Florida Power & Light Company, 6501 S. Ocean Drive, Jensen Beach, FL 34957

FPL

February 29, 2012

L-2012-084
10 CFR 50.90

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555

Re: St. Lucie Plant Unit 1
Docket No. 50-335
Renewed Facility Operating License No. DPR-67

Supplemental Information for the Extended Power Uprate License Amendment Request Related to the Post-Loss of Coolant Accident (LOCA) Boric Acid Precipitation Analysis

References:

(1) R. L. Anderson (FPL) to U.S. Nuclear Regulatory Commission (L-2010-259), "License Amendment Request (LAR) for Extended Power Uprate," November 22, 2010, Accession No. ML103560419.

(2) R. L. Anderson (FPL) to U.S. Nuclear Regulatory Commission (L-2010-442), "Response to NRC Nuclear Performance and Code Review Branch Request for Additional Information Regarding Extended Power Uprate License Amendment Request," October 20, 2011, Accession No. ML11297A198.

By letter L-2010-259 dated November 22, 2010 [Reference 1], Florida Power & Light Company (FPL) requested to amend Renewed Facility Operating License No. DPR-67 and revise the St. Lucie Unit 1 Technical Specifications (TS). The proposed amendment will increase the unit's licensed core thermal power level from 2700 megawatts thermal (MWt) to 3020 MWt and revise the Renewed Facility Operating License and TS to support operation at this increased core thermal power level. This represents an approximate increase of 11.85% and is therefore considered an Extended Power Uprate (EPU).

By letter L-2011-442 [Reference 2], FPL provided response to the NRC staff Nuclear Performance and Code Review Branch (SNPB) request for additional information (RAI) related to post-LOCA boric acid precipitation. The boric acid precipitation analysis was updated to reflect revised hot leg injection requirements. The attachment to this letter transmits supplemental information for the EPU License Amendment Request (LAR) Attachment 5 Section 2.8.5.6.3.5, Technical Evaluation – Post-LOCA Boric Acid Precipitation and the RAI responses provided in Reference 2.

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This submittal contains no new commitments and no revisions to existing commitments.

This submittal does not alter the significant hazards consideration or environmental assessment previously submitted by FPL letter L-2010-259 [Reference 1].

In accordance with 10 CFR 50.91(b)(1), a copy of this letter is being forwarded to the designated State of Florida official.

Should you have any questions regarding this submittal, please contact Mr. Christopher Wasik, St. Lucie Extended Power Uprate LAR Project Manager, at 772-467-7138.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge.

Executed on 29- February - 2012

Very truly yours,

Richard L. Anderson
Site Vice President
St. Lucie Plant

Attachment

cc: Mr. William Passetti, Florida Department of Health

SUPPLEMENTAL INFORMATION FOR THE EXTENDED POWER UPRATE LICENSE AMENDMENT REQUEST

By letter L-2010-259, dated November 22, 2010, Accession Number ML103560419, Florida Power & Light (FPL) requested to amend the St. Lucie Unit 1 Renewed Facility Operating License to increase the licensed core thermal power level from 2700 megawatts thermal (MWt) to 3020 MWt, which constitutes an extended power uprate (EPU).

By letter L-2011-442, dated October 20, 2011, Accession No. ML11297A198, FPL provided a response to the NRC staff Nuclear Performance and Code Review Branch (SNPB) request for additional information (RAI) related to the EPU post-LOCA boric acid precipitation analysis. The EPU boric acid precipitation analysis has since been updated to reflect revised hot leg injection requirements. The following is provided as supplemental information to the EPU License Amendment Request and the referenced response to SNPB RAIs.

Supplemental Information for LAR Attachment 5 Section 2.8.5.6.3.5, Technical Evaluation – Post LOCA Boric Acid Precipitation.

1. Summary of Change

During the winter 2012 EPU implementation outage, FPL performed testing of the hot leg injection (HLI) flow paths. Following that testing, FPL updated the boric acid precipitation analysis to reflect a minimum required HLI flow rate of 229 gpm. This value revises the value identified in the EPU LAR and is supported by the analysis updates described below. The methodology used for the revised analysis remains unchanged from the previously submitted EPU analysis.

2. Input Consideration

Certain plant specific input values used in the analysis are changed to support the new minimum HLI flow rate requirement. A comparison of the values used for these parameters in the previously submitted boric acid precipitation analysis and those in the revised analysis is provided below:

Parameter	Previous Value (Current EPU Analysis)	New Value (EPU Re-analysis)
HLI flow rate (gpm)	250	229
Maximum refueling water tank (RWT) boric acid concentration (ppm)	2600	2300
Maximum safety injection tank (SIT) boric acid concentration (ppm)	2600	2300
Maximum RWT volume (gallons)	705,000	580,000
Boric Acid Solubility Limit (wt%)	27.6	29.27

The previous EPU boric acid precipitation analysis value for maximum RWT volume is greater than the actual maximum volume. A higher RWT volume is conservative, as it introduces more boric acid into the reactor coolant system (RCS). A solubility limit of 29.27 wt% has been credited. This is the solubility limit of boric acid in water at atmospheric pressure and at the boiling point temperature of the boric acid solution in water (218°F). The maximum RWT and SIT boric acid concentrations are plant specific inputs that are administratively maintained.

3. Summary of Results

The boric acid precipitation analysis was revised to address the revised input conditions documented above and the revised results were evaluated against the previous EPU evaluations. The re-analysis determined that beginning simultaneous hot and cold leg injection at 6.0 hours post-LOCA, with a HLI flow rate of 229 gpm provides acceptable results. At 6.0 hours post-LOCA, the HLI (229 gpm) is less than the boil-off rate of approximately 250 gpm. The analysis credits flushing only after HLI exceeds boil-off, which begins at approximately 8.6 hours post-LOCA for the re-analysis. Flushing is equal to HLI minus boil-off rate. The case of 229 gpm of HLI begun at 6.0 hours post-LOCA resulted in a maximum boric acid concentration of 29.1 wt% at 9.9 hours, which is less than the solubility limit of 29.27 wt%. Based on the results of the re-analysis, seen in Table 1, the maximum core boric acid concentration remains less than the solubility limit. Therefore, the proposed EPU remains acceptable with the revised EPU boric acid precipitation analysis.

Figure 1 shows the results of the post-LOCA boric acid precipitation analysis by comparing the boric acid concentration as a function of time for HLI flow rate of 229 gpm and a flushing flow of 20 gpm.

Figure 2 shows the reactor vessel flow rate comparison. The required minimum simultaneous hot and cold leg flow rate for EPU increased as follows: (1) from 190 gpm for the current condition to 229 gpm to the hot leg for EPU, and (3) from 235 gpm for the current condition to 275 gpm to the cold leg for EPU. It has been confirmed that a minimum hot and cold leg injection flow rate of 229 gpm to the hot leg and 275 gpm to the cold leg will be available within the four to six hour window post-LOCA for EPU.

Table 1
Summary of Results for the
Updated Boric Acid Precipitation Analysis

EPU Analysis - CENPD-254-P-A Methodology Modified by the Waterford Approach	
Parameter	**EPU Result**
Boric acid solubility limit	29.27 wt%
Time boric acid concentration reaches solubility limit with no HLI	9.3 hours
Minimum simultaneous hot and cold leg injection flow rates Hot leg Cold leg	 229 gpm 275 gpm
Initiation time for simultaneous hot and cold leg injection	4 to 6 hours post-LOCA
Minimum core boric acid concentration with 229 gpm HLI started at 6.0 hours	29.1 wt% at 9.9 hours post-LOCA
Maximum core boric acid concentration with 20 gpm flushing flow initiated at 6.0 hours	21.9 wt% at 6.0 hours post-LOCA

Figure 1
Updated Boric Acid Precipitation Analysis
Boric Acid Concentration in the Core versus Time

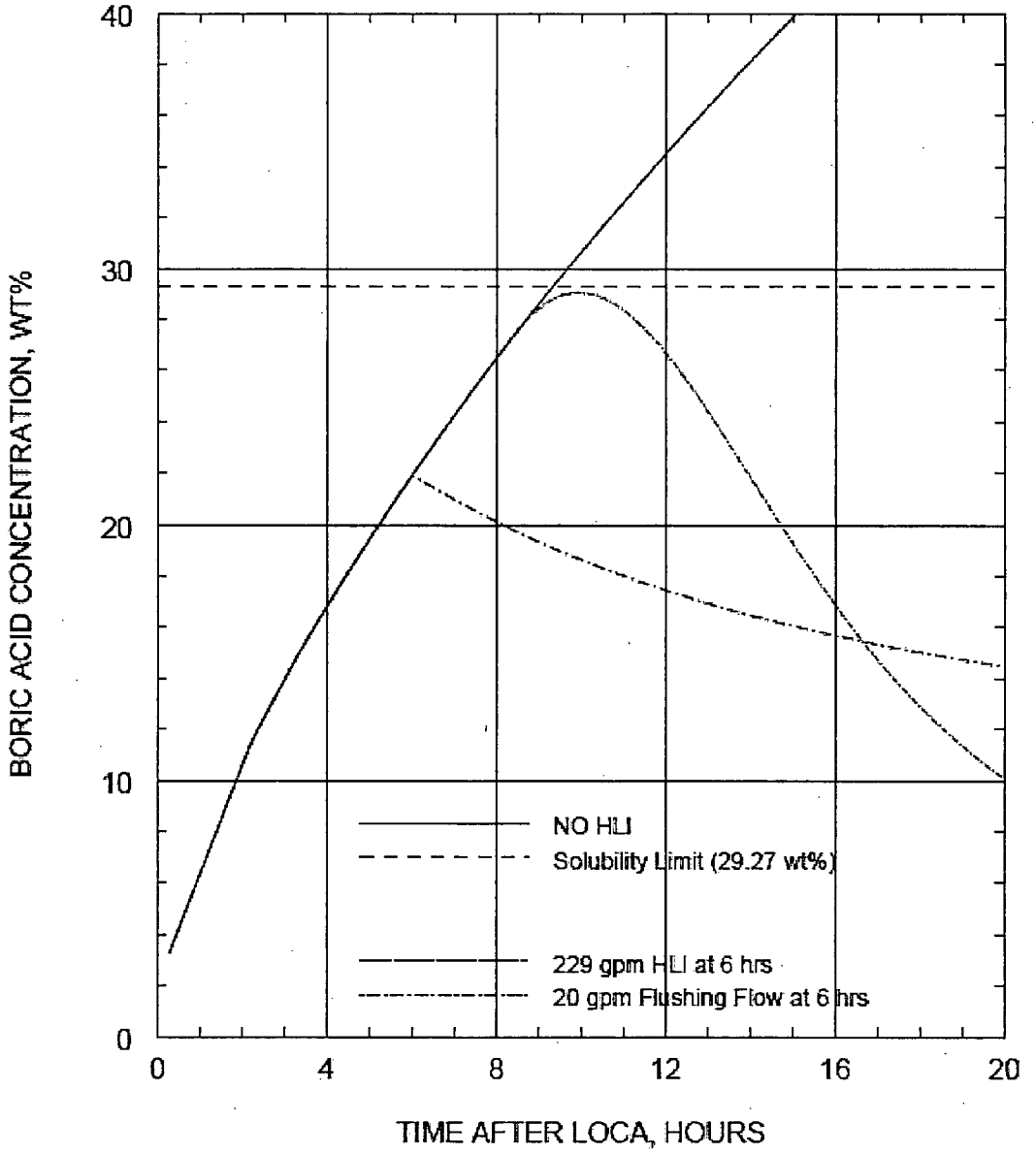

Figure 2
Updated Boric Acid Precipitation Analysis
Core Boil-off and Simultaneous Hot/Cold Leg Injection versus Time