimately aid in its review of licensees' FHRR. This audit summary was completed in accordance with the guidance set forth in NRC Office of Nuclear Reactor Regulation, Office Instruction LIC-111, "Regulatory Audits," dated December 29, 2008 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML082900195).

AUDIT LOCATION AND DATES

The audit was completed remotely over a period of 5 months with one discussion session held on October 29, 2015. The exit meeting was held on November 5, 2015.

Enclosure

AUDIT TEAMS

Title	Team Member	Organization
Team Leader, NRR/JLD	Anthony Minarik	NRC
Branch Chief, NRO/DSEA	Aida Rivera	NRC
Technical Lead	Michael Willingham	NRC
Technical Support	Nebiyu Tiruneh	NRC
Technical Support	Henry Jones	NRC
Technical Support	Vinod Mahat	Argonne National Labs
Technical Support	John Quinn	Argonne National Labs
Technical Lead	Shaun Kline	NextEra (Enercon)
Technical Support	Lori Christensen	NextEra
Corporate Licensing Support	Wayne Miller	NextEra
Corporate Licensing Support	Mark Reiff	NextEra
Technical Support	Brad Fromm	NextEra
Corporate Licensing Support	Jerry Philabaum	NextEra

DOCUMENTS AUDITED

The attachment details all the documents that were reviewed by the NRC staff, in part or in whole, as part of this audit. The documents were located in an electronic reading room during staff review. The documents, or portions thereof, that were used by the staff as part of the technical analysis and/or as reference in the completion of the staff assessment, were submitted by the licensee and docketed, as necessary, as described in the "EXIT MEETING" section.

I. AUDIT ACTIVITIES

In general, the audit activities consisted mainly of the following actions:

- Review background information on site topography and geographical characteristics of the watershed.
- Review site physical features and plant layout.
- Understand the selection of important assumptions and parameters that would be the basis for evaluating the individual flood causing mechanisms described in the 50.54(f) letter.
- Review model input/output files to computer files such as HEC-RAS and FLO-2D to have an understanding of how modeling assumptions were programmed and executed.

Table 1 below provides more detail and summarizes specific technical topics (and resolution) of important items that were discussed and clarified during the audit. The items discussed in Table 1 may be referenced/mentioned in the staff assessment in more detail.

The NRC staff conducted a virtual audit on October 29, 2015, and resolved outstanding issues to the review of the Point Beach FHRR. The licensee provided a draft response by a letter dated November 6, 2015. The resolution of the information needs is described in this audit summary and the staff has determined that the responses provided in the response package dated November 6, 2015, should be docketed to complete the staff assessment report.

EXIT MEETING/BRIEFING:

The NRC staff held an exit meeting via teleconference with the licensee on November 5, 2015. At this meeting the staff laid out the path forward to resolve all issues and request final documentation from the licensee to aid the staff in the documentation of its review.

The staff requested clarification on some of the figures, justification for modeling assumptions, and information presented in the FHRR as well as certain flow depths at specific door locations. In addition, the staff requested figures that were presented during the audit to be submitted on the docket.

This extra documentation was received on November 9, 2015 (ADAMS Accession No. ML15310A170)

