UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
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ATLANTA, GEORGIA 30303-1257

April 18, 2017

EA-17-013

Mr. Mano Nazar
President and Chief Nuclear Officer
Nuclear Division
Florida Power & Light Co.
Mail Stop: EX/JB
700 Universe Blvd.
Juno Beach, FL 33408

SUBJECT: ST. LUCIE PLANT – FINAL SIGNIFICANCE DETERMINATION OF A WHITE FINDING; NRC INSPECTION REPORT 05000335/2017011

Dear Mr. Nazar:

This letter provides the final significance determination of the preliminary White finding discussed in our previous correspondence dated February 2, 2017, which included Inspection Report 05000335/2016012, available in the Agencywide Documents Access and Management System (ADAMS) (Accession Number ML17033B599). The finding involved a failure to maintain configuration control of the Unit 1 main generator inadvertent energization lockout relay circuitry, which resulted in a reactor trip and loss of offsite power (LOOP) on August 21, 2016. Inspectors identified this issue during performance of a follow-up of events inspection associated with Licensee Event Report (LER) 05000335/2016-003-00, "Generator Lockout Relay Actuation During Power Ascension Results in Reactor Trip." Based on the review of this issue and in accordance with NRC Inspection Manual Chapter 0612, the NRC determined that no violation of a regulatory requirement occurred. A Detailed Risk Evaluation was completed on December 14, 2016, which concluded the increase in risk due to the performance deficiency was a 2E-6 change in core damage frequency (ΔCDF).

At your request, a Regulatory Conference was held in the Region II office on March 21, 2017, to discuss your views on this issue. A copy of the presentation you provided at this meeting is available in ADAMS (Accession No. ML17072A376). During the meeting, your staff provided a summary of the event and restoration actions, and described the cause determination, corrective actions taken, and your assessment of the significance of the finding.

The NRC staff has extensively reviewed each of the factors that your staff presented at the Regulatory Conference. A description of each of the factors, Cases 1, 2, and 3 as described in the aforementioned presentation, is provided below along with our conclusions:

Case 1: Your staff presented that the 6-hour offsite power recovery probability of 93.6 percent, which the NRC used as part of our analysis, should be replaced with a higher

recovery credit. In support of this case, your St. Lucie Operations staff performed four simulator runs to demonstrate and validate the ease of offsite power recovery. To further support this case your staff also performed a human reliability analysis (HRA) that estimated a 99.6 percent probability of success.

NRC analysts reviewed the material your staff presented and evaluated the justifications used. In our assessment we determined the following: (1) it is preferable to rely on data from actual events, which is based on industry averages for a plant-centered LOOP used in the NRC's Standardized Plant Analysis Risk (SPAR) model, rather than an HRA analysis based on more theoretical conditions; (2) the simulator evaluations you performed were not sufficiently challenging to the operators, in that they did not require operators to respond to multiple casualties simultaneously, which would be more reflective of actual scenarios that operators could encounter; (3) four successful simulated tests was not a large enough statistical sample to warrant a deviation from industry averages; (4) sufficient information was not provided that would give our analysts appropriate justification to model St. Lucie in a manner significantly better than the industry average with respect to offsite power recovery; and (5) a reasonable and realistic amount of credit had been applied to both the Station Blackout (SBO) and LOOP sequences in our detailed risk evaluation. Therefore, after evaluating the information provided by your staff, the NRC determined that the risk result for this case remained greater than 1E-6 ΔCDF (White).

Case 2: Your staff presented that a "realistic estimate of the risk of this Performance Deficiency assumes zero test and maintenance (T&M) unavailability." The basis for your conclusion was that the performance deficiency would only manifest itself during power ascension following a unit restart and, therefore, in keeping with normal practice, risk-significant structures, systems and components (SSCs), or key equipment, would not have been removed from service. Additionally, your staff shared that a historical review of maintenance records demonstrated high equipment availability to support your conclusion.

NRC analysts reviewed the material your staff presented, performed additional evaluations of the T&M unavailability and reviewed existing guidance to determine the appropriateness of applying additional credit in this manner. To consider your case, our analysts were required to deviate from the NRC's guidance document, which dictates the use of nominal T&M terms when performing a Significance Determination Process (SDP) analysis. For reference see the Risk Assessment of Operational Events (RASP) Handbook, Volume 1 – Internal Events, Revision 2.0, Section 8.2, and Appendix A, pages 120-121, available in ADAMS (Accession No. ML13030A049).

In assessing the T&M case that was presented, NRC analysts performed additional sensitivity analyses by adjusting all of the dominant T&M unavailability from their normal values to one-half, one-quarter, and one-tenth fractional values. Additionally, the NRC analysts calculated the probability of restart from a refueling outage and the probability of restart from a forced outage (e.g., a reactor trip where restart could occur within 1 – 2 days). The probability of restarting from a forced outage in a given year, when T&M unavailability values would be more uncertain and potentially higher, was greater than the probability of restarting from a refueling outage. Therefore, if the impact of lower T&M terms were to be calculated, they would need to be adjusted with a split fraction that reflects this fact and would therefore have the effect of decreasing the risk reduction.

The NRC staff performed additional sensitivity analyses for Case 2 and the risk results remained greater than 1E-6 ΔCDF (White).

Case 3: Your staff presented that local operation of the Turbine-Driven Auxiliary Feedwater (TDAFW) pump was credited in your St. Lucie risk model and that credit should be given for that operator action in the analysis for this performance deficiency. The value that was used in the NextEra, St. Lucie risk model was 1E-1. Your staff stated that your risk model is compliant with Regulatory Guide 1.200, "An Approach for Determining the Technical Adequacy of Probabilistic Risk Assessment Results for Risk-Informed Activities," available in ADAMS (Accession No. ML090410014), and that operators are trained on these actions per a Job Performance Measure.

The NRC agrees that this manual action could be accomplished in an actual event. However the NRC and Idaho National Labs have historically not modeled this type of manual recovery action in the SPAR models for all plants in the U.S. fleet, because this type of action is inherently unreliable. The bases for the unreliability of this recovery action are in part due to: (1) the ergonomics of operating a turbine-driven pump, manual operated valves, etc. in an adverse temperature environment, with poor/non-existent lighting; (2) the diminished communications between different operators due to the noise levels of the components being operated (e.g. atmospheric dump valves (ADVs) and the TDAFW pump); (3) the level of coordination required between multiple operators at the TDAFW pump, steam generator (SG) injection valve(s), the ADV(s), and the Control Room; (4) the reduced control and indication caused by station battery depletion, affecting such critical parameters as SG level indication (blind feeding of the SGs); and (5) the consequences of overfeeding or underfeeding the SGs (TDAFW pump flooding out or over-speeding and loss of secondary heat removal, respectively).

NRC analysts reviewed the material your staff presented and performed additional evaluations of the local operation of the TDAFW pump; however, they could not identify a technical basis for the 1E-1 value your staff referenced (i.e., a formal HRA had not been performed.). To fully consider your case, given the aforementioned challenges, NRC analysts performed additional sensitivity analysis on the St. Lucie NRC SPAR model using a value of 5E-1 and the risk results remained greater than 1E-6 ΔCDF (White).

Additionally, to fully evaluate the risk, NRC staff also considered other qualitative factors to inform our decision which included the following: (1) the potential extent of condition of the performance deficiency on other SSCs; (2) the corrective actions associated with this performance deficiency taken by your staff to date; (3) operator and equipment performance during the actual event and historically; and (4) the length of time the performance deficiency was present in the plant.

In conclusion, the NRC has reviewed and analyzed the information provided in support of each of the cases that your staff presented at the Regulatory Conference. When evaluated collectively (both Case 2 and Case 3 together), the risk results remained greater than 1E-6 ΔCDF (White). We determined that this did not change the preliminary significance provided in our previous correspondence dated February 2, 2017. Therefore the NRC has determined the final significance of the performance deficiency was greater than 1E-6 ΔCDF or White. As

discussed in the aforementioned correspondence (Inspection Report 05000335/2016012), this finding did not involve a violation of regulatory requirements.

You have 30 calendar days from the date of this letter to appeal the staff's determination of significance for the identified White finding. Such appeals will be considered to have merit only if they meet the criteria given in NRC Inspection Manual Chapter 0609, Attachment 2, available in ADAMS (Accession No. ML101400502). An appeal must be sent in writing to the Regional Administrator, Region II, 245 Peachtree Center Avenue NE, Suite 1200, Atlanta, Georgia 30303-1257.

The NRC has concluded that the information regarding the reason for the finding, the corrective actions taken to correct the finding and prevent recurrence, is already adequately addressed in your presentation, which is on the docket in ADAMS (Accession No. ML17072A376). Therefore, you are not required to respond to this letter unless the description therein does not accurately reflect your position.

Because plant performance for this issue has been determined to be beyond the licensee response band, we will use the NRC's Action Matrix to determine the most appropriate NRC response for this event. We will notify you, by separate correspondence, of that determination.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter, 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 document 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.

Please contact LaDonna B. Suggs, Chief, Reactor Projects Branch 3, at 404-997-4539, for any additional discussion or clarifications on the content of this letter.

Sincerely,

/RA Len Wert Acting for/

Catherine Haney
Regional Administrator

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