**From:** Paige, Jason
**Sent:** Monday, April 11, 2011 9:12 AM
**To:** Abbatiello, Tom
**Cc:** Abbott, Liz; Tiemann, Philip; Hoffman, Jack
**Subject:** Turkey Point EPU - Reactor Systems (SRXB) Request for Additional Information - Round 2

Tom,

Below are requests for additional information (RAIs) regarding the Turkey Point Extended Power Uprate (EPU) license amendment request. On March 31, 2011, the Nuclear Regulatory Commission (NRC) staff and Florida Power & Light Company (FPL) held a public meeting to discuss draft RAIs generated from various NRC technical branches while reviewing the October 21, 2010, EPU application. During the meeting, it was concluded that a follow-up call would be needed to discuss the reactor systems (SRXB) RAIs in more detail since the licensee did not receive the RAIs in enough time before the March 31, 2011, meeting. On April 6, 2011, the NRC and FPL held a teleconference to discuss the draft RAIs. During the teleconference, the licensee stated that the requested information in question SRXB-2.8 can be found in Section 2.8.7.3 of the October 21, 2010, application. Also, the licensee provided background information regarding questions SRXB-2.10 – 2.12. After further review from the NRC reviewer, it was determined that Section 3.2.2 provides the necessary information requested in questions SRXB-2.10 - 2.12. As a result of the April 6, 2011, call and the NRC reviewer's evaluation, questions SRXB-2.8, and SRXB-2.10 – 2.12 can be withdrawn. The below RAIs reflect the questions discussed during the March 31, 2011, meeting and April 6, 2011, teleconference. FPL agreed upon providing its responses within 30 days of the date of this email. If you have any questions, feel free to contact me.

SRXB-2.1 Provide plant piping configuration drawings that include scale three dimensional (3D) drawings or isometrics with dimensional information and piping and instrumentation diagrams (P&IDs) that describe the feedwater piping associated with the CheckPlus installation. Scaled 3D drawings comparable to Figures 1 and 2 in ER-748 Revision 1[1] that illustrate the Alden Laboratory test configurations are preferred in place of isometrics that cover the plant piping configuration comparable to the Alden Laboratory figures but the overall response to this RAI is for configuration information that describes piping, valves, flow straighteners (if any), feedwater flow meters, and any other components from the feedwater pumps to at least 10 pipe diameters downstream of each feedwater flow meter.

SRXB-2.2 Section 2.8.4.3 discusses reactor vessel neutron fluence calculations performed to support the pressure and temperature limits and cold over-pressure mitigation system setpoint confirmation. Describe how the fluence calculations account for uprated core operation.

SRXB-2.3 Assumption 2 in Section 2.8.4.4.2.2 states that the reactor coolant system (RCS) is assumed to be at a uniform temperature during residual heat removal (RHR) system operation and that there are no "hot spots" that could cause an

[1] "Meter Factor Calculation and Accuracy Assessment for Turkey Point 3 Nuclear Power Plant," Engineering Report No. 748, Rev 1, Caldon Ultrasonics, June, 2010.

unexpected increase in the bulk RCS temperature. Discuss why the uniform temperature assumption was made. Justify this assumption with respect to the core, upper plenum, upper head, and the pressurizer for both RCPs running and not running. Include a discussion of the implications where RCS temperature is not uniform and equal to average RCS temperature in the hot legs. Include drain down of RCS inventory and emptying the pressurizer in this discussion.

SRXB-2.4 Section 2.8.4.4.2.3 identifies a higher heat load that often extends cooldown time, yet, in the case of normal cooldown, time is 28 hours versus the lower heat load cooldown time of 30 hours. Explain since the expectation is that an increased heat generation rate would result in a longer cooldown time. The potential concern is that the analysis methodology used for normal cooldown may be applicable to other conditions and an understanding is necessary to assess predicted plant behavior for other conditions.

SRXB-2.5 Sections 2.8.4.4.2.3 and 2.8.4.4.2.5 state that there are no safety-related design criteria for normal plant cooldown times and, therefore, the calculated cooldown times are acceptable. Yet Section 2.8.4.4.2.5 also states a Technical Specification (TS) time limit for achieving cold shutdown of 6 + 30 = 36 hours after reactor shutdown and states that the 28 hours applies. Explain the rationale for concluding that calculated cooldown times are acceptable since there are stated to be no safety-related design criteria in contrast to using these results for meeting TS and other cooldown criteria.

SRXB-2.6 There appears to be no information that addresses the effect of the EPU on heat exchanger fouling factors. Address the behavior of heat exchanger fouling factors due to the higher heat load, longer cooldown times, and greater differential temperatures.

SRXB-2.7 The end of Section 2.8.4.4.2.3 states “The EPU has no effect on the ability of the RHR system to remove residual heat at reduced reactor coolant system inventory, and therefore the PTN (Turkey Point Nuclear Power Plant) will continue to meet the current licensing basis requirements with respect to NRC Generic Letter 88-17.” Justify this conclusion in light of the increased decay heat generation rate that must be removed after shutdown. Include the effect on temperature, RHR flow rate including any limitations on flow rate as a function of RCS water level, and potential hot leg vortexing in your justification.

SRXB-2.8 Section 2.8.7.2 states that a minimum subcooling margin of 50˚F is maintained during natural circulation cooldown until RCS temperature is below 350˚F. What temperature sensors are used to determine RCS temperature and where are they located within the RCS? If hot leg temperatures are used, address the distribution of temperature that is expected in the hot legs. What is used to determine maximum upper head temperature during natural circulation cooldown? Compare the upper head temperatures predicted to exist during natural circulation cooldown for the existing power level and the proposed power level. Include saturation temperature at the uppermost upper head elevation in the comparison.

SRXB-2.9 Provide representative RCS natural circulation temperatures that have been observed during operation of the Turkey Point plant and compare these to selected natural circulation temperatures provided in Section 2.8.7.2.2.3.

SRXB-2.10 Is the Table 2.8.7.2-1 620.8˚F core outlet temperature an average value or the peak value located immediately above the hottest region of the core?

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