Table 1: Sample of Technical Topics of Discussion

Info Need No.	Information Need Description	Post-Audit Status
1	**Comparison of Reevaluated Flood Hazard with Current Design Basis** **Background:** The FHRR provides a comparison of the reevaluated flood hazards with the current licensing basis (CLB) instead of the current-design basis (CDB) as required in the 50.54(f) letter. The hazard comparison in Section 5 of the FHRR and the tabulated summary comparison presented in Table 5.1 are all based on CLB instead of CDB. **Request**: Clarify the comparison of the reevaluated flood hazard to the current design bases.	The licensee addressed the staff's concerns with the response given below. This issue is considered resolved upon receipt of additional information (NOTE: This information was received on November 9, 2015). "All subsections within FHRR Section 5 compare the CDB flood elevations to the reevaluated flood hazards at Point Beach Nuclear Power Plant (PBNP). For the postulated flooding events, PBNP does not differentiate between CDB and CLB. The CDB and CLB can be considered synonymous for postulated flooding."
2	**Local Intense Precipitation - Figures** **Background**: FHRR text in Section 4.1.7 discusses model results and includes the description of the use of scenarios with and without wave barriers. Figures throughout the FHRR do not clearly indicate the location of the wave barriers described in Section 4.1.7. Figure 4.8 does show the barriers, but groups them with other temporary structures. Section 3.9 calls out Figure 4.5 to indicate the wave barriers, but does not seem to show them. Figure 6.6 and 7.3 in the "FLO-2D Evaluation of Local Intense Precipitation (LIP) Calculation" (Enercon, 2014b) refer to the wave barriers as "CPWH" Door Barriers. **Request**: The licensee is requested to update any relevant figures in the FHRR to distinguish the locations and areal extents of temporary wave barriers accurately. Please also make door numbers more legible in FHRR Figure 4.5. Also consider revising the LIP Calculation (Enercon, 2014b) figures to use consistent naming schemes between text and figures.	The licensee addressed the staff's concerns with the response given below. This issue is considered resolved upon receipt of additional information (NOTE: This information was received on November 9, 2015). In the FHRR, Figure 4.5 has been revised to improve the display of the door numbers. A specific callout in FHRR Figure 4.8, separate from the temporary structures, was made for the wave/door barriers. Those barriers were included as temporary structures previously in Figure 4.8 but not specifically identified. Revised FHRR Figure 4.5 and Figure 4.8 are provided on the following pages. The legends in Figure 6.6 and Figure 7.3 of FPL-076-FHRCALC-011, Revision 1 "FLO-2D Evaluation of Local Intense Precipitation (LIP) Calculation" (Enercon, 2015) have been edited to "Wave/Door Barrier." Note that "wave barrier" and "door barrier" were used interchangeably in the calculation since the placed barriers were a wave and flood defense for the adjacent Circulating Water Pump House (CWPH) doors." The licensee also attached Figure 4.5 PBNP Door Locations and Figure 4.8 LIP Maximum Flow Depths – Scenario B.

Info Need No.	Information Need Description	Post-Audit Status
3	**Local Intense Precipitation - Temporary Structures** **Background**: Figure 6.13 in the "FLO-2D Evaluation of Local Intense Precipitation (LIP) Calculation" (Enercon, 2014b) indicates the reduction in areas of two temporary structures or possible laydown areas for two of the sensitivity model runs. It is unclear what type of feature these temporary structures or laydown areas represent. **Request**: The licensee is requested to provide clarification on what features these temporary structures represent, and justification for the reduction percentage chosen by the licensee for the sensitivity analysis.	The licensee addressed the staff's concerns with the response given below. This issue is considered resolved. "The reduced areas of the two temporary structures/laydown areas, shown in Figure 6.13 (Figure 1 in this response) in FPL-076-FHRCALC-011 "FLO-2D Evaluation of Local Intense Precipitation (LIP) Calculation" (Enercon, 2015) were selected for the sensitivity analysis because they were located in areas that experienced significant ponding during the LIP event. Each area represented possible equipment laydown areas at the site. No permanent structures are located in these temporary structure footprints. The areas were subjectively condensed for the sensitivity analysis to determine the effect on maximum Water Surface Elevations (WSELs) and flood duration. Conclusions in the FHRR are based on unreduced areas, as these sensitivity runs were only performed for information." The licensee also attached Figure 1 – Reduced Temporary Structures (Enercon, 2015) Note: if the reduced area is used for sensitivity it would logically result in higher flow depths for a given flow rate/volume in a given time.
4	**Local Intense Precipitation - Wave Barrier Height** **Background**: In the FHRR, Section 4.1.7 details that the wave barriers in Scenario B are incorporated into the FLO-2D model by increasing the elevation of the cells adjacent to the CWPH where wave barrier would be installed by 3.5 ft. Section 3.2.1 of the walkdown staff assessment (NRC, 2014) reports temporary jersey barriers are to be placed to protect equipment up to 9 ft-Plant Datum if the Lake elevation is above 580.7 ft NAVD88. This is restated by the licensee in Section 3.9 of the FHRR. NRC staff reviewed the FLO-2D input files and noticed that in the *Elevation at Cell* shape files for Scenario B (OWBQ4), the grid cells corresponding to wave barriers as indicated in Figure 6.6 of the LIP Calculation, correspond to an elevation of 10.5-Plant Datum.	The licensee addressed the staff's concerns with the response given below. This issue is considered resolved. "The jersey barriers noted in the walkdown (NRC, 2014) are no longer used to protect against CLB wave runup. The height of the wave/door barriers were documented in Design Information Transmittal (DIT) number NPC 2014-00214 and also stated in FPL-076-FHRCALC-011 "FLO-2D Evaluation of Local Intense Precipitation (LIP) Calculation" (Enercon, 2015). The document indicates the wave/door barriers will have a height of 3.5 ft. The ground elevation file used in FLO-2D for the original fourth quartile (OQ4) without wave/door barriers is illustrated in Figure 2. The area where the wave/door barriers are located (outlined in red) is at an elevation of approximately +7 ft-Plant Datum (+588.3 ft-NAVD88) (Enercon, 2015). The elevation files used in FLO-2D for the combination of the barrier heights with the existing elevation from the

Info Need No.	Information Need Description	Post-Audit Status
	Request: Clarify that the use of 10.5ft-Plant Datum for the wave barrier installation is consistent with the planned temporary barriers in response to high Lake elevations.	fourth quartile (OWBQ4) is +10.5 ft-Plant Datum (+591.5 ft-NAVD88) (Enercon, 2015) (Figure 2)." The licensee also attached Figure 2 – Scenario A (without wave barrier/OQ4 FLO-2D Model Elevations (Enercon, 2015).
5	**Local Intense Precipitation - Elevation modifications** **Background**: The licensee stated in the FHRR that the elevations of the grid cells to the east of the Turbine Building (TB) were manually set at 589.3 ft NAVD88 (+8ft-Plant Datum) for reasons of accurately determining flood elevations and model stability. **Request**: Staff requests more information on the modification of the Digital Terrain Model (DTM) to 589.3 ft NAVD88 (+8ft-Plant Datum). Specifically, what was the original elevation and why was that elevation unacceptable for accuracy and model stability?	The licensee responded as follows. "Figure 3 shows the unaltered elevation data for the area east of the Turbine Building. The elevation cells within the black outline were manually set to +8 ft-Plant Datum (+589.3 ft-NAVD88). The ground elevations in that area range from approximately +7.0 ft-Plant Datum to +8.4 ft-Plant Datum Based on the construction drawings of the Turbine Building (NEE, 2014c), the floor at the east end of the building (where Doors 1, 2, 4, 11 and 13 are located (Figure 3) are at an elevation of +8 ft-Plant Datum. The model cells adjacent to these doors, interpolated from site survey data, were at elevations other than +8 ft-Plant Datum originally. To properly represent the door elevations, all the cells within the black outline were manually adjusted to +8 ft-Plant Datum. Although the manual alteration of grid cell elevations changes the surface topography, it does so in a conservative manner. In most of the area, storage capacity was removed by increasing the cell elevation to +8 ft-Plant Datum, which would (slightly) increase the maximum LIP WSELs." Staff has held additional discussions about the manual alterations and the issue is considered resolved.

