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

FPL

Proprietary Information – Withhold From Public Disclosure Under 10 CFR 2.390.
The balance of this letter may be considered non-proprietary upon removal of Attachment 1.

July 23, 2012

L-2012-294
10 CFR 50.90
10 CFR 2.390

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

Supplemental Information Related to the Control Element Assembly Reactivity Insertion Curve for the 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.

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).

Westinghouse Electric Company (Westinghouse) has revised the bounding control element assembly (CEA) reactivity insertion curve (referred to as the SCRAM curve) used in the EPU license amendment request (LAR). Attachment 1 to this letter provides an assessment of the SCRAM curve revision to the St. Lucie Unit 2 EPU analyses. A comparison of the revised SCRAM curve to the original SCRAM curve used in the EPU LAR safety analyses is also included.

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Attachment 1 contains information that is proprietary to Westinghouse. Attachment 2 provides non-proprietary version of Attachment 1.

Attachment 3 contains the Proprietary Information Affidavit. The purpose of this attachment is to withhold the proprietary information contained in Attachment 1 from public disclosure. The Affidavit, signed by Westinghouse as the owner of the information, sets forth the basis for which the information may be withheld from public disclosure by the Commission and addresses with specificity the considerations listed in paragraph (b)(4) of § 2.390 of the Commission's regulations. Accordingly, it is respectfully requested that the information which is proprietary to Westinghouse be withheld from public disclosure in accordance with 10 CFR 2.390.

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.

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. Jack Hoffman, St. Lucie Extended Power Uprate LAR Project Manager, at 772-467-7493.

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

Executed on JULY 23, 2012.

Very truly yours,

Joseph Jensen
Site Vice President
St. Lucie Plant

Attachments (3)

cc: Ms. Cynthia Becker, Florida Department of Health

Supplemental Information Related to the Control Element Assembly Reactivity Insertion Curve for the Extended Power Uprate License Amendment Request

1.0 Introduction

The purpose of this letter is to evaluate a change in the bounding control element assembly (CEA) reactivity insertion curve (referred to as SCRAM curve herein) applicable to the St. Lucie Unit 2 Extended Power Uprate (EPU). A comparison of the revised normalized SCRAM curve versus the SCRAM curve used in the safety analyses and described in the St. Lucie Unit 2 EPU license amendment request (LAR) (Reference 1) is presented in Table 1.0-1.

Table 1.0-1
Comparison of Revised SCRAM Curve Versus LAR SCRAM Curve

Original Fraction Inserted LAR Table 2.8.2-2	Original Rod Worth (%k) LAR Table 2.8.2-2	Revised Fraction Inserted	Revised Rod Worth (%k)
0.00	0.0000	0.000	0.000
0.05	-0.0057	0.057	-0.006
0.10	-0.0281	0.107	-0.028
0.15	-0.0588	0.156	-0.043
0.20	-0.0884	0.206	-0.055
0.25	-0.1217	0.255	-0.066
0.30	-0.1529	0.305	-0.078
0.35	-0.1862	0.355	-0.093
0.40	-0.2267	0.404	-0.113
0.45	-0.2766	0.454	-0.140
0.50	-0.3385	0.504	-0.176
0.55	-0.4186	0.553	-0.226
0.60	-0.5231	0.603	-0.290
0.65	-0.6651	0.653	-0.390
0.70	-0.8632	0.702	-0.540
0.75	-1.1419	0.752	-0.770
0.80	-1.5532	0.801	-1.150
0.85	-2.1975	0.851	-1.817
0.90	-3.2375	0.901	-2.950
0.95	-4.6051	0.950	-4.605
1.00	-5.2000	1.000	-5.200

The assessment herein will evaluate the impact of the revised SCRAM curve shown in Table 1.0-1 on the following EPU LAR sections:

- LAR Section 2.8.2 – Nuclear Design (Section 2.0 herein)
- LAR Section 2.8.3 – Thermal and Hydraulic Design (Section 3.0 herein)
- LAR Section 2.8.5 – Accident and Transient Analyses (Section 4.0 herein)

Note that both the loss of coolant accident (LOCA) and the Non-LOCA events are discussed. Each LAR subsection identified will be completely assessed and the impact of the revised SCRAM curve explicitly determined. Updated results, tables or figures will be provided as appropriate.

2.0 Nuclear Design

Nuclear Design LAR and Request for Additional Information Input:

LAR Section 2.8.2 presents the nuclear design LAR input for the St. Lucie Unit 2 EPU. A review of this LAR section indicates that only LAR Table 2.8.2-2, Sheet 2 of 3, is affected by the revised SCRAM curve. A replacement for LAR Table 2.8.2-2, Sheet 2, is provided as Table 2.0-1. Note that annotation (5) is unaffected by the revised SCRAM curve, and thus is not repeated.

