



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

October 1, 2015

Mr. Mano Nazar  
President and Chief Nuclear Officer  
Nuclear Division  
NextEra Energy  
P.O. Box 14000  
Juno Beach, FL 33408-0420

SUBJECT: NUCLEAR REGULATORY COMMISSION REPORT FOR THE AUDIT  
OF FLORIDA POWER AND LIGHT COMPANY'S FLOOD HAZARD  
REEVALUATION REPORT SUBMITTALS RELATING TO THE NEAR-TERM  
TASK FORCE RECOMMENDATION 2.1-FLOODING FOR ST. LUCIE PLANT,  
UNITS 1 AND 2 (TAC NOS. MF6113 AND MF6114)

Dear Mr. Nazar:

By letter dated June 1, 2015 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML15147A591), the U.S. Nuclear Regulatory Commission (NRC) informed you of the staff's plan to conduct a regulatory audit of Florida Power and Light Company's (the licensee, FPL) Flood Hazard Reevaluation Report (FHRR) submittals related to the Near-Term Task Force Recommendation 2.1-Flooding. The audit was intended to support the NRC staff review of the licensees FHRRs and the subsequent issuance of a staff assessment.

The audit was conducted on July 23, 2015, and was performed consistent with NRC Office of Nuclear Reactor Regulation, Office Instruction LIC-111, "Regulatory Audits," dated December 29, 2008, (ADAMS Accession No. ML082900195). Therefore, the purpose of this letter is to provide you with the final audit report, which summarizes and documents the NRC's regulatory audit of FPL's FHRR submittals. The details of this audit have been discussed with Mr. Ken Frehafer of your staff.

M. Nazar

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

Sincerely,

A handwritten signature in black ink, appearing to read 'AM', is positioned above the typed name and title.

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

Docket Nos. 50-335 and 50-389

Enclosure:  
Audit Report

cc w/encl: Distribution via Listserv



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
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U.S. NUCLEAR REGULATORY COMMISSION AUDIT REPORT FOR THE AUDIT OF  
FLORIDA POWER AND LIGHT COMPANY'S FLOOD HAZARD REEVALUATION  
REPORT SUBMITTALS RELATING TO THE  
NEAR-TERM TASK FORCE RECOMMENDATION 2.1-FLOODING FOR  
ST. LUCIE 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 Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident. Recommendation 2.1 in that document recommended that the NRC staff issue orders to all licensees to reevaluate seismic and flooding for their sites against current NRC requirements and guidance. Subsequent Staff Requirements Memoranda associated with Commission Papers 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 10, 2015, Florida Power and Light Company (FPL, the licensee) submitted its Flood Hazard Reevaluation Reports (FHRRs) for St. Lucie Plant, Units 1 and 2 (St. Lucie) (Agencywide Documents Access and Management System (ADAMS) Accession Package No. ML15083A306). The NRC is in the process of reviewing the aforementioned submittals and has completed a regulatory audit of FPL to inform the licensee of its development of the submittals, identify any similarities/differences with past work completed and ultimately aid in its review of licensees' FHRRs. This audit summary is being 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 (ADAMS Accession No. ML082900195).

AUDIT LOCATION AND DATES

The audit was completed by document review via electronic reading room and teleconference on July 23, 2015, from 9:00 am to 10:00 am.

Enclosure

AUDIT TEAMS

<b>Title</b>	<b>Team Member</b>	<b>Organization</b>
Team Leader, NRR/JLD	Anthony Minarik	NRC
Branch Chief, NRO/DSEA	Christopher Cook	NRC
Technical Lead	Laura Quinn-Willingham	NRC
Technical Support	Peter Chaput	NRC
Technical Support	Henry Jones	NRC
Technical Support	Christopher Bender	Taylor Eng./NRC Support

DOCUMENTS AUDITED

Attachment 1 of this report contains a list, which 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 the NRC 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 for transparency and completeness of information, as necessary. They are identified in Table 1.

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 Delft-3D and FLO-2D to have an understanding of how modeling assumptions were programmed and executed

Table 1 on the following page, 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.