Info Need No.	Information Need Description	Post-Audit Status
6	**Local Intense Precipitation - Topography accuracy** **Background**: In Section 1.1 of the FLO-2D Bathymetry and Topography Calculation (Enercon, 2014a), the licensee states that "The topography output datasets from this calculation will be reviewed to ensure accuracy is within the limits of the original dataset". **Request**: Please note and confirm the accuracy of the topography.	The licensee addressed the staff's concerns with the response given below. This issue is considered resolved. "The 95% confidence interval of vertical survey error was estimated to be ±0.1 ft (AECOM, 2014). In development of the LIP-FLO-2D model, ENERCON reviewed the model topography (i.e., output from FPL-076-FHRCALC-001 revision 0 "FLO-2D Bathymetry and Topography Calculation") and found comparable accuracy. The manually adjusted cells (see Response to Information Need 5) were not considered in this review."
7	**Local Intense Precipitation - Conditions for temporary barriers** **Background**: In Scenario B, temporary wave barriers near the CWPH are considered. These concrete barriers and sandbags would likely be set up during a period of high lake levels. **Request**: Staff requests justification on why high lake levels were not also included in the model of this scenario.	The licensee addressed the staff's concerns with the response given below. This issue is considered resolved. "The temporary wave/door barriers near the CWPH were considered in Scenario B simulations in Calculation FPL-076-FHRCALC-011, "FLO-2D Evaluation of Local Intense Precipitation (LIP) Calculation" (Enercon, 2015). However, the high Lake Michigan level of +1.8 ft-Plant Datum, determined in Calculation FPL-076-FHRCALC-005, "100-Year Lake Michigan Water Levels Calculation." (Enercon, 2014), was not incorporated into the FLO-2D runoff model. The DTM used in FPL-076-FHRCALC-011 (Enercon, 2015) is shown in Figure 4. The elevations were reclassified to illustrate clearly the high lake level contour of +1.8 ft-Plant Datum (Enercon, 2014). The high lake level of +1.8 ft-Plant Datum was not used in the FLO-2D runoff model since site grade and associated features are at least 3 feet higher than the high lake level. Accordingly, the elevated lake level would have no appreciable effect on site runoff (Figure 4), as the runoff from the site grade would flow freely down to the beach and into the Lake, as stated in FPL-076-FHRCALC-011 Section 6.3.4 "Outflow Nodes" (Enercon, 2015). The FLO-2D boundary is shown in Figure 5, originally FPL-076-FHRCALC-011 Figure 6.1 (Enercon, 2015)." The licensee also attached Figure 4 – DTM Used in FLO-2D Model and Figure 5 – PBNP Site with FLO-2D Boundary (Enercon, 2015)

List of References Reviewed by the NRC

FHRR References
LIP Flooding Evaluation FLO-2D Simulation Model Computer Files.
Enercon Services, Inc. (ENERCON), Calculation FPL-076-FHRCALC-001, Revision 0, "FLO-2D Bathymetry and Topography Calculation," (2014).
Enercon Services, Inc., Calculation FPL-076-FHRCALC-011, "FLO-2D Evaluation of Local Intense Precipitation (LIP) Calculation" (2014).
Enercon Services, Inc., Calculation FPL-076-FHRCALC-016, "Hydrostatic, Hydrodynamic, Sediment and Debris Loading Calculation" (2014).
Enercon Services, Inc., Calculation FPL-076-FHRCALC-011, Revision 02, "Point Beach Nuclear Plant, Units 1 and 2 Flooding Hazards (2015).
NextEra Energy (NEE), "DIT Answering FHR Modeling Questions," Design Information Transmittal NPC 2014-00188, May 28, 2014.
NextEra Energy (NEE), "CWPH Door Barrier Topography," Design Information Transmittal NPC 2014-00214, July 3, 2014.
NextEra Energy (NEE), "Design Drawings Marked to Indicate Doors of Interest," Internal Document (2014).
NextEra Energy (NEE), "Design Information for Calculation FPL-076-FHRCALC-017," Design Information Transmittal NPC 2014-00079, February 13, 2014.
NextEra Energy (NEE), "Data on Yard Drain System Details," Design Information Transmittal DIT-PB-EXT-0723-00, October 22, 2014.
Email from Matthew LeMay to James Knighton, "FW: Calc 19 Temp Structure Areas," May 7, 2014.
Email from Mark Reiff to Shaun Kline, "FW: 13.8 kV Switchgear Building – LIP Max Depths and Time Series," December 18, 2014.

If you have any questions, please contact me at (301) 415-6185 or by e-mail at Anthony.Minarik@nrc.gov.

Sincerely,

/RA/

Anthony Minarik, Project Manager
Hazards Management Branch
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Office of Nuclear Reactor Regulation

Docket Nos. 50-266 and 50-331

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