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

FPL

September 8, 2011

L-2011-367
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

Response to NRC Containment and Ventilation 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-2010-259), "License Amendment Request for Extended Power Uprate," November 22, 2010, Accession No. ML103560419.
(2) Email from T. Orf (NRC) to C. Wasik (FPL), "St. Lucie 1 EPU Draft RAIs (3rd Round) - Containment and Ventilation (SCVB)," August 18, 2011.

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 email from the NRC Project Manager dated August 18, 2011 [Reference 2], additional information related to containment considerations was requested by the NRC staff in the Containment and Ventilation Branch (SCVB) to support their review of the EPU LAR. The request for additional information (RAI) identified three questions. The response to these RAIs 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.

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

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NRR

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 08-September-2011

Very truly yours,

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 (FPL) in response to the U. S. Nuclear Regulatory Commission's (NRC) Request for Additional Information (RAI). This information was requested to support the Extended Power Uprate (EPU) License Amendment Request (LAR) for St. Lucie Unit 1 that was submitted to the NRC by FPL via letter (L-2010-259) dated November 22, 2010 (Accession Number ML103560419).

In an email dated August 18, 2011 from NRC (T. Orf) to FPL (C. Wasik), "St. Lucie 1 EPU Draft RAIs (3rd Round) - Containment and Ventilation (SCVB)," the NRC staff requested additional information regarding FPL's request to implement the EPU. The RAI consisted of three (3) questions from the NRC's Containment and Ventilation Branch (SCVB). These three RAI questions and the FPL responses are documented below.

SCVB-19:

Section 2.6.1.2.2.2 states "The peak pressure case that produces the highest containment temperature is used for the Equipment Qualification (EQ) case."

(a) Please explain why the peak pressure case was chosen rather than a case which gives the highest temperature regardless of the pressure.

(b) Section 2.6.1.2.2.3 states that the limiting peak pressure case is at 100.3-percent power. Please explain why the initial pressure was chosen to be the minimum containment pressure (first bullet in Section 2.6.1.2.2.2) to delay the reactor trip.

Response

The objective of a containment Main Steam Line Break (MSLB) analysis is to consider a range of initial power levels and single failures so the peak pressure can be identified. Twelve (12) MSLB cases were performed for the EPU. Each case identifies its peak pressure and temperature. LR Section 2.6.1.2.2.2 should be understood as, "The case that produces the highest containment temperature is used for the Equipment Qualification (EQ) case."

(a) The MSLB case which produces the highest containment temperature (100.3% power MSLB with the failure of a containment spray pump) was chosen for the EQ case.

(b) The initial containment pressure is maximum (15.51 psia) for all cases except the one EQ case. The EQ case assumes a minimum containment pressure, which will delay the reactor trip. Delaying the reactor trip results in more energy being added to the reactor coolant system (RCS). The RCS energy is transferred to the steam generator resulting in a more limiting containment temperature.

SCVB-20:

Section 2.6.1.2.2.2 claims to list the differences between the EQ methodology and the peak pressure methodology, whereas only the EQ methodology is described in the three bullets. Provide a table listing the differences and conservatisms in the EPU peak pressure methodology and the EQ methodology. Provide separate tables listing the differences in the current licensing basis (CLB) and the EPU basis for the (a) peak pressure methodology and (b) EQ methodology, and justify the differences between the CLB and the EPU basis for both methodologies.

Response

The following table lists the differences between the peak pressure methodology and the EQ methodology.

EPU MSLB Peak Pressure and EQ Differences and Conservatisms

EPU MSLB Peak Pressure and EQ Differences		
Peak Pressure	**Equipment Qualification**	**Justification**
Maximum Initial Containment Pressure	Minimum Initial Containment Pressure	A higher initial pressure will result in a more limiting containment peak pressure. A lower initial pressure will result in a more limiting containment peak temperature for EQ cases.
Superheating upon steam generator (SG) U-tube uncovery not considered	Superheating upon SG U-tube uncovery considered	This allows the calculation code to continue to heat the steam in contact with uncovered U-tubes instead of only producing steam. The effect of superheat is required by IE Information Notice No. 84-90 for EQ cases.
No re-evaporation of condensation from the heat sinks	8% re-evaporation of condensation from the heat sinks	NUREG-0588 Rev. 1, Interim Staff Position on Environmental Qualification of Safety-Related Electrical Equipment, Appendix B, Section 1.b states that credit for as much as 8% evaporation can be allowed when superheat exists.

The following table provides conservative assumptions that are used for both the peak pressure methodology and EQ methodology.

EPU MSLB Peak Pressure and EQ Conservatisms	
Conservatisms	**Justification**
Metal expansion due to pressure and temperature increases the RCS and SG volumes by 2%	Results in more steam released from the SG as well as additional energy to be transferred from the primary to secondary systems.
Maximum RCS flow	Allows the maximum possible heat transfer from primary to secondary systems.
No safety injection (SI)	SI would decrease the primary system heat.
No steam generator tube plugging (SGTP)	SGTP would reduce the primary to secondary heat transfer.
Initially all rods are fully out	This maximizes the time required to reduce core power.
All main feedwater flow is assumed to be delivered to the ruptured steam generator	Results in twice as much feedwater flow to ruptured steam generator.

The EPU analysis follows the same peak pressure and EQ methodologies used in the CLB. The EPU analysis does limit the return to power to a value that bounds the maximum value identified in the safety analysis MSLB, because the conservative assumption to not credit safety injection can allow the restart power to greatly exceed the maximum value.

The following table lists some of the more significant differences between input data used in the CLB and the EPU peak pressure analyses.

Summary of CLB and EPU MSLB Peak Pressure Differences

Parameter	CLB Peak Pressure	EPU Peak Pressure	Justification
Core Power (MWt)	2754	3030	The uprate will increase the current power to 3020 MWt. Including an uncertainty of 0.3% increases the core power to 3030 MWt.
Initial Pressure (psia)	17.1	15.51	The containment initial pressure for EPU is reduced as indicated in the proposed change to Technical Specification 3.6.1.4.
Containment Volume (ft^3)	2.506×10^6	2.498×10^6	A smaller containment volume will result in more limiting containment peak pressure and temperature results.
Heat Sink Area (ft^2)	Nominal	Nominal minus 2%	This reduces the heat transfer area for the inactive heat sinks in containment to remove heat from the steam releases.

The following table lists some of the more significant differences between input data used in the CLB and the EPU peak temperature analyses.

Summary of CLB and EPU MSLB EQ Differences

Parameter	CLB EQ	EPU EQ	Justification
Core Power (MWt)	2754	3030	The uprate will increase the current power to 3020 MWt. Including an uncertainty of 0.3% increases the core power to 3030 MWt.
Initial Pressure (psia)	14.0	13.69	A lower initial pressure will result in a more limiting containment peak temperature for EQ cases.
Containment Volume (ft^3)	$2.506x10^6$	$2.498x10^6$	A smaller containment volume will result in more limiting containment peak pressure and temperature results.
Heat Sink Area (ft^2)	Nominal	Nominal minus 2%	This reduces the heat transfer area for the inactive heat sinks in containment to remove heat from the steam releases.

SCVB-21:

Section 2.6.1.2.2.2 does not state whether the three single failure scenarios at 0-percent, 25-percent, 50-percent, 75-percent, and full hot power were analyzed with or without offsite power available. Please clarify.

Response

Loss of offsite power (LOOP) results in a loss of RCS flow, which greatly reduces the rate of energy transfer from the RCS to the secondary side. This results in lower energy release to containment, which reduces the containment pressure/temperature response. This was confirmed by running the limiting case for both offsite power available and LOOP. For conservatism, all cases (peak pressure and EQ) assume offsite power is available.