From: Orf, Tracy
Sent: Friday, May 20, 2011 12:26 PM
To: 'Wasik, Chris'
Cc: Abbott, Liz; Frehafer, Ken
Subject: St. Lucie Unit 1 EPU - request for additional information (Electrical Engineering)

Dear Mr. Wasik,

By letter dated November 22, 2010 (Agencywide Documents Access and Management System Accession No. ML103560415) Florida Power & Light Company (the licensee) submitted a license amendment request for St. Lucie Unit 1.

The U.S. Nuclear Regulatory Commission (NRC) staff has reviewed the licensee's submittal and has concluded that additional information is required from the licensee in order for the NRC staff to complete their review. The questions below describe these requests for additional information (RAIs).

The NRC requests that the licensee respond to these RAIs within 30 days of the date of this e-mail. If the licensee concludes that more than 30 days are required to respond to the RAIs, the licensee should request additional time, including a basis for why the extension is needed.

Please contact me at the number below or by e-mail if you have any questions on this issue or if you require additional time to submit your responses.

Sincerely,

Tracy J. Orf, Project Manager
St. Lucie
Plant Licensing Branch II-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation
Phone: (301) 415-2788

REQUEST FOR ADDITIONAL INFORMATION (RAI)

REGARDING LICENSE AMENDMENT REQUEST FOR

EXTENDED POWER UPRATE

ST. LUCIE PLANT, UNIT NO.1

DOCKET NO. 50-335

EEEB-1: Explain how the licensee is addressing environmental qualification (EQ) margins for the electrical equipment in accordance with the following regulations and regulatory guidance documents: (a) 10 CFR 50.49e(8), (b) Regulatory Guide (RG) 1.89, Revision 1, Section C.4, and (c) IEEE 323-1974, Section 6.3.1.5.

EEEB-2: Figures 2.3.1-1 and 2.3.1-2, in Attachment 5 of the LAR, show the Unit 1 Containment LOCA and MSLB Accident Temperature and Pressure Profiles vs. Plant EQ Profiles of electrical equipment. The profiles in these figures do not appear to have the minimum EQ margins required per IEEE 323-1974. Provide justifications for apparent lack of margins. Provide discussion of the margins in the pre-EPU and post-EPU stages.

EEEB-3: Page 2.3.1-6 in Attachment 5 of the LAR states, "Pressure effects are generally stress-related rather than age degradation related." Provide clarification as to how pressure effects were considered for environmental qualification.

EEEB-4: Page 2.3.1-6 in Attachment 5 of the LAR, states, "Using the information available in the Doc Pacs, any equipment that could not be qualified by direct comparison to the beta radiation dose plus the total integrated gamma dose was assessed for potential beta dose reduction. Factors included consideration if a component was sealed, equipment shielding considerations." Provide a summary of EQ calculations in which radiation reduction factors were considered necessary as a result of EPU. In particular, confirm whether the following statement in RG 1.89, Section C.2.c(6) was considered in the calculation: "If, after considering the appropriate shielding factors, the total beta radiation dose contribution to the equipment or component is calculated to be less than 10% of the total gamma radiation dose to which the equipment or component has been qualified, the equipment or component is considered qualified for beta and gamma radiation environment."

EEEB-5: Provide a comparison of radiation levels, pre and post EPU for plant areas that have electrical equipment that have changed from mild to harsh radiological environments.

EEEB-6: Page 2.3.1-9 and Table 2.3.1-1 in Attachment 5 of the LAR list four components which are now considered to be located in a harsh radiation environment. However, in Table 2.3.1-2, five components (additional component HVE-6B) are identified. Explain the apparent discrepancy.

EEEB-7: Provide a justification for not performing an evaluation of High Energy Line Break analysis for the impact on the EQ of the electric equipment inside containment.

EEEB-8: Page 2.3.1-10 in Attachment 5 of the LAR states, "The localized MSLB accident temperature of 3200 F is exceeded by a few degrees for a matter of seconds while steam is flowing; however, this has been evaluated for qualified equipment in the trestle area and found not to have any impact." Discuss in detail how the localized MSLB accident temperature of 3200 F is exceeded by how many degrees for how many seconds while steam is flowing. Discuss how this condition meets the required EQ temperature margin in accordance with 10 CFR 50.49 and Regulatory Position C.4 in Regulatory Guide 1.89.

EEEB-9: Confirm that the Target Dose, shown in Table 2.3.1-1, Attachment 5 of the LAR, is the Target Total Integrated Dose for the impacted electrical equipment.

EEEB-10: Page 2.3.4-3 in Attachment 5 of the LAR states, "Each battery's capacity permits 4 hours of emergency operation without assistance from a battery charger. Each station battery supplies power for 125 VDC safety loads that include ….instrument power along with some non-Class loads…" Confirm that a failure of these non-safety loads under postulated environmental conditions will not prevent satisfactory accomplishment of safety functions of the safety-related batteries.

EEEB-11: Table 2.3.1-2 in Attachment 5 of the LAR indicates submergence level in the Reactor Containment Building is increased due to EPU but there is no impact on the electrical equipment. Provide a summary of your evaluation that determined that there is no impact on the electrical equipment.

EEEB-12: Section 2.3.3.2.4 in Attachment 5 of the LAR provides a summary of the following planned modifications for EPU conditions:

- The current limiting reactors (CLRs) are being replaced with lower impedance CLRs. Provide the following: 1) Details on the change in fault current as a consequence of this change, and fault current contribution due to the higher rating of the main generator and additional motor loads and 2) A summary of the calculation performed to validate the degraded voltage relay setting after the auxiliary system load and impedance changes.

- The non-safety sections of the 480V Motor Control Centers 1A5/1B5 and 1A6/1B6 will be tripped on a safety injection actuation signal (SIAS). If this modification is required to satisfy separation criteria, provide details on how the existing configuration is in compliance with separation criteria between safety and non-safety related circuits.

EEEB-13: Appendix H in Attachment 5 of the LAR states that the proposed EPU meets the reactive capability requirements of the grid. Provide the specific reactive power requirements pre-EPU and post EPU and explain how the licensee satisfies the requirements of the Standard Large Generator Interconnection Procedures in FPL's Open Access Transmission Tariff (OATT). Confirm that post trip voltages at the safety busses are adequate for plant shutdown in the event that Unit 1 and

Unit 2 were operating at the maximum required power factor during stressed grid conditions.

EEEB-14: The results of grid stability analyses are provided in Appendix H. The voltages at the St Lucie 230 kV busses are assumed to be approximately 104% of nominal with the result that post contingency (i.e. post loss of line or generation) voltages are considered acceptable. Provide details on the allowable voltage range for the transmission system and the justification for selecting the 104% of nominal voltage as the starting point. Also include the reactive power support provided by St Lucie Units pre and post contingencies that were evaluated.

EEEB-15: The seven case studies performed for grid stability analyses (Appendix H) concluded that the grid was stable for the specific cases. Case studies 3 and 4 indicate significant voltage and frequency variations for an extended duration (up to 8 seconds). Operating experience has indicated that reactor coolant pump (RCP) flow is changed when the RCP motor is subjected to voltage and frequency variations. Provide details on the effect of the voltage and frequency variations during the worst case grid transients and verify that the consequences of the grid transients will not lead to additional unit trips. In addition, explain how the models were validated with respect to operational events on the grid.

EEEB-16: Page 2.3.3-5 in Attachment 5 of the LAR states, "However, isolated phase bus (IPB) main transformer (MT), unit auxiliary transformer (UAT) and potential transformer (PT) tap buses short circuit design ratings are less than the anticipated worst-case fault current levels for both pre-EPU and EPU conditions. This is a current plant design issue. The over duty condition on IPB tap buses will be further analyzed and corrective action, as appropriate, completed prior to EPU". Provide details on the final resolution and modifications on the above issue. Explain how the final modifications will resolve the above issue for EPU conditions.

EEEB-17: Page 2.3.3-6 in Attachment 5 of the LAR states, "The existing MT 1A will have its cooling unit upgraded. The existing MT 1B is to be swapped with existing spare transformer." Provide details on transformer impedances (MT 1A, MT 1B, and MT spare) and any evaluations performed for circulating currents in the event of unbalanced loading resulting in potential degradation of operating safety related equipment.

EEEB-18: Section 2.3.3 of Attachment 5 of the LAR concludes that the emergency diesel generator (EDG) loading has increased but maximum load is within the rating of the EDGs. Provide a summary of calculation(s) detailing the EDG loading with EPU changes and the EDGs operating at the worst case allowable voltage and frequency.

EEEB-19: The LAR indicates that EDG loading has increased. Provide a summary of the calculation validating the proposed 19,000 gallons of fuel oil requirement for each EDG (as shown on the marked-up pages of TS LCOs 3.8.1.1.b.2 and 3.8.1.2.b.2 of Attachment 3 of the LAR).

EEEB-20: Page 2.3.5-1 in Attachment 5 of the LAR states, "The SBO analysis credits the availability of an EDG from St. Lucie 2 as an alternate alternating current

source." The safety related loading on EDGs for Unit 1 has increased. Provide a summary of the calculation detailing the margin in Unit 2 EDGs when used as an AAC source for Unit 1 SBO conditions.

EEEB-21: Page 2.3.5-3 in Attachment 5 of the LAR, states, "One hour direct current (dc) coping is assumed to start at the actual time of the SBO. Attachment 8, 10 CFR 50.63 Station Blackout DC Coping, to this LAR provides an analysis of the station's ability to cope for up to one hour without alternate alternating current power available." Section 2.1 in Attachment 8 of the LAR states, "The transition from 25-minute to one-hour dc coping does not compromise the Class 1E 125 V dc system function during the SBO event. The station batteries have sufficient capacity to power the necessary loads for one hour under SBO conditions with 100% margin." Confirm that one hour dc coping time supported by the safety related station batteries will be verified by periodic battery service tests for the SBO load profile for the one hour dc coping duration.

EEEB-22: Page 26 in Attachment 8, Appendix A of LAR shows that time of the Motor Operated Valves (MOV) MV-08-03 (on bus 1AB) and MV-08-13/14 and MV-09-11/12 (on bus 1AB-1) as 0 – 60 seconds. However, Table 3.34 Station Blackout Sequence of Events in Attachment 8, Appendix B of LAR reflects beginning of Auxiliary Feedwater (FW) delivery to the steam generators at 336.6 seconds which would mean that all Auxiliary FW loads will start at approximately 336.6 seconds. Provide clarification for discrepancy on timing of actuation of Auxiliary Feedwater System motor operated valve loads between Page 26 in Attachment 8, Appendix A of LAR and Table 3.34 in Attachment 8, Appendix B of LAR.

EEEB-23: Provide details on any load shedding that is required to extend the SBO coping time for the safety-related batteries to one hour due to proposed uprate.

EEEB-24: As a result of the proposed uprate, discuss any change(s) in frequency of loss of offsite power and/or reliability of the EDGs as discussed in Regulatory Guidance 1.155 since the NRC staff approved the original SBO Coping analyses.