Table 1: Sample of Technical Topics of Discussion

Info Need No.	Information Need Description	Post-Audit Status
1	<p><b><u>All Flood Causing Mechanisms – Comparison of Reevaluated Flood Hazard with Current Design-Basis</u></b></p> <p><u>Background:</u> The FHRR for the St Lucie site provides comparisons of the reevaluated flood hazards with the current licensing basis (CLB) for all flood causing mechanisms for which a CLB had been established in Section 3.0. In FHRR Section 5.14 of the report is a summary of this comparison. The 50.54(f) letter requested a comparison with the current design-basis.</p> <p><u>Request:</u> The licensee is requested to provide clarification regarding the inconsistencies identified in the FHRR with regard to the comparison of the reevaluated flood hazard to the current design-basis and submit a revised hazard comparison consistent with the instructions provided in the 50.54(f) letter.</p>	<p>The licensee stated that the current design-basis and CLB values are the same, therefore the NRC Staff can interpret mentioning of the CLB as the current design-basis in the FHRR. The NRC staff accepts this response as sufficient and the issue resolved, therefore no substantial discussion was needed during the audit. However, the NRC did request that the licensee provide a letter stating this explanation on the docket.</p>
2	<p><b><u>Local Intense Precipitation</u></b></p> <p><u>Background:</u> The FHRR presents a local intense precipitation (LIP) flood reevaluation using a grid size of 20-feet in the FLO-2D model. This approach may not capture the potentially most conservative and bounding flood condition resulting from precipitation events of different magnitude and duration.</p> <p><u>Request:</u> Provide justification that the 20-foot grid size described FHRR is bounding in terms of flood depth. This justification should include sensitivity analysis of LIP event for grid sizes less than 20-feet (e.g. 10-feet, 5-feet).</p>	<p>The licensee discussed that the 20-feet by 20-feet resolution is sufficient for the flow conditions. During the audit, the licensee provided additional discussion regarding how vehicle barrier systems and other obstructions were modeled with this grid size. Additional discussion regarding durations have been made irrelevant by LIP duration white paper.</p>

Info Need No.	Information Need Description	Post-Audit Status
3	<p><b><u>Local Intense Precipitation</u></b>  <u>Background:</u> The FHRR includes Figure 4-6, Points of Interest (POI), and Figure 4-7, Maximum Water Depths at POIs for All Simulations, which combined locate the openings to safety related structures and the LIP time-depth plots at selected locations. This information focuses on specific points at the site, and may not provide enough information regarding overall areas of LIP flooding concern. This type of graphical information could be used to determine where to focus mitigating strategies, interim actions and other flood mitigation and protection activities (e.g. improving drainage along a building rather than installing multiple flood doors).</p> <p><u>Request:</u> Provide detailed figures or maps of the flooding depths that result from LIP flooding across the entire site, rather than depths and elevations at select locations. The figures or maps can only be for the LIP event that produces the greatest flooding depth.</p>	<p>The licensee directed staff to the figures in calculation package FPL-072-CALC-003 "Local Intense Precipitation (LIP) Flooding Calculation", Revision 1, Section 7, Attachment A. During the audit, NRC staff explained that the information was being requested to assist in the completion of the staff assessment. The NRC staff informed the licensee that docketing of the final LIP analysis FLO-2D output files would be necessary for the NRC Staff to document its review of the LIP analysis. The NRC staff has no further issues on this topic.</p>

**EXIT MEETING/BRIEFING:**

On July 23, 2015, the NRC staff closed out the discussion of the technical topics described above. The NRC staff determined the information that would need to be provided to resolve some of the items discussed during the audit and the licensee agreed to provide the information as soon as possible. This information included the following:

- 1) An explanation via letter that references to the current licensing basis in the FHRR could be taken to mean the current design-basis.
- 2) The FLO-2D output files related to the final LIP analysis.

## ATTACHMENT 1

<b>FHRR Reference Lists</b>
FPL-072-CALC-001, FLO-2D Bathymetry and Topography Processing Calculation, Rev. 1
FPL-072-CALC-002, Local Intense Precipitation Rainfall Distribution Calculation, Rev. 1
FPL-072-CALC-003, Local Intense Precipitation (LIP) Flooding Calculation, Rev. 1
FPL-072-CALC-004, DELFT3D BATHYMETRY AND TOPOGRAPHY CALCULATION
FPL-072-CALC-005, REGIONAL HURRICANE CLIMATOLOGY CALCULATION
FPL-072-CALC-006, PROBABLE MAXIMUM STORM (PMS) PARAMETERS AND STORM TRACKS CALCULATION
FPL-072-CALC-007, 10% EXCEEDANCE HIGH AND LOW TIDES CALCULATION
FPL-072-CALC-008, SEA LEVEL RISE CALCULATION
FPL-072-CALC-009, DELFT3D SURGE MODEL GEOMETRY CALCULATION
FPL-072-CALC-010, DELFT3D SURGE MODEL CALIBRATION
FPL-072-CALC-011, PROBABLE MAXIMUM STORM SURGE (PMSS) CALCULATION
FPL-072-CALC-012, SEICHE CALCULATION
FPL-072-CALC-013, PROBABLE MAXIMUM STORM SURGE (PMSS) WAVE RUNUP AND COMBINED EFFECTS CALCULATION
FPL-072-CALC-017, PROBABLE MAXIMUM STORM SURGE - HYDROSTATIC, HYDRODYNAMIC, DEBRIS, AND SEDIMENTATION LOADING CALCULATION

M. Nazar

- 2 -

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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**ADAMS Accession No.: ML15273A209**

<b>OFFICE</b>	NRR/JLD/JHMB/PM	NRR/JLD/JHMB/LA	NRR/JLD/JHMB/BC	NRR/JLD/JHMB/PM
<b>NAME</b>	AMinarik	SLent	MShams	AMinarik
<b>DATE</b>	10/1/2015	10/1/2015	10/1/2015	10/1/2015

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