



September 2, 2011

L-2011-355
10 CFR 50.90

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

Re: St. Lucie Plant Unit 2
Docket No. 50-389
Renewed Facility Operating License No. NPF-16

Response to NRC Reactor Systems Branch Request for Additional
Information Regarding Extended Power Uprate License Amendment Request

References:

- (1) R. L. Anderson (FPL) to U.S. Nuclear Regulatory Commission (L-2011-021), "License Amendment Request for Extended Power Uprate," February 25, 2011, Accession No. ML110730116.
- (2) Email from T. Orf (NRC) to C. Wasik (FPL), "Question on required CST volume," August 5, 2011.

By letter L-2011-021 dated February 25, 2011 [Reference 1], Florida Power & Light Company (FPL) requested to amend Renewed Facility Operating License No. NPF-16 and revise the St. Lucie Unit 2 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 email from the NRC Project Manager dated August 5, 2011 [Reference 2], additional information related to the required water volume of the condensate storage tank (CST) was requested by the NRC staff in the Reactor Systems Branch (SRXB) to support their review of the EPU LAR. The draft request for additional information (RAI) identified one question. The response to this RAI is provided in Attachment 1 to this letter.

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

ADD
NRR

This submittal does not alter the significant hazards consideration or environmental assessment previously submitted by FPL letter L-2011-021 [Reference 1].

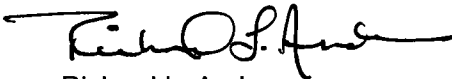
This submittal contains no new commitments and no revisions to existing commitments.

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 *02-September-2011*

Very truly yours,

A handwritten signature in black ink, appearing to read "Richard L. Anderson". The signature is fluid and cursive, with a long horizontal stroke at the end.

Richard L. Anderson
Site Vice President
St. Lucie Plant

Attachment

cc: Mr. William Passetti, Florida Department of Health

Response to Request for Additional Information

The following information is provided by Florida Power & Light in response to the U.S. Nuclear Regulatory Commission's (NRC) Request for Additional Information (RAI). This information was requested to support Extended Power Uprate (EPU) License Amendment Request (LAR) for St. Lucie Nuclear Plant Unit 2 that was submitted to the NRC by FPL via letter (R. L. Anderson (FPL) to U.S. Nuclear Regulatory Commission (L-2011-021), "License Amendment Request for Extended Power Uprate," February 25, 2011, Accession No. ML110730116).

In an email dated August 5, 2011 from NRC (Tracy Orf) to FPL (Chris Wasik), Subject: Question on required CST volume, the NRC staff requested additional information regarding FPL's request to implement the Extended Power Uprate. The RAI consisted of one draft question from the NRC's Reactor Systems Branch (SRXB). This draft RAI question, and the FPL response, are documented below.

SRXB-CST Sizing:

Page 2.5.4.5-8 indicates that the water volume of 154,000 gallons in the CST is required to accommodate the SL2 decay heat removal for the 10.63 hour cooldown period including the RCS at hot standby for 4 hours in order to reduce the reactor coolant temperature to the shutdown cooling entry condition in the event of loss of offsite power (LOOP).

Provide a discussion of the analysis that determines the CST water volume of 154,000 gallons for the required cooldown for LOOP conditions, and address acceptability of the cooldown analysis in accordance with Branch Technical Position 5-1 in Standard Review Plan. The information should include a discussion of methods, assumptions, sequence of cooldown events, and single failure consideration for the analysis. Provide justification if non-safety grade equipment is used in the cooldown analysis.

Response

The required CST volume, 154,000 gallons, is calculated with a CENTS computer code cooldown simulation which follows Branch Technical Position (BTP) 5-4 Revision 4. BTP 5-4 replaces BTP 5-1 as the current NUREG-0800 review document.

The initiating event, time zero, is a Loss of Offsite Power (LOOP) followed by a natural circulation cooldown from hot standby conditions to shutdown cooling system entry conditions and assuming the worst single failure. The most limiting single failure is a loss of one DC emergency power train. A loss of one DC emergency train would prevent AC power from one emergency diesel generator from being transferred to the onsite electrical system. The single failure disables one train of components associated with the atmospheric dump valves (ADVs), auxiliary feedwater system, and shutdown cooling systems. Only two of the four DC powered ADVs (one per SG) are used. The systems and equipment assumed available are safety grade.

Following the initial LOOP and subsequent reactor trip, the plant is kept at hot standby for four hours prior to commencing cooldown. Assumptions, plant conditions, and actions are as follows:

- a. Plant power is initially at 100.3% of rated power including 0.3% power measurement uncertainty
- b. 1979 ANS 5.1 Standard Decay Heat Curve including long term Actinides with 2 σ uncertainty

- c. Charging is available following the plant trip
- d. Letdown is disabled
- e. Main feedwater is disabled
- f. Main Steam Safety Valves (MSSV) provide initial heat removal path
- g. Safety Injection System (SIS) is not used
- h. RCS heat losses to containment are set to zero
- i. Reactor Vessel upper head heat losses to containment are set to zero
- j. Main Steam Isolation Valves (MSIVs) are closed upon event start
- k. The AFW flow is set to maintain Steam Generator (SG) level to match boiloff during the cooldown
- l. SG Blowdown is unavailable
- m. As required, charging is controlled to maintain pressurizer level within acceptable range

A post-EPU natural circulation cooldown at a maximum cooldown rate of 75°F/hr after a hot standby period of four hours is performed. Actions detailed above are initiated when the LOOP event and the failure of a DC emergency train are initiated. The details of the sequence of events are listed below in Table 1.

Table 1 – Sequence of Events - Cooldown at 75°F/hr with 4 hour Hot Standby

Time (seconds)	Event
1	Reactor Trip
	Turbine Trip
	RCP Trip
2600	Turn off charging flow to maintain pressurizer level
14,000	Turn one charging pump on
14,401	Set Atmospheric Dump Valves to manual control
	Initiate cooldown at 75°F/hr
	Turn second charging pump on
15,000	Set auxiliary feedwater flow to 18 lbs/sec per SG
19,000	Turn off one charging pump
27,000	Turn off second charging pump
28,500	Turn on one charging pump
29,000	Turn on aux spray from one charging pump
30,800	Turn off aux spray from one charging pump
	Set auxiliary feedwater flow to 12 lbs/sec per SG
34,000	Turn on aux spray from one charging pump
35,100	Turn off aux spray from one charging pump
	Set auxiliary feedwater flow to 10 lbs/sec per SG
37,400	Turn on aux spray from one charging pump
	Set auxiliary feedwater flow to 8 lbs/sec per SG
38,250	Shutdown Cooling Entry Conditions Achieved