Table 2.0-1
Replacement Table for Sheet 2 of LAR Table 2.8.2-2

Safety Parameter	Current Design Values		Revised EPU Values	
	Fraction of Rod Insertion	Rod Worth (%k)	Fraction of Rod Insertion	Rod Worth (%k)
Trip Reactivity versus Rod Position(5)	0.00	0.0000	0.000	0.000
	0.05	-0.0005	0.057	-0.006
	0.10	-0.0022	0.107	-0.028
	0.15	-0.0043	0.156	-0.043
	0.20	-0.0076	0.206	-0.055
	0.25	-0.0151	0.255	-0.066
	0.30	-0.0200	0.305	-0.078
	0.35	-0.0275	0.355	-0.093
	0.40	-0.0400	0.404	-0.113
	0.45	-0.0594	0.454	-0.140
	0.50	-0.0907	0.504	-0.176
	0.55	-0.1426	0.553	-0.226
	0.60	-0.2279	0.603	-0.290
	0.65	-0.3672	0.653	-0.390
	0.70	-0.5870	0.702	-0.540
	0.75	-0.9223	0.752	-0.770
	0.80	-1.4645	0.801	-1.150
	0.85	-2.3425	0.851	-1.817
	0.90	-3.5948	0.901	-2.950
	0.95	-4.7698	0.950	-4.605
	1.00	-5.4000	1.000	-5.200

In addition to review of the LAR Section 2.8.2, a review of the responses to the requests for additional information (RAI) was performed. The responses for RAIs SRXB-26, SRXB-27, and SRXB-28 are documented in FPL letter L-2011-493 (Reference 2). The RAI response review indicates that responses to these RAIs are unaffected by the revised SCRAM curve and remain applicable.

3.0 Thermal and Hydraulic Design

LAR Section 2.8.3, presents the thermal and hydraulic design LAR input for the St. Lucie Unit 2 EPU. A review of this LAR section indicates that the revised SCRAM curve has no effect on the original text. As such, no change to LAR Section 2.8.3 is required.

Further, the responses to RAIs SRXB-29, SRXB-30, and SRXB-31 are documented in FPL letter L-2011-493 (Reference 2). A review indicates that these RAI responses are unaffected by the revised SCRAM curve and thus remain applicable.

4.0 Accident and Transient Analyses

LAR Section 2.8.5 (and subsections) presents the LOCA and Non-LOCA transient analyses for the St. Lucie Unit 2 EPU.

LAR Figure 2.8.5.0-4 presents the original normalized SCRAM curve. This figure is revised as shown in Figure 4.0-1.

The revised SCRAM curve has the potential to alter Non-LOCA transient responses after the beginning of rod insertion. This effect could result in changes to reported values of parameters of interest that occur shortly after the SCRAM rods insert, such as minimum departure from nucleate boiling ratio (mDNBR), peak reactor coolant system (RCS) pressure, peak main steam system (MSS) pressure, peak linear heat rate (PLHR) or actuation timing of emergency safety features (ESFs).

Note that since there is only a change to the SCRAM curve, reactor trip times are unaffected. While there may be slight timing changes in post-trip reported sequence of events entries, these changes are negligible. However, their impact on the acceptance criteria is explicitly factored into the assessments. Similarly, unaffected are long term Non-LOCA transient responses such as steam releases, pressurizer overfill, steam generator margin to overfill (MTO) and long term auxiliary feedwater (AFW) adequacy. For long term events, the intermediate negative reactivity contribution during CEA insertion is insignificant. These events are primarily dependent upon the total rod worth when fully inserted. Thus, events such as Station Blackout, steam generator tube rupture (SGTR), RCS depressurization for pressurizer overfill, and the loss of feedwater and feedline break AFW adequacy events are unaffected by the revised SCRAM curve.

Table 4.0-1 is based on LAR Table 2.8.5.0-5 with the following additional items:

- Inclusion of LAR Section 2.8.5.6.3 – LOCA
- Inclusion of locked rotor/sheared shaft (LR/SS) mDNBR
- Inclusion of RCS depressurization pressurizer overfill
- Inclusion of SGTR MTO

As presented in Table 4.0-1, there is only a slight impact on certain parameters of interest. Despite the minor differences in mDNBR and peak pressure values, the transient response (sequence of events and figures) presented in LAR Section 2.8.5 remain representative of the events analyzed. Events that were determined to be not impacted are designated with “N/A” in the “Revised Value” column of Table 4.0-1. Parameters that were recalculated and found to remain the same are presented as “No Change.” Parameters which showed negligible impact are presented as “Insignificant” (pressure change less than 2 psia, DNBR reduction less than 0.01, peak clad temperature change less than 15 °F).

As such, only the revised parameters of interest and a revision to LAR Figure 2.8.5.0-4 are presented. Individual sequence of events and summary tables are not explicitly revised, as the current LAR tables provide the representative transient response.

Table 4.0-1
Accident and Transient Analysis Impact Summary

LAR Section	Event	Criterion	Analysis Limit	Current LAR Value	Revised Value	Comment
2.8.5.1.1	Decrease in Feedwater (FW) Temperature, Increase in FW Flow, Increase in Steam Flow, and Inadvertent Opening of a Steam Generator Relief or Safety Valve	Minimum DNBR (mDNBR) for Increase in FW Flow	1.42	1.96	No Change	No Impact (See Note 1)
		mDNBR for Reduced FW Temperature	1.42	1.97	No Change	No Impact (See Note 1)
		Maximum Post Trip Reactivity Hot Zero Power (HZP)	N/A	-3.005$	N/A	No Impact (See Note 2)
2.8.5.1.2	Steam System Piping Failures Inside and Outside Containment	mDNBR (Pre-Trip, Failure of Fast Bus Transfer (FFBT)	1.42	1.63	No Change	No Impact (See Notes 3,20)
		Peak Linear Heat Rate (PLHR) (Pre-Trip, FFBT)	22 kW/ft	17.677 kW/ft	No Change	No Impact (See Notes 3,20)
		mDNBR (Pre-Trip, LOOP)	1.42	1.76	No Change	No Impact (See Notes 3,20)
		PLHR (Pre-Trip, LOOP)	22 kW/ft	< 17.677 kW/ft	No Change	No Impact (See Notes 3,20)
		mDNBR W-3 Correlation (Post-Trip)	1.30	4.286	N/A	No Impact (See Note 2)
		PLHR (Post-Trip)	22 kW/ft	7.25 kW/ft	N/A	No Impact (See Note 2)
2.8.5.2.1	Loss of External Load, Turbine Trip, Loss of Condenser Vacuum (LOCV)	mDNBR (LOCV)	1.42	2.23	No Change	No Impact (See Note 1)
		Peak RCS Pressure (LOCV)	2750 psia	2669.14 psia	Insignificant	Negligible Impact (See Note 6)
		Peak MSS Pressure (LOCV)	1100 psia	1093.97 psia	Insignificant	Negligible Impact (See Note 6)

LAR Section	Event	Criterion	Analysis Limit	Current LAR Value	Revised Value	Comment
2.8.5.2.2	Loss of Non-Emergency AC Power to the Station Auxiliaries	mDNBR	1.42	Bounded by LAR Section 2.8.5.3.1	N/A	No Impact (See Note 5)
		Peak RCS Pressure	2750 psia	Bounded by LAR Section 2.8.5.2.1	N/A	No Impact (See Note 5)
		Peak MSS Pressure	1100 psia	Bounded by LAR Section 2.8.5.2.1	N/A	No Impact (See Note 5)
2.8.5.2.3	Loss of Normal Feedwater Flow	mDNBR	1.42	Bounded by LAR Section 2.8.5.3.1	N/A	No Impact (See Note 5)
		Peak RCS Pressure	2750 psia	Bounded by LAR Section 2.8.5.2.1	N/A	No Impact (See Note 5)
		Peak MSS Pressure	1100 psia	Bounded by LAR Section 2.8.5.2.1	N/A	No Impact (See Note 5)
2.8.5.2.4	Feedwater System Pipe Breaks Inside and Outside Containment	mDNBR	1.42	2.21	Insignificant	No Impact (See Note 1)
		Peak RCS Pressure	2750 psia	2704.2 psia	2714.9 psia Large Break 2710.6 psia Small Break	Impacted (See Note 16)
		Peak MSS Pressure	1100 psia	1094 psia	Insignificant	Negligible Impact (See Note 6)

Table 4.0-1 (continued)
Accident and Transient Analysis Impact Summary

LAR Section	Event	Criterion	Analysis Limit	Current LAR Value	Revised Value	Comment
2.8.5.2.5	Asymmetric Steam Generator Transient	mDNBR (0% SGTP)	1.42	2.229	No Change	No Impact (See Note 1)
		Peak RCS Pressure (0% SGTP)	2750 psia	2371 psia	Insignificant	Negligible Impact (See Note 19)
		Peak MSS Pressure (0% SGTP)	1100 psia	1081 psia	No Change	No Impact (See Note 6)
		mDNBR (10% SGTP)	1.42	2.229	No Change	No Impact (See Note 1)
		Peak RCS Pressure (10% SGTP)	2750 psia	2392 psia	Insignificant	Negligible Impact (See Note 19)
		Peak MSS Pressure (10% SGTP)	1100 psia	1080 psia	No Change	No Impact (See Note 6)
2.8.5.3.1	Loss of Forced Reactor Coolant Flow	mDNBR	1.42	1.445	1.378	Impacted (See Notes 3,8)
		Peak RCS Pressure	2750 psia	2405.7 psia	Insignificant	Negligible Impact (See Note 19)
		Peak MSS Pressure	1100 psia	1039.5 psia	Insignificant	Negligible Impact (See Note 6)

Table 4.0-1 (continued)
Accident and Transient Analysis Impact Summary

LAR Section	Event	Criterion	Analysis Limit	Current LAR Value	Revised Value	Comment
2.8.5.3.2	Reactor Coolant Pump Rotor Seizure and Reactor Coolant Pump Shaft Break	Peak Clad Temperature	2375 °F	1589.8 °F	Insignificant	Negligible Impact (See Note 7)
		Max. Reacted Zirconium	16%	0.3%	No Change	No Impact (See Note 7)
		Peak Primary Pressure	2750 psia	2650.03 psia	2657.82 psia	Impacted (See Note 16)
		Rods-in-DNB	10%	< 1.0%	No Change	No Impact (See Note 8)
		mDNBR	1.42	1.38	1.327	Impacted (See Notes 3,8)
2.8.5.4.1	Uncontrolled Control Rod Assembly Withdrawal from a Subcritical or Low Power Startup Condition	mDNBR	1.26	1.28	N/A	No Impact (See Note 2)
		Peak Fuel Centerline Temperature	4717 °F	3432 °F	N/A	No Impact (See Note 2)
		Peak Fuel Avg. Temperature	N/A	2761 °F	N/A	No Impact (See Note 2)

Table 4.0-1 (continued)
Accident and Transient Analysis Impact Summary

LAR Section	Event	Criterion	Analysis Limit	Current LAR Value	Revised Value	Comment
2.8.5.4.2	Uncontrolled Control Rod Assembly Withdrawal at Power	mDNBR	1.42	1.74	No Change	No Impact (See Note 1)
		Core Heat Flux	1.27 FON	1.246 FON	No Change	No Impact (See Note 17)
		PLHR	22 kW/ft	14.9 kW/ft	No Change	No Impact (See Note 17)
		Peak RCS Pressure	2750 psia	2485.2 psia	Insignificant	Negligible Impact (See Notes 4,6)
		Peak MSS Pressure	1100 psia	1090 psia	Insignificant	Negligible Impact (See Note 6)
		Pressurizer Overfill	< 1519 ft^3	1483.4 ft^3	N/A	No Impact (See Note 9)
2.8.5.4.3	Control Element Assembly Misoperation	mDNBR	1.42	> 1.42	N/A	No Impact (See Note 10)
		PLHR	22 kW/ft	< 22 kW/ft	N/A	No Impact (See Note 10)
2.8.5.4.4	Startup of an Inactive Loop at an Incorrect Temperature	N/A	N/A	N/A	N/A	This event is not analyzed for St. Lucie Unit 2
2.8.5.4.5	Chemical and Volume Control System Malfunction that Results in a Decrease in Boron Concentration in the Reactor Coolant	Minimum Time to Loss of Shutdown Margin (Modes 1-5)	> 15 min	> 15 min	N/A	No Impact (See Note 11)
		Minimum Time to Loss of Shutdown Margin (Mode 6)	> 30 min	> 30 min	N/A	No Impact (See Note 11)

Table 4.0-1 (continued)
Accident and Transient Analysis Impact Summary

LAR Section	Event	Criterion	Analysis Limit	Current LAR Value	Revised Value	Comment
2.8.5.4.6	Spectrum of Rod Ejection Accidents	Max. Fuel Pellet Enthalpy, cal/g Beginning of Cycle (BOC)	200	151.4 (HFP) 78.2 (HZP)	N/A	No Impact (See Note 12)
		Max. Clad Average Temperature, °F (BOC)	3000	1941.0 (HFP) 1373.0 (HZP)	N/A	No Impact (See Note 12)
		Max Reacted Zirconium, % (BOC)	16	0.33 (HFP) 0.09 (HZP)	N/A	No Impact (See Note 12)
		Rods-in-DNB, % (BOC)	9.5	< 9.5 (HFP and HZP)	N/A	No Impact (See Note 12)
		Max Fuel Melted, % (BOC)	0.5	< 0.5 (HFP and HZP)	N/A	No Impact (See Note 12)
		Max. Fuel Pellet Enthalpy, cal/g End of Cycle (EOC)	200	141.3 (HFP) 88.7 (HZP)	N/A	No Impact (See Note 12)
		Max. Clad Average Temperature, °F (EOC)	3000	1832.0 (HFP) 1509.0 (HZP)	N/A	No Impact (See Note 12)
		Max Reacted Zirconium, % (EOC)	16	0.24 (HFP) 0.09 (HZP)	N/A	No Impact (See Note 12)
		Rods-in-DNB, % (EOC)	9.5	< 9.5 (HFP and HZP)	N/A	No Impact (See Note 12)
		Max Fuel Melted, % (EOC)	0.5	< 0.5 (HFP and HZP)	N/A	No Impact (See Note 12)

Table 4.0-1 (continued)
Accident and Transient Analysis Impact Summary

LAR Section	Event	Criterion	Analysis Limit	Current LAR Value	Revised Value	Comment
2.8.5.5	Inadvertent Operation of Emergency Core Cooling System (ECCS) and Chemical and Volume Control System (CVCS) Malfunction that Increases Reactor Coolant Inventory	mDNBR	1.42	Bounded by LAR Section 2.8.5.4.2	N/A	No Impact (See Note 13)
		Peak RCS Pressure	2750 psia	Bounded by LAR Section 2.8.5.2.1	N/A	No Impact (See Note 13)
		Peak MSS Pressure	1100 psia	Bounded by LAR Section 2.8.5.2.1	N/A	No Impact (See Note 13)
		Pressurizer Overfill	< 1519 ft^3	1512.3 ft^3	N/A	No Impact (See Note 13)
2.8.5.6.1	Inadvertent Opening of a Pressurizer Relief Valve	mDNBR	1.42	1.73	No Change	No Impact (See Note 1)
		Pressurizer Overfill	N/A	Fills in 184 seconds	N/A	No Impact (See Note 9)

Table 4.0-1 (continued)
Accident and Transient Analysis Impact Summary

LAR Section	Event	Criterion	Analysis Limit	Current LAR Value	Revised Value	Comment
2.8.5.6.2	Steam Generator Tube Rupture	Steam Releases via Turbine to Condenser Prior to Trip (50.1% Affected SG/49.9% Intact SG)	---	1,050,872 lbm	N/A	No Impact (See Note 14)
		Affected / Intact SG Steam Releases (from Reactor Trip to Operator Action)	---	131,269 lbm / 103,333 lbm	N/A	No Impact (See Note 14)
		Affected SG Tube Leakage Before Trip	---	17,190 lbm	N/A	No Impact (See Note 14)
		Affected SG Tube Leakage from Reactor Trip to Operator Action	---	90,347 lbm	N/A	No Impact (See Note 14)
		RCS to Affected SG Total Tube Leakage	---	107,537 lbm	N/A	No Impact (See Note 14)
		Total Intact SG Steam Releases via ADV (from operator action to 2 hrs)	---	492,200 lbm	N/A	No Impact (See Note 14)
		Total Intact SG Steam Releases via ADV (from 2 hrs to 8 hrs)	---	911,300 lbm	N/A	No Impact (See Note 14)
		Margin to Overfill	< 7984 ft^3	6631 ft^3	N/A	No Impact (See Note 14)
2.8.5.6.3	Loss of Coolant Accidents	Peak Cladding Temperature (PCT) Peak Local Oxidation (PLO) Core Wide Oxidation (CWO)	---	---	N/A	No Impact (See Note 18)
2.8.5.7	Anticipated Transients Without Scram	N/A	N/A	N/A	N/A	No Impact (See Note 15)

Notes for Table 4.0-1:

Note 1: Reanalysis for these events confirmed that the RETRAN calculated mDNBRs are changed negligibly as a result of the revised SCRAM curve.

Note 2: These events are analyzed at HZP or post-shutdown conditions. As such, the control rods are assumed to be fully inserted at the start of the event. Thus, these events and their respective results are unaffected by the revised SCRAM curve.

Note 3: The mDNBR criterion for these events is analyzed using the VIPRE-W code. The VIPRE-W calculated DNBRs do not credit increases in RCS pressure or decreases in RCS temperature and therefore represent a conservative estimate of the impact of the SCRAM curve change on minimum DNBR for these events.

Note 4: LAR Table 2.8.5.4.2-3 presents part power RCS overpressurization results for seven assumed initial power values. Per LAR Table 2.8.5.4.2-3, the 100% power case is the most limiting with respect to peak RCS pressure. The revised SCRAM curve resulted in a slight increase in the 100% power RCS peak pressure as shown in Table 4.0-1. Note that the revised SCRAM curve would similarly impact the part power case results presented in LAR Table 2.8.5.4.2-3. However, since the total increase in peak RCS pressure is negligible, the part power RCS pressure increases would also be negligible, and the relative relationship between the different power levels remains the same. Thus, LAR Table 2.8.5.4.2-3 provides the representative peak RCS pressure relationships between the different assumed initial power levels. Note that per previous discussions in Section 4.0, pressurizer overfill results are not impacted by the revised SCRAM curve.

Note 5: The results for these events are bounded by the Loss of Forced Reactor Coolant Flow (LOF) event (for mDNBR) and the LOCV event (for peak pressure). The revised SCRAM curve does not change the conclusion that these events remain bounded by another event. As such, the current LAR sections remain applicable.

Note 6: Per the individual event analyses cited in Table 4.0-1, there is approximately a 1 psi increase in reported peak pressures. As such, the revised SCRAM curve presents a negligible impact on the event results as they remain below their respective peak pressure limits.

Note 7: The peak clad temperature following reanalysis is 1610°F, which remains significantly below the limit of 2375°F. Thus, there is a negligible impact due to the revised SCRAM curve. Further, the maximum reacted Zirconium is 0.3%, which remains below the limit of 16% and is unchanged from the previous revision. Thus, both acceptance criteria are satisfied following reanalysis due to the revised SCRAM curve.

Note 8: The recalculated mDNBR for the LR/SS event is 1.327. Although the EPU analysis mDNBR is below the analysis DNBR limit of 1.42, it remains above the design limit for fuel failures plus applicable penalties [ ][a,c] per LAR Table 2.8.3-5. As such, there are no Rods-in-DNB. Consistent with the previous revision of the analysis and the corresponding LAR text, a Rods-in-DNB value of < 1.0% is conservatively reported. Similarly, the LOF event was reanalyzed. The recalculated mDNBR is 1.378. While this is below the analysis DNBR limit of 1.42, it remains above the design limit for fuel failures plus applicable penalties [ ][a,c] per LAR Table 2.8.3-5.

Note 9: Events analyzed for pressurizer overfill are unaffected by the revised SCRAM curve as the pressurizer level transient is a long term event much greater than several loop cycle times (typical loop cycle time is 10-15 seconds). As such, this event criterion would be insensitive to intermediate changes in reactivity insertion during the dropping of the control rods and would depend primarily on the full scram rod worth. The LAR input related to pressurizer overfill for the events indicated in Table 4.0-1 is unaffected.

Note 10: The CEA Misoperation event is unaffected by the revised SCRAM curve as none of the limiting cases analyzed result in a reactor trip. As such, the current analysis of record (AOR), LAR section and RAI responses remain applicable following the revised SCRAM curve.

Note 11: The Inadvertent Boron Dilution (IBD) analysis performed for St. Lucie Unit 2 does not explicitly model a reactor trip and as such is insensitive to the revised SCRAM curve. The reactivity insertion due to an IBD at Mode 1 conditions is bounded by the CEA withdrawal event.

Note 12: The CEA Ejection event only models total trip reactivity rather than reactivity as a function of insertion. As such, the event is independent of changes in the intermediate SCRAM curve values and remains bounding with respect to the new SCRAM curve. The existing AOR, LAR section and RAI responses remain applicable.

Note 13: The CVCS Malfunction event is a steady state power event with no reactor trip. As such, a revised SCRAM curve has no effect on the calculation, the LAR section and the RAI responses.

Note 14: The SGTR event is not affected by a revised SCRAM curve as it is analyzed for long term criteria such as steam releases and MTO. The revised SCRAM curve presents a negligible impact for long term results, as the total scram worth drastically outweighs the intermediate insertion effects prior to the rods being fully inserted. As such, the existing AOR, LAR section and RAI responses remain applicable.

Note 15: The Anticipated Transients Without SCRAM (ATWS) evaluation is only dependent upon the diversity of the Diverse SCRAM System (DSS), Diverse Turbine Trip (DTT) and Diverse Auxiliary Feedwater Actuation System (DAFAS). As such, it is unaffected by the revised SCRAM curve. The existing evaluation, LAR section and RAI responses remain applicable. Note that as part of the RAI submittals, an ATWS evaluation was performed using the St. Lucie Unit 2 Chapter 15 LOCV and FLB events. This evaluation uses the peak LOCV and FLB pressures and presents a scaling calculation to model the increase from the High Pressurizer Pressure Trip (HPPT) setpoint of 2415 psia to the DSS setpoint of 2450 psia. As indicated in Table 4.0-1, the LOCV event was insignificantly impacted, thus presenting a negligible impact to the LOCV portion of the ATWS analysis. The peak RCS pressure for the FLB event increased approximately 11 psia. This would increase the ATWS peak pressure calculated for the FLB adjustment to approximately 2758 psia, which remains significantly below the limit of 3200 psig applicable to the ATWS event. As such, the ATWS RAI evaluation is negligibly impacted by the change in SCRAM curves.

Note 16: The Feedline Break (FLB) and LR/SS events were reanalyzed for the revised SCRAM curve. The peak RCS pressure for both the large and small FLBs is increased by approximately 10 psi. The peak RCS pressure for the overpressurization LR/SS case increased by approximately 8 psi. These increases are due to the FFBT in conjunction with the revised SCRAM curve. Despite the increase, the reanalyzed results remain below the respective design limits of 2750 psia for the small break FLB and LR/SS event and 3000 psia for the large break FLB event.

Note 17: The calculated maximum heat flux and mDNBR are unchanged, thus the maximum PLHR is unchanged.

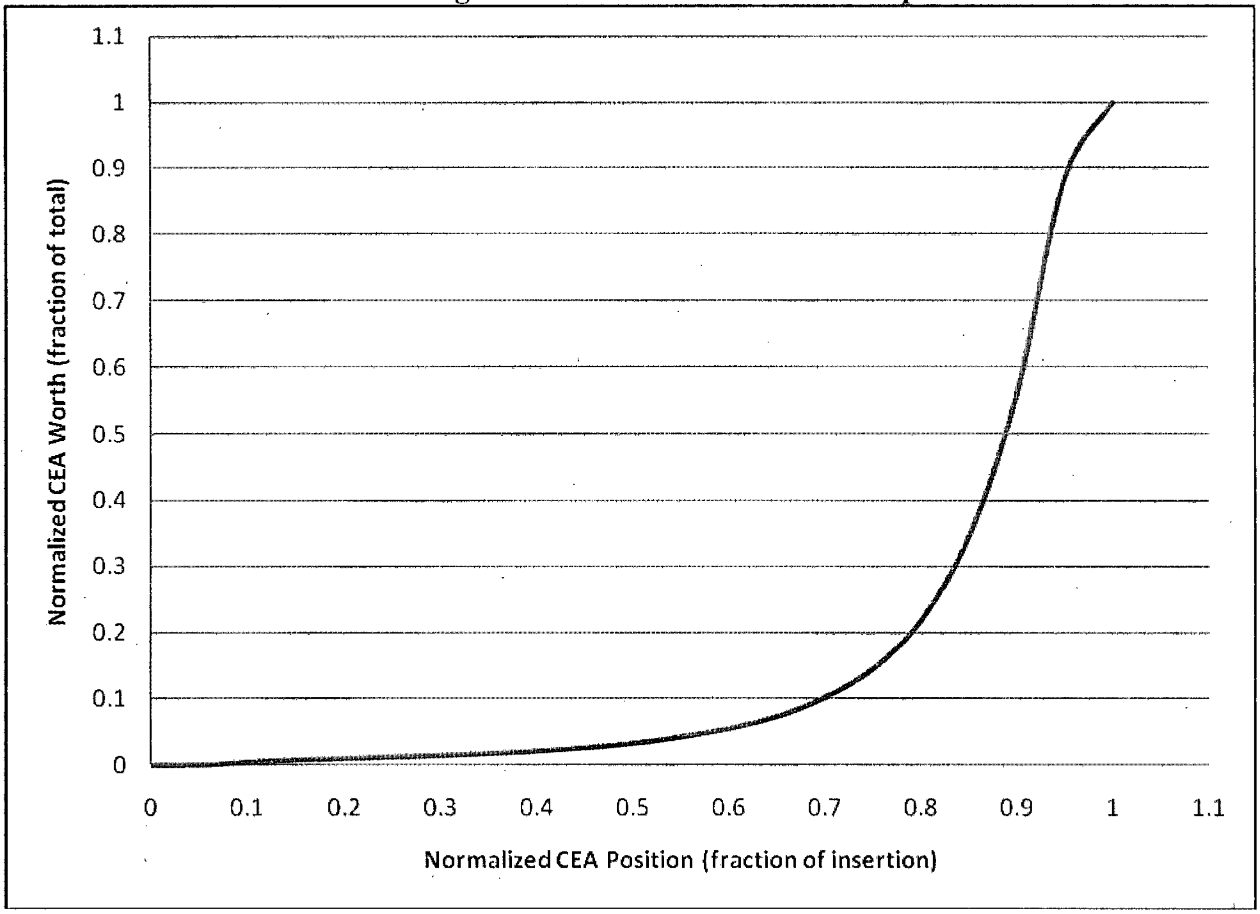
Note 18: The LOCA analyses are unaffected by the revised SCRAM curve. The small break LOCA analysis models a very conservative delay for rod insertion (3 seconds as opposed to the typical 0.74 second holding coil delay) which offsets any impact in the revised SCRAM curve. Further, the large break LOCA does not credit CEA insertion, and as such, is unaffected. The Long Term Cooling analysis does not use the SCRAM curve. Thus, the LOCA AORs, LAR section, RAI responses and UFSAR markups remain applicable.

Note 19: While there is an approximate 8 psia increase in the peak RCS pressure for the LOF event, the peak pressure does not approach the design limit and the event remains bounded by LOCV with respect to peak RCS pressure. Similarly, for the Asymmetric Steam Generator Transient (ASGT) event, there is an approximate 6 psi increase for the 0% SGTP case and 10 psi increase for the 10% SGTP case. However, in both cases the peak RCS pressure does not approach the design limit and remains bounded by the LOCV event. As such, despite the approximate 6-8 psi increase, these events are classified as negligibly impacted.

Note 20: The Pre-Trip Steamline Break (SLB) event was reanalyzed. The FFBT case mDNBR and PLHR remained the same following the revised SCRAM curve. The LOOP case shows an improvement in the mDNBR, however, the previous mDNBR of 1.76 and PLHR of < 17.677 kW/ft are retained herein for conservatism.

This figure replaces LAR Figure 2.8.5.0-4.

Figure 4.0-1:
Revised Normalized CEA Worth vs. Normalized Position
Following CEA Release from Reactor Trip



RAI Responses:

In addition to the assessment of the LAR, a review of the Non-LOCA Transient analysis specific RAIs responses documented in FPL letter L-2011-532 (Reference 3) was performed. Review of these RAI responses indicates only two RAI responses (RAIs SRXB-53 and SRXB-72) require evaluation. These evaluations are performed below. Further, one additional RAI response has changed as a result of the change in SCRAM curve. This RAI, SRXB-66, is revised using the data presented in Table 4.0-1.

Evaluation of RAI SRXB-53:

RAI SRXB-53 requests discussion of the use of the RETRAN DNBR approximation for the Feedwater Malfunction (FWM) event. The response to SRXB-53, documented in FPL letter L-2011-532 (Reference 3), identifies the limiting mDNBR for the FWM event of 1.96. This mDNBR remains unchanged following the revision to the SCRAM curve. As such, the current RAI response remains applicable.

Evaluation of RAI SRXB-72:

The response to RAI SRXB-72 requests discussion related to the use of reactivity parameters and the mDNBR for the RCS depressurization event. The response to RAI SRXB-72, documented in FPL letter L-2011-532 (Reference 3), presents percent of margin to the DNBR specified acceptable fuel design limits (SAFDL). A revised SCRAM curve has no effect on the mDNBR for the RCS depressurization event. Thus, there is no change to the percent of margin to the DNBR SAFDL. As such, the current RAI response remains applicable.

Revision of RAI SRXB-66:

RAI SRXB-66 requests inclusion of a specific MSS overpressurization case. The response to RAI-SRXB-66, documented in FPL letter L-2011-532 (Reference 3), presents the CEA Withdrawal at Power (CEAWAP) MSS overpressurization results and compares them to the bounding MSS overpressurization event, the LOCV event. Both the LOCV and CEAWAP MSS overpressurization results have changed due to the change in SCRAM curves.

SRXB-66 ***Tables 2.8.5.4.2-2 and 2.8.5.4.2-3 show the results of an uncontrolled control rod assembly withdrawal at power for the RCS over-pressurization and DNB cases. The results of the main steam system (MSS) over-pressurization cases are missing.***

Explain why the results of the MSS over-pressurization are not discussed for this event.

Response:

The uncontrolled control rod assembly withdrawal at power main steam system (MSS) over-pressurization results are bounded by the loss of condenser vacuum (LOCV) event in EPU LAR Attachment 5, Section 2.8.5.2.1, due to the more significant reduction in heat removal capability of the steam generators (SGs). The uncontrolled control rod assembly withdrawal at power event assumes the secondary side operates normally with the turbine still relieving steam flow and pressure prior to the reactor trip. The LOCV event combines a loss of normal feedwater with a turbine trip which results in a total loss of secondary heat sink with the reactor still operating at full power, causing a greater challenge to secondary overpressure. Therefore, the MS system over-pressurization results have not been discussed.

For completeness, the results of the uncontrolled control rod assembly withdrawal at power MSS over-pressurization are presented in Table SRXB-66-1 below. Note that the 100% power, maximum feedback, 2 pcm/sec case yields the most limiting MSS over-pressurization results for all power levels for the uncontrolled control rod assembly withdrawal at power event. Per the LOCV reanalysis, the limiting LOCV MSS peak pressure is 1094.75 psia.

Table SRXB-66-1
Uncontrolled Control Rod Assembly Withdrawal at Power Event
Limiting Main Steam System Over-Pressurization Results

	Limiting Analysis Value	***Analysis Limit***	***Case***
Maximum Secondary Pressure (psia)	*1090.74*	*1100.0*	*100% power, maximum feedback, 2 pcm/sec*

5.0 Conclusion

<u>Nuclear Design Impact:</u>

A review of the nuclear design LAR section, Section 2.8.2, and the nuclear design specific RAI responses indicates that only LAR Table 2.8.2-2, Sheet 2, required revision due to the revised SCRAM curve. Sheet 2 of LAR Table 2.8.2-2 is revised and provided as Table 2.0-1. The remaining LAR input and RAI responses are applicable.

<u>Thermal-Hydraulic (T-H) Impact:</u>

A review of the T-H LAR section, Section 2.8.3, and the T-H specific RAI responses indicates that neither the LAR section nor the RAI responses are affected by the revised SCRAM curve. As such, the existing text remains applicable.

<u>Non-LOCA Safety Analysis Impact:</u>

A review of the Non-LOCA LAR section, Section 2.8.5 and subsections, indicates that the following events were affected by the revised SCRAM curve:

- Loss of Forced Reactor Coolant Flow
- Locked Rotor/Sheared Shaft (LR/SS)
- Feedline Break

Revised parameters of interest are provided in Table 4.0-1 herein for these events. Further, the primary and MSS pressure peaks and other parameters of interest for the following events were negligibly impacted by the revised SCRAM curve:

- Feedline Break (Peak MSS Pressure)
- Loss of Condenser Vacuum
- Asymmetric Steam Generator Transient (ASGT)
- Loss of Forced Reactor Coolant Flow (LOF)

- Locked Rotor/Sheared Shaft (Peak Clad Temperature)
- CEA Withdrawal at Power

The changes in pressure peaks are presented in Table 4.0-1 for these events. The results conclude that there is a minor change in peak primary and main steam system pressure and all peaks remain below the respective acceptance criteria limits.

A review of the Non-LOCA RAI responses indicated that only the response to RAI SRXB-66 required revision due to the revised SCRAM curve. The revised RAI response is provided in Section 4.0.

Although the mDNBR for the LOF and LR/SS events was recalculated to be below the identified safety analysis limit of 1.42, in both cases it remains above the applicable DNBR design limit plus associated rod bow penalty. Per LAR Table 2.8.3-5, the design limit applicable to the LOF and LR/SS is 1.29 plus penalty due to rod bow [ ]^{a,c} for the large thimble subchannel. As such, in both cases, the mDNBR criterion remains satisfied.

LOCA Impact:

Per Note 18 to Table 4.0-1, the LOCA events are unaffected by the revised SCRAM curve. As such, the existing AORs, LAR section and RAI responses remain applicable.

6.0 References

1. R. L. Anderson (FPL) to U.S. Nuclear Regulatory Commission (L-2011-021), "License Amendment Request for Extended Power Uprate, Attachment 5, Licensing Report," February 25, 2011, (Accession Number ML110730299).
2. R. L. Anderson (FPL) to U. S. Nuclear Regulatory Commission (L-2011-493), "Response to NRC Reactor System Branch and Nuclear Performance Branch Request for Additional Information Regarding Extended Power Uprate License Amendment Request," November 23, 2011 (Accession No. ML11332A133).
3. R. L. Anderson (FPL) to U. S. Nuclear Regulatory Commission (L-2011-532), "Response to NRC Reactor System Branch and Nuclear Performance Branch Request for Additional Information Regarding Extended Power Uprate License Amendment Request," January 14, 2012 (Accession No. ML12019A074).

ATTACHMENT 3

Supplemental Information Related to the Control Element Assembly Reactivity Insertion Curve for the Extended Power Uprate License Amendment Request

Westinghouse Electric Company Affidavit to Withhold Proprietary Information from Public Disclosure

This coversheet plus 7 pages

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CAW-12-3513

July 18, 2012

APPLICATION FOR WITHHOLDING PROPRIETARY
INFORMATION FROM PUBLIC DISCLOSURE

Subject: P-Attachment to FPL-12-194, "Impact of the Revised SCRAM Curve Used in the St. Lucie Unit 2 EPU License Amendment Request" (Proