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UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
245 PEACHTREE CENTER AVENUE NE, SUITE 1200
ATLANTA, GEORGIA 30303-1257

September 24, 2014

EA-14-131

Mr. Mano Nazar
Executive Vice President
Nuclear and Chief Nuclear Officer
Florida Power and Light Company
P.O. Box 14000
Juno Beach, FL 33408-0420

SUBJECT: ST. LUCIE PLANT – NRC INSPECTION REPORT 05000335/2014009 AND
05000389/2014009; PRELIMINARY WHITE FINDING AND APPARENT
VIOLATIONS

Dear Mr. Nazar:

On September 24, 2014, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at St. Lucie Plant Units 1 and 2. The purpose of the inspection was to conduct a review of the following licensee event reports (LERs):

- LER 05000335, 389/2012-010, “Degraded Manhole Conduit Seals Bypassed External Flood Protection,” Supplement 1
- LER 05000335/2014-001, “Internal RAB Flooding During Heavy Rain Due to Degraded Conduits Lacking Internal Flood Barriers,” Supplements 0, 1 and 2

This inspection examined activities conducted under your license as they relate to safety and compliance with the Commission’s rules and regulations and with the conditions in your license. Within these areas, the inspection consisted of an examination of selected procedures and representative records, observations of activities, and interviews with personnel.

The enclosed report presents the results of this inspection. A final exit briefing was conducted with Mr. Joseph Jensen, St. Lucie Site Vice President, and other members of your staff on September 24, 2014.

Based on the results of this inspection, the report discusses a finding that has preliminarily been determined to be of low to moderate safety significance (White), which may require additional inspections, regulatory actions, and oversight. As described in Section 4OA3.1 of the enclosed report, Florida Power and Light (FPL) failed to implement measures to ensure the watertight integrity of the Unit 1 reactor auxiliary building (RAB) below the design basis flood elevation when electrical conduits that penetrated the RAB wall were installed without internal flood barriers. The failure to maintain the watertight integrity of the Unit 1 RAB resulted in a condition

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where a design basis external flood event would challenge the operability of safety-related equipment. This was evident when, on January 9, 2014, the St. Lucie site experienced a period of heavy rainfall, and approximately 50,000 gallons of water entered the -0.5 foot elevation of the RAB through two degraded conduits in the emergency core cooling system (ECCS) pipe tunnel. This finding does not present an immediate safety concern because the missing conduit internal flood barriers were installed following discovery of the condition. This finding was assessed based on the best available information, using the NRC's significance determination process (SDP). The basis for the NRC's preliminary significance determination is described in the enclosed report. Please be advised that the number and characterization of apparent violations described in the enclosed inspection report may change as a result of further NRC review. You will be advised by separate correspondence of the results of our deliberations on this matter. The NRC will inform you in writing when the final significance has been determined. Additionally, if you disagree with the cross-cutting aspect assignment in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your disagreement, to the Regional Administrator, Region II; and the NRC resident inspector at the St. Lucie Plant.

The finding is also associated with apparent violations of NRC requirements and is being considered for escalated enforcement action in accordance with the Enforcement Policy, which appears on the NRC's Web site at <http://www.nrc.gov/about-nrc/regulatory/enforcement/enforce-pol.html>. We intend to complete and issue our final safety significance determination within 90 days from the date of this letter. The NRC's significance determination process is designed to encourage an open dialogue between your staff and the NRC; however, the dialogue should not affect the timeliness of our final determination.

Before the NRC makes a final decision on this matter, you may choose to (1) attend a regulatory conference, where you can present to the NRC your point of view on the facts and assumptions used to arrive at the finding and assess its significance, or (2) submit your position on the finding to the NRC in writing. If you request a regulatory conference, it should be held within 30 days of your receipt of this letter. We encourage you to submit supporting documentation at least one week prior to the conference in an effort to make the conference more efficient and effective. If you choose to attend a regulatory conference, it will be open for public observation. The NRC will issue a public meeting notice and press release to announce the conference. If you decide to submit only a written response, it should be sent to the NRC within 30 days of your receipt of this letter. If you choose not to request a regulatory conference or to submit a written response, you will not be allowed to appeal the NRC's final significance determination.

The enclosed inspection report also discusses one additional apparent violation identified during the inspection and is also being considered for escalated enforcement action in accordance with the NRC's Enforcement Policy on traditional enforcement. As described in Section 4OA3.2 of the enclosed report, an apparent violation of 10 CFR 50.9(a), "Completeness and Accuracy of Information," was identified for the failure to provide the NRC with complete and accurate information regarding the safety impact of Unit 1 and Unit 2 degraded and missing flood barriers following flood protection walkdowns that were performed at St. Lucie in 2012.

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Before the NRC makes its enforcement decision on this matter, we are providing you an opportunity to: 1) respond to the apparent violation addressed in this inspection report within 30 days of the date of this letter, 2) request a Pre-decisional Enforcement Conference (PEC), or 3) request Alternative Dispute Resolution (ADR). If a PEC is held, it will be open for public observation and the NRC will issue a press release to announce the time and date of the conference. A PEC should be held within 30 days and an ADR session within 45 days of the date of this letter.

If you choose to provide a written response, it should be clearly marked as a “Response to Apparent Violations in NRC Inspection Report 05000335/2014009 and 05000389/2014009; EA-14-131” and should include for each apparent violation: 1) the reason for the apparent violation or, if contested, the basis for disputing the apparent violation, 2) the corrective steps that have been taken and the results achieved, 3) the corrective steps that will be taken, and 4) the date when full compliance will be achieved. Your response may reference or include previously docketed correspondence, if the correspondence adequately addresses the required response. If an adequate response is not received within the time specified or an extension of time has not been granted by the NRC, the NRC will proceed with its enforcement decision or schedule a PEC.

If you choose to request a PEC, the conference will afford you the opportunity to provide your perspective on these matters and any other information that you believe the NRC should take into consideration before making an enforcement decision. The decision to hold a PEC does not mean that the NRC has determined that a violation has occurred or that enforcement action will be taken. This conference would be conducted to obtain information to assist the NRC in making an enforcement decision. The topics discussed during the conference may include information to determine whether a violation occurred, information to determine the significance of a violation, information related to the identification of a violation, and information related to any corrective actions taken or planned.

In lieu of a PEC, you may also request ADR with the NRC in an attempt to resolve this issue. ADR is a general term encompassing various techniques for resolving conflicts using a neutral third party. The technique that the NRC has decided to employ is mediation. Mediation is a voluntary, informal process in which a trained neutral (the “mediator”) works with parties to help them reach resolution. If the parties agree to use ADR, they select a mutually agreeable neutral mediator who has no stake in the outcome and no power to make decisions. Mediation gives parties an opportunity to discuss issues, clear up misunderstandings, be creative, find areas of agreement, and reach a final resolution of the issues. Additional information concerning the NRC's program can be obtained at <http://www.nrc.gov/about-nrc/regulatory/enforcement/adr.html>. The Institute on Conflict Resolution (ICR) at Cornell University has agreed to facilitate the NRC's program as a neutral third party. Please contact ICR at 877-733-9415 within 10 days of the date of this letter if you are interested in pursuing resolution of these issues through ADR.

Please contact David Dumbacher at (404) 997-4748, within 10 days from the issue date of this letter to notify the NRC of your intentions. If we have not heard from you within 10 days, we will continue with our significance determination and enforcement decision. Because the NRC has not made a final determination in this matter, no notice of violation is being issued for this inspection finding and the apparent violations at this time. In addition, please be advised that

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the number and characterization of the apparent violations may change based on further NRC review. You will be advised by separate correspondence of the results of our deliberations on this matter.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosures, and your response, if you choose to provide one, will be made available electronically for public inspection in the NRC Public Document Room or from the NRC's Agencywide Documents Access and Management System (ADAMS), accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html>. To the extent possible, your response should not include any personal privacy, proprietary, or safeguards information so that it can be made available to the Public without redaction.

If you have any questions concerning this matter, please contact David Dumbacher of my staff at (404) 997-4748.

Sincerely,

/Mark Lesser RA for/

Joel T. Munday, Director
Division of Reactor Projects

Docket Nos. 50-335, 50-389
License No. DPR-67, NPF-16

Enclosures:

1. NRC Inspection Reports 05000335/2014009 and 05000389/2014009
w/Attachment: Supplemental Information
2. Detailed Risk Assessment w/Attachments: External Flood Vulnerability due to Reactor
Auxiliary Building Conduit Penetrations

cc w/encl: See page 5

cc w/o encl: Distribution via ListServ

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/Mark Lesser RA for/

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cc w/encl:

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Letter to Mano Nazar from Joel T. Munday dated September 24, 2014.

SUBJECT: ST. LUCIE PLANT – NRC INSPECTION REPORT 05000335/2014009 AND
05000389/2014009; PRELIMINARY WHITE FINDING AND APPARENT
VIOLATIONS

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U.S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket Nos: 50-335, 50-389

License Nos: DPR-67, NPF-16

Report Nos: 05000335/2014009, 05000389/2014009

Licensee: Florida Power & Light Company (FP&L)

Facility: St. Lucie Plant, Units 1 & 2

Location: 6501 South Ocean Drive
Jensen Beach, FL 34957

Dates: April 1, 2014 to September 24, 2014

Inspectors: T. Morrissey, Senior Resident Inspector
J. Reyes, Resident Inspector

Approved by: David Dumbacher, Chief (Acting)
Reactor Projects Branch 3
Division of Reactor Projects

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Enclosure 1

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SUMMARY OF FINDINGS

IR 05000335/2014009, 05000389/2014009; 04/01/2014 – 09/24/2014; St. Lucie Nuclear Plant, Units 1 & 2; Follow-up of Events and Notice of Enforcement Discretion

The resident inspectors performed a review of the events and the licensee's corrective actions associated with licensee event report (LER) 05000335/2014-001 (including Supplements 1 and 2) and LER 05000335, 389/2012-010 (Supplement 1). The significance of inspection findings are indicated by their color (i.e., greater than Green, or Green, White, Yellow, or Red) and determined using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process," (SDP) dated June 2, 2011. The cross-cutting aspect was determined using IMC 0310, "Aspects Within the Cross-Cutting Areas," dated December 19, 2013. All violations of NRC requirements were dispositioned in accordance with the NRC's Enforcement Policy dated July 9, 2013. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 5.

NRC-Identified and Self-Revealing Findings

Cornerstone: Mitigating Systems

TBD: Self-revealing apparent violations (AV) of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," and Criterion XVI, "Corrective Action," were identified for the failure to install internal flood barriers in conduits that penetrated the Unit 1 reactor auxiliary building (RAB) exterior wall at elevations below the design flood height; and the failure to identify those missing flood barriers during flooding walkdowns performed in response to the NRC's "Request for Information Pursuant to Title 10 of the *Code of Federal Regulations* 50.54(f) Regarding Recommendations 2.1, 2.3, and 9.3, of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident," dated March 12, 2012. The licensee's failure to implement measures to ensure the watertight integrity of the Unit 1 RAB below the design basis flood elevation was a performance deficiency. The licensee installed internal flood barriers in the conduits and entered the issues into the corrective action program as action request (AR) 1941159 and AR 1943185.

The performance deficiency was more than minor because it was associated with the protection against external factors attribute of the mitigating systems cornerstone and adversely affected the cornerstone objective of ensuring availability, reliability, and capability of systems that respond to initiating events. Specifically, the failure to maintain the watertight integrity of the Unit 1 RAB resulted in a condition where a design basis external flood event would challenge the operability of safety-related equipment. The inspectors screened the finding using Inspection Manual Chapter 0609, "Significance Determination Process," Attachment 4 and Appendix A (June 19, 2012). The inspectors determined the finding was associated with the mitigating systems cornerstone and required a detailed risk evaluation because the performance deficiency affected more than one train of systems used to support the risk significant functions associated with external flood protection. Inspection Manual Chapter 0609, Appendix M, "Significance Determination Process Using Qualitative Criteria,"

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Enclosure 1

(April 12, 2012) was used to assess the significance. The analyst performed a bounding quantification of the risk then identified various qualitative factors that could affect the final values, either increasing or decreasing the preliminary significance determination. The dominant risk scenario was a postulated event where the plant is operating at power when a significant rainfall event occurs, a reactor trip occurs, the performance deficiency causes emergency core cooling system (ECCS) tunnel flooding, and the floor drain valves in the RAB that isolate the ECCS rooms during a flooding event fail to close allowing water to flow unobstructed and submerge all of the ECCS pumps. After 24 hours, the plant would not achieve a 'safe and stable' condition and core damage would normally be assumed because all reactor coolant system (RCS) injection capability was lost, unless some recovery action was successful. The analyst calculated a factor to apply which would represent the likelihood that the licensee could recover some RCS makeup capability after several days before core uncover. The calculated overall risk ranged from 3E-6/year to 1E-5/year and the preliminary risk significance of the finding was determined to be low to moderate safety significance (i.e. White) when other qualitative factors were considered. The inspectors concluded that the finding was associated with the design margin aspect (H.6) of the human performance area because the licensee did not maintain external flood protection design margin by ensuring that penetrations in the Unit 1 RAB were waterproofed below the design basis flood elevation. (Section 4OA3.1)

Other Findings

TBD: The licensee identified an apparent violation (AV) of 10 CFR 50.9(a), "Completeness and Accuracy of Information," for the failure to provide the NRC with complete and accurate information regarding the safety significance of degraded and missing penetration seals that were identified on electrical conduits and piping that passed through exterior walls of the Unit 1 and Unit 2 reactor auxiliary buildings (RABs). Specifically, the licensee failed to identify missing flood barriers on the Unit 1 RAB and the licensee underestimated the volume of water that would have entered the Unit 1 and Unit 2 RABs during a design basis flood event and challenge the operability of safety-related equipment. The licensee entered this issue into the corrective action program as action requests (AR) 1932213 and AR 1943185 and completed corrective actions to repair and replace the degraded and missing flood penetration seals.

The apparent violation had the potential to impede or impact the regulatory process, and was therefore subject to traditional enforcement as described in the NRC Enforcement Policy, dated July 9, 2013. The inspectors used the examples provided in Section 6.9, "Inaccurate and Incomplete Information or Failure to Make a Required Report," of the NRC Enforcement Policy, and concluded that this AV should be considered for escalated enforcement action. In particular, had this information been complete and accurate, it may have caused the NRC to reconsider a regulatory position or undertake a substantial further inquiry. Because the apparent violation involved the traditional enforcement process with no underlying technical violation that would be considered more than minor in accordance with Inspection Manual Chapter (IMC) 0612, a cross-cutting aspect was not assigned to this violation. (Section 4OA3.2)

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REPORT DETAILS

4. OTHER ACTIVITIES

4OA3 Follow-up of Events and Notice of Enforcement Discretion

.1 (Closed) Licensee Event Report (LER) 05000335/2014-001-00 (and Supplement -01 and Supplement-02), "Internal RAB Flooding During Heavy Rain Due to Degraded Conduits Lacking Internal Flood Barriers"

(Closed) Unresolved Item (URI) 05000335/2014002-02, "Evaluation of January 9, 2014 RAB Flooding"

a. Inspection Scope

On January 9, 2014, with both units operating at 100 percent power, a stalled weather front resulted in excess of seven inches of rainfall on the site. The site met Emergency Action Level (EAL) HU1 which, in part, requires a Notification of Unusual Event (NOUE) declaration for a natural occurrence affecting the protected area if water levels are approaching storm drain capacity. The site was in a NOUE for approximately six hours. The unusual event was terminated at approximately 0001 hours on January 10, when the storm drain levels had lowered and actions were taken to ensure the site's storm drain system was fully functional. The inspectors verified the event was properly classified and notifications were made in accordance with the emergency plan implementing procedure EPIP-01, "Classification of Emergencies," and EPIP-02, "Duties and Responsibilities of the Emergency Coordinator." During the event, storm water entered the reactor auxiliary building (RAB) through degraded electrical conduits that were later found not to have internal flood seals. The inspectors opened an unresolved item (URI) documented as URI 05000335/2014002-02, "Evaluation of January 9, 2014 RAB Flooding" in NRC Integrated Inspection Report 05000335/2014002 and 05000389/2014002 (ADAMS Accession No. ML14121A193), while awaiting the licensee's evaluation of the event documented in LER 050000335/2014-001 and its subsequent supplements.

The licensee entered the event into the corrective action program as action request (AR) 1941159 and performed a root cause evaluation. The licensee's evaluation determined the modifications that installed the conduits did not follow the requirements of ANSI 45.2.11, "Quality Assurance Requirements for the Design of Nuclear Power Plants," which resulted in the conduits being installed without penetration seals. The licensee also determined that the following were contributing causes to the event: 1) Station programs and procedures related to flooding and barriers management are limited to internal flooding events, 2) flood protection features to prevent RAB external flooding were marginal, and 3) station personnel lacked knowledge about the design features for mitigating external flood on Category 1 structures. The inspectors reviewed the LER and its supplements as well as the licensee's root cause evaluation. The inspectors evaluated the accuracy of the information submitted in the LER, and the licensee's conformance with regulatory requirements. The inspectors evaluated the licensee's root

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cause evaluation as well as the corrective actions to determine if the actions appropriately addressed the causes that were identified in the licensee's root cause evaluation. The LER and URI are closed.

b. Findings

Introduction: Self-revealing apparent violations (AV) of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," and Criterion XVI, "Corrective Action," were identified when: 1) the licensee failed to install internal flood barriers in conduits that penetrated the Unit 1 reactor auxiliary building (RAB) exterior wall at elevations below the design flood height; and 2) the licensee failed to identify those missing flood barriers during flooding walkdowns performed in response to the NRC's "Request for Information Pursuant to Title 10 of the *Code of Federal Regulations* 50.54(f) Regarding Recommendations 2.1, 2.3, and 9.3, of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident," dated March 12, 2012 (ADAMS Accession No. ML12053A340). The failure to implement measures to ensure the watertight integrity of the Unit 1 RAB resulted in a condition where external flood water was able to enter the Unit 1 RAB and challenge the operability of safety-related equipment.

Description: On January 9, 2014, the St. Lucie site experienced a period of heavy rainfall. Blockage of the site's storm drain system caused water to back up in the floor drains of the Unit 1 component cooling water (CCW) building and begin to fill the emergency core cooling system (ECCS) pipe tunnel adjacent to the CCW building. Approximately 50,000 gallons of water entered the -0.5 foot elevation of the RAB through two degraded conduits in the ECCS pipe tunnel which were severely corroded and lacked internal flood barriers. Operators cycled drain valves to transfer the flood water to the floor sumps in the ECCS pump rooms where the water was then pumped to a waste holding tank. The Unit 1 RAB water intrusion event terminated after approximately five hours when the storm had passed and the site storm drain system had been cleared. After the event, the licensee identified four additional conduits in the ECCS pipe tunnel without internal flood barriers that penetrated the Unit 1 RAB wall at elevations below the design basis flood height. The licensee evaluated the missing flood barriers and concluded that a design basis external flood event would have allowed water to enter the Unit 1 RAB and potentially impact both trains of high head and low head ECCS pumps. The licensee also concluded that modifications implemented in 1978 and 1982 had installed the six conduits below the design basis flood elevation without internal flood barriers.

The inspectors noted that Unit 1 Updated Final Safety Analysis Report (UFSAR) Section 3.1.2, "Criterion 2-Design Basis for Protection against Natural Phenomena," states, in part, that structures, systems, and components important to safety shall be designed to withstand effects of natural phenomena such as floods without loss of capability to perform their safety function. Unit 1 UFSAR Section 3.4.1, "Flood Elevations," states that wave run-up of 17.2 feet from the probable maximum hurricane (PMH) is possible. Unit 1 UFSAR Section 3.4.4, "Flood Protection," states that structures and components whose failure could prevent safe shutdown of the plant or result in significant

uncontrolled release of radioactivity are protected from the effects of high water levels and wave runup associated with PMH conditions by one or more of the following: a) design of structures and components to withstand such effects where functionally required, b) positioning of the structures and components such that they are located at sufficient grade to preclude inoperability due to external flooding, and c) housing within waterproof structures. Condition c) specifically identifies that the shield building and reactor auxiliary building are the only seismic Class 1 structures with basements and that these are completely waterproofed to finish grade.

The inspectors also noted that prior flooding walkdowns performed by the licensee in response to the NRC's "Request for Information Pursuant to Title 10 of the *Code of Federal Regulations* 50.54(f) Regarding Recommendations 2.1, 2.3, and 9.3, of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident," dated March 12, 2012, had failed to identify the degraded conduits or the missing internal flood barriers that resulted in the January 9, 2014, water intrusion event. The licensee walkdowns were performed in 2012 using the guidance contained in Nuclear Energy Institute (NEI) 12-07, "Guidelines for Performing Verification Walkdowns of Plant Flood Protection Features," dated May 2012 (ADAMS Accession No. ML12144A401). Section 5.5.2 of NEI 12-07 states that if "visual inspection of the flood protection feature is relevant; perform an external visual inspection for indications of degradation that would prevent its credited function from being performed. Conditions that should be recorded include (but are not limited to) missing flood protection feature, severe corrosion, missing fittings, missing fasteners or structural anchors, water leakage pathways through barriers (for example, conduit that is below the licensing basis flood level), degraded/missing penetration seals, degraded/missing door seals, etc." The inspectors learned that one of the degraded conduits had previously been identified and entered into the licensee's corrective action program in 2009 as action request (AR) 461394 and again in 2010 as AR 533359. In both cases, the licensee's evaluation of the degraded conduit only addressed the impact of the corrosion on the cabling inside the non-safety related conduit. The evaluation did not address whether the degraded conduit had an internal flood barrier that would prevent flooding of the reactor auxiliary building. Both ARs were closed to work order (WO) 39003054 which was not implemented before the January 9, 2014, rain event. The inspectors concluded that the 2009 and 2010 corrective action program entries for the degraded conduit in the ECCS pipe tunnel were missed opportunities to identify the missing flood barriers, and the degraded conduits and missing flood barriers should have been identified during the licensee's subsequent 2012 flooding walkdowns.

Analysis: The licensee's failure to implement measures to ensure the watertight integrity of the Unit 1 RAB below the design basis flood elevation was a performance deficiency. The performance deficiency was more than minor because it was associated with the protection against external factors attribute of the mitigating systems cornerstone and adversely affected the cornerstone objective of ensuring availability, reliability, and capability of systems that respond to initiating events. Specifically, the failure to maintain the watertight integrity of the Unit 1 RAB resulted in a condition where a design basis external flood event would challenge the operability of safety-related equipment.

The inspectors screened the finding using Inspection Manual Chapter 0609, “Significance Determination Process,” Attachment 4 and Appendix A (June 19, 2012). The inspectors determined the finding was associated with the mitigating systems cornerstone and required a detailed risk evaluation because the finding degraded more than one train of systems used to support the risk significant functions associated with external flood protection.

Inspection Manual Chapter 0609, Appendix M, “Significance Determination Process Using Qualitative Criteria,” (April 12, 2012) was used for this issue because immediately available risk methods and tools could not adequately address this finding’s complexity to provide a reasonable estimate of the significance within the established SDP timeliness goal. The dominant risk scenario was a postulated event where the plant is operating at power when a significant rainfall event occurs (12 or more inches), a reactor trip occurs, and the floor drain valves in the RAB that isolate the ECCS rooms during a flooding event fail to close allowing water to flow unobstructed and submerge all of the ECCS pumps. After 24 hours, the plant would not achieve a ‘safe and stable’ condition and core damage would normally be assumed because all reactor coolant system (RCS) injection capability was lost unless a recovery action was successful. The analyst calculated a factor to apply which would represent the likelihood that the licensee could recover some RCS makeup capability after several days. The influential considerations in determining this factor were: 1) that cooling of the core would occur due to natural circulation and feeding of the steam generators from auxiliary feedwater; 2) lower RCS temperature and pressure would result in a slower loss of RCS inventory through the reactor coolant pump seals; and 3) there were multiple success paths for the licensee to restore RCS injection capability. Based on this qualitative information, along with estimated quantitative core damage frequency (CDF) values, the calculated Δ CDF ranged from 3E-6/year to 1E-5/year.

The licensee completed immediate corrective actions to install flood barriers to prevent external flood water intrusion through the conduits. The preliminary risk significance of the finding was determined to be low to moderate safety significance (i.e., White). The inspectors concluded that the finding was associated with the design margin aspect (H.6) of the human performance area because the licensee did not maintain external flood protection design margin by ensuring that penetrations in the Unit 1 RAB were waterproofed below the design basis flood elevation.

Enforcement: The two violations described below are associated with the preliminary White Significance Determination Process finding.

1. Appendix B to 10 CFR Part 50, Criterion XVI, Corrective Action, states, in part, that measures shall be established to assure that conditions adverse to quality, such as failures, malfunctions, deficiencies, deviations, defective material and equipment, and non-conformances are promptly identified and corrected.

Contrary to the above, from 2012 until 2014, the licensee failed to promptly identify and correct conditions adverse to quality involving missing external flood barriers in

the Unit 1 reactor auxiliary building (RAB). Specifically, the licensee performed flooding walkdowns in response to the NRC's "Request for Information Pursuant to Title 10 of the *Code of Federal Regulations* 50.54(f) Regarding Recommendations 2.1, 2.3, and 9.3, of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident," dated March 12, 2012. The walkdowns, conducted using the guidance contained in Nuclear Energy Institute (NEI) 12-07, "Guidelines for Performing Verification Walkdowns of Plant Flood Protection Features," dated May 2012, were completed on November 26, 2012, and failed to identify missing internal flood barriers on six conduits that penetrated the Unit 1 RAB wall below the design basis external flood elevation.

2. Appendix B to 10 CFR Part 50, Criterion III, Design Control, states, in part, that measures shall be established to assure the design basis for those structures, systems, and components to which this appendix applies are correctly translated into specifications, drawings, procedures and instructions.

Unit 1 UFSAR Section 3.1.2, "Criterion 2 - Design Basis for Protection against Natural Phenomena," states, in part, that structures, systems, and components important to safety shall be designed to withstand effects of natural phenomena such as floods without loss of capability to perform their safety function.

Unit 1 UFSAR Section 3.4.1, "Flood Elevations," states that wave runup of 17.2 feet from the probable maximum hurricane (PMH) is possible.

Unit 1 UFSAR Section 3.4.4, "Flood Protection," states that structures and components whose failure could prevent safe shutdown of the plant or result in significant uncontrolled release of radioactivity are protected from the effects of high water levels and wave runup associated with PMH conditions by one or more of the following: a) design of structures and components to withstand such effects where functionally required, b) positioning of the structures and components such that they are located at sufficient grade to preclude inoperability due to external flooding, and c) housing within waterproof structures. Condition c) specifically identifies that the shield building and reactor auxiliary building (RAB) are the only seismic Class 1 structures with basements and that these are completely waterproofed to finish grade.

Contrary to the above, from 1978 and 1982 until 2014, the licensee failed to translate the design basis associated with external flood protection into specifications, drawings, procedures and instructions. Specifically, permanent change modifications (PCM) 77272, Primary Water Degassifier and Transfer Pump, and PCM 80105, Waste Monitor Tank Addition, added six power supply conduits in the ECCS pipe tunnel that penetrated the Unit 1 RAB wall below the design basis external flood elevation and did not include internal flood barriers to protect safety-related equipment from the effects of a design basis external flood event. As a result, the Unit 1 RAB was not completely waterproofed to finish grade, and structures and components whose failure could prevent safe shutdown of the plant or

result in significant uncontrolled release of radioactivity were not protected from the effects of high water levels and wave runup associated with PMH conditions. This condition was identified when the site experienced a period of unusually heavy rainfall on January 9, 2014, when approximately 50,000 gallons of water entered the -0.5 foot elevation of the RAB through two of the six degraded conduits in the ECCS pipe tunnel.

The apparent violations described above have preliminarily been determined to be associated with a finding of low to moderate safety significance (i.e., White), and are being treated as an AV, consistent with the NRC's Enforcement Policy and are identified as AV 05000335/2014009-01: "Failure to Implement Measures to Ensure the Watertight Integrity of the Unit 1 Reactor Auxiliary Building"

.2 (Closed) LER 05000335, 389/2012010, Supplement -01 "Degraded Manhole Conduit Seals Bypassed External Flood Protection"

a. Inspection Scope

On November 1, 2012, licensee engineering completed their review of the cumulative effects of degraded and missing conduit seals in the electrical manholes that provided a leakage path into Unit 1 and 2 reactor auxiliary buildings (RABs). The degraded and missing penetrations were identified during walkdowns completed in response to a letter from the NRC to licensees, entitled "Request for Information Pursuant to Title 10 of the *Code of Federal Regulations* 50.54(f) Regarding Recommendations 2.1, 2.3, and 9.3, of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident," dated March 12, 2012 (ADAMS Accession No. ML12053A340). The licensee determined that the as-found condition of Unit 1 conduit seals could have resulted in flooding of the Unit 1 RAB during a probable maximum hurricane (PMH) greater than the internal flooding analysis of record. The licensee also found similarly degraded and missing penetration seals in the manholes associated with Unit 2 RAB; however, the cumulative effect of flooding during a postulated PMH would be bounded by the internal flooding analysis. The inspectors checked the accuracy and completeness of the LER and the appropriateness of the licensee's corrective actions and closed out the LER.

On May 14, 2014, the licensee submitted an update to the LER that determined the original external flooding analyses were non-conservative with respect to hold up volumes of the flood waters on the site. The licensee entered this issue into the corrective action program as AR 1932213 and updated the flooding analysis. Based on the new evaluation, water intrusion in both Unit 1 and Unit 2 RAB would have exceeded the internal flooding analysis of record. The inspectors checked the accuracy and completeness of the supplement to the LER and the appropriateness of the licensee's corrective actions. The inspectors concluded that the LER was associated with an apparent violation of NRC requirements that is discussed below. The LER is closed.

b. Findings

Introduction: The licensee identified an apparent violation (AV) of 10 CFR 50.9(a), “Completeness and Accuracy of Information,” for the failure to provide the NRC with complete and accurate information regarding the safety significance of degraded and missing penetration seals that were identified on electrical conduits and piping that passed through exterior walls of the Unit 1 and Unit 2 reactor auxiliary buildings (RABs). Specifically, the licensee failed to identify missing flood barriers on the Unit 1 RAB and the licensee underestimated the volume of water that would have entered the Unit 1 and Unit 2 RABs during a design basis flood event and challenge the operability of safety-related equipment.

Description: On November 1, 2012, the licensee completed a review of the cumulative effects of degraded and missing conduit seals in the electrical manholes that provided a leakage path into Unit 1 and 2 reactor auxiliary buildings (RABs). The degraded and missing seals were identified during walkdowns completed in response to a letter from the NRC to licensees, entitled “Request for Information Pursuant to Title 10 of the Code of Federal Regulations 50.54(f) Regarding Recommendations 2.1, 2.3, and 9.3, of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident,” dated March 12, 2012 (ADAMS Accession No. ML12053A340). The licensee determined that during a probable maximum hurricane (PMH) the as-found condition of Unit 1 conduit seals in the electrical manholes could have resulted in flooding of the Unit 1 RAB greater than the internal flooding analysis of record, but that the only safety-related equipment affected would be the boric acid pumps. The licensee also found similarly degraded and missing seals in the manholes associated with Unit 2 RAB. However, the licensee determined that the cumulative effect of flooding during a postulated PMH would be bounded by the internal flooding analysis for Unit 2 and that all safety-related systems, structures and components (SSCs) would be able to perform their specified functions as required by Technical Specifications. The licensee submitted the results of the flooding walkdowns for St. Lucie to the NRC in FPL060-PR-001, “Flooding Walkdown Report,” Revision 0, on November 27, 2012 (ADAMS Accession No. ML12335A202). The inspectors reviewed the licensee’s flooding analysis methodology for both units and at the time found it to be reasonable. The inspectors also walked down Unit 1 and Unit 2 RABs to determine whether any other safety-related equipment other than the Unit 1 boric acid pumps could be impacted from flooding during a PMH. Based on the information provided by the licensee, the NRC concluded that a finding of very low safety significance (i.e., Green) was associated with the degraded and missing seals and issued a non-cited violation (NCV) of 10 CFR 50, Appendix B, Criterion III, “Design Control,” in Inspection Report 05000335, 389/2013002 (ADAMS Accession No. ML13115A594) for the licensee’s failure to ensure that all below grade Unit 1 and 2 reactor auxiliary building (RAB) penetrations were adequately sealed as required by the licensee’s design basis.

Following the January 9, 2014, rain event (see Section 4OA3.1 of this report), the licensee determined that the previous 2012 flooding evaluation had failed to account for six conduit penetrations that were missing flood barriers in the Unit 1 RAB. Additionally,

the licensee determined that non-conservative assumptions had been used in the 2012 flooding analysis which resulted in non-conservative estimates of flood inundation times. The licensee performed an evaluation of their external flooding analysis and identified two issues with assumptions that had been used. The first issue was that the duration of the flood surge during a storm or stalled weather front was a more significant factor than the highest flood level (i.e., peak surge event) in determining the duration of flood stage on site. The second issue was the assumption that all flood waters would recede immediately with the receding flood surge was not accurate. These assumptions did not account for site pooling phenomenon or increased inundation time which would also increase the amount of time that the degraded and missing flood barriers would be exposed to flood elevations. The updated external flooding analysis concluded that resulting water ingress into the Unit 1 RAB would have impacted not only the boric acid transfer pumps, but also the charging pumps. Additionally, the new analysis concluded that flood water ingress into Unit 2 RAB during a design basis event would have exceeded the bounding internal flood analysis and challenged safe shutdown diversity.

The inspectors concluded that the licensee's original safety analysis documented in 10 CFR 50.73 LER 05000335/2012-010-00, "Degraded Manhole Conduit Seals Bypassed External Flood Protection," (ADAMS Accession No. ML13004A096) should have identified that Unit 2 was also subject to the unanalyzed condition reported for Unit 1. Specifically, the event report should have identified that the degraded and missing flood barriers found on Unit 2 would have resulted in design basis flooding that exceeded the internal flood analysis and would have challenged safe shutdown diversity. The licensee's event report should have also identified that a design basis flood event for Unit 1 would have impacted safety-related equipment in addition to the boric acid transfer pumps. Additionally, the event report should have included the missing internal conduit flood barriers that were located in the Unit 1 emergency core cooling (ECCS) tunnel adjacent to the RAB which resulted in a self-revealing water intrusion event into the Unit 1 RAB on January 9, 2014. The inspectors also concluded that the licensee's 10 CFR 50.54(f) flooding walkdown report to the NRC should have identified the missing conduit seals in the Unit 1 ECCS tunnel adjacent to the RAB, and also should have identified that the missing and degraded seals on Unit 2 were considered inoperable, prior to the implementation of compensatory actions, and were also reportable to the NRC. The inspectors determined that the information described above, that was not included in the licensee's 2012 LER and flooding walkdown report, was necessary to evaluate the safety significance of the as-found condition at St. Lucie. The licensee entered this issue into their corrective action program as action request (AR) 1932213 and AR 1943185, and issued a revision to the original 2012 LER on May 12, 2014 (ADAMS Accession No. ML14142A009). The licensee is evaluating a revision to the flooding walkdown report for submittal to the NRC.

Analysis: The apparent violation had the potential to impede or impact the regulatory process, and therefore was subject to traditional enforcement as described in the NRC Enforcement Policy, dated July 9, 2013. The inspectors used the examples provided in Section 6.9, "Inaccurate and Incomplete Information or Failure to Make a Required Report," of the NRC Enforcement Policy, and concluded that this AV should be

considered for escalated enforcement action. Specifically, had the information been complete and accurate, it would likely have caused the NRC to reconsider a regulatory position or undertake a substantial further inquiry.

The NRC senior reactor analyst used risk-informed tools and determined that the change in the licensee's analysis of the degraded and missing flood barriers would have changed the NRC's conclusions regarding the significance of the 2012 design control violation from green to greater-than-green (NCV 05000335, 389/2013002-02) (i.e., escalated enforcement). In addition, the licensee's failure to identify the missing seal penetrations on the degraded conduits in the Unit 1 ECCS tunnel during the external flooding walkdowns in 2012 (reference section 4OA3.1 of this report) resulted in a preliminary White finding (i.e., escalated enforcement). Because the apparent violation involved the traditional enforcement process with no underlying technical violation that would be considered more than minor in accordance with Inspection Manual Chapter (IMC) 0612, a cross-cutting aspect was not associated to this violation.

Enforcement: 10 CFR 50.9(a) requires, in part, that information provided to the Commission by a licensee or information required by the statute or by the Commission's regulations, orders or license conditions to be maintained by the licensee shall be complete and accurate in all material respects.

Contrary to the above, the licensee provided inaccurate and incomplete information as evidenced by the following two examples:

1. Licensee Event Report (LER) 05000335/2012-010-00, dated December 27, 2012, was inaccurate and incomplete in that it only discussed the flooding effects from a probable maximum hurricane (PMH), and did not discuss potential limiting conditions involving the duration of a precipitation event or the possibility of site pooling when determining the impact of the degraded and missing flood seals on water intrusion into the Unit 1 and Unit 2 RABs. Because the safety evaluation documented in the LER was based on non-conservative assumptions regarding flood inundation times, the LER did not identify that the Unit 2 missing or degraded flood seals represented an inoperable condition prior to the implementation of compensatory measures, and the LER did not identify that the charging pumps on Unit 1 would also have been impacted as a result of the flood barrier degradation. Additionally, the LER did not identify and evaluate the effect of the missing internal flood barriers in six conduits that penetrated the Unit 1 RAB wall. This information was material to the NRC in that it was used to determine the safety significance of the degraded and missing external flood barriers as well as to determine the appropriate NRC follow-up and response to the event report.
2. By cover letter dated November 27, 2012, the licensee submitted to the NRC a report entitled "Flooding Walkdown Report, FPL060-PR-001, Rev. 0, In Response to the 50.54(f) Information Request Regarding Near-Term Task Force Recommendation 2.3: Flooding for the St. Lucie Plant." The report was submitted in response to the NRC's "Request for Information Pursuant to Title 10 of the Code of

Federal Regulations 50.54(f) Regarding Recommendations 2.1, 2.3, and 9.3, of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident,” dated March 12, 2012. The NRC determined that the licensee’s report was inaccurate and incomplete in that it failed to include the missing conduit seals on six conduits in the Unit 1 ECCS pipe tunnel adjacent to the RAB as non-conforming items. In addition, the licensee’s report failed to identify that the Unit 2 missing or degraded flood seals represented an inoperable condition prior to the implementation of compensatory measures. This information was material to the NRC, in that it was used to determine compliance with the current licensing basis, the safety significance of the degraded and missing external flood barriers, and used to determine follow-up NRC response.

The licensee entered this issue into their corrective action program as action request (AR) 1932213 and AR 1943185, and issued a revision to the original 2012 LER on May 12, 2014, which provided the NRC with accurate flooding safety analysis information. The licensee is evaluating a revision to the flooding walkdown report for submittal to the NRC. The issue was preliminarily determined to be an apparent violation of 10 CFR 50.9(a), consistent with the NRC’s Enforcement Policy and is identified as AV 05000335, 389/2014009-02: “Inaccurate Information Concerning External Flooding Evaluations.”

4OA6 Meetings, including Exit

On September 24, 2014, the results of this inspection were discussed with Mr. Joseph Jensen, St. Lucie Site Vice President, and other members of the licensee’s staff. The inspectors confirmed that none of the potential report input discussed was considered proprietary.

ATTACHMENT: SUPPLEMENTAL INFORMATION

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee personnel:

J. Jensen, Site Vice President
C. Bible, Corporate Functional Area Manager – Design Engineering
J. Connolly, Engineering Director
D. DeBoer, Operations Director
E. Katzman, Licensing Manager

NRC personnel:

D. Dumbacher, Chief (Acting), Branch 3, Division of Reactor Projects
J. Hanna, Senior Reactor Analyst, Division of Reactor Projects

LIST OF ITEMS OPENED, CLOSED AND DISCUSSED

Opened

05000335/2014009-01	AV	Failure to Implement Measures to Ensure the Watertight Integrity of the Unit 1 Reactor Auxiliary Building (Section 4OA3.1)
05000335, 389/2014009-02	AV	Inaccurate Information Concerning Flooding Analysis (Section 4OA3.2)

Closed

05000335/2014-001-00, 01, 02	LER	Internal RAB Flooding During Heavy Rain Due to Degraded Conduits Lacking Internal Flood Barriers (Section 4OA3.1)
05000335/2014002-02	URI	Evaluation of January 9, 2014 RAB Flooding (Section 4OA3.1)
05000335, 389/2012-010-01	LER	Degraded Manhole Conduit Seals Bypassed External Flood Protection (Section 4OA3.2)

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LIST OF DOCUMENTS REVIEWED

Section 40A3: Follow-up of Events and Notices of Enforcement Discretion

AR 1800822-01, Technical Assessment for Reportability (TAR) – St. Lucie Unit 2- RAB Electrical Manholes- Missing or Degraded Conduit Seals, Rev. 0
AR 1800822-02, Prompt Operability Determination – Unit 2 Reactor Auxiliary Building - Degraded/Missing Conduit Flood Seal(s), Rev. 0
AR1804496-01, Technical Assessment for Report Ability (TAR) – St. Lucie Unit 1 - RAB Electrical Manholes- Missing or Degraded Conduit Seals, Rev. 0
AR 1804496-02, Prompt Operability Determination – Unit 1 Reactor Auxiliary Building - Degraded/Missing Conduit Flood Seal(s), Rev. 0
AR 1932155, Unusual Event Declared for Unit 1 Due to Rainstorm Flooding, Rev. 0
AR 1932213, Penetration P19 Pipe Seals Leaking, Rev. 0
AR 1941159, Unit 1 Reactor Auxiliary Building Flooding, Rev. 5
AR 1943185, Apparent Cause for 2012 Flooding Walkdown Report, Rev. 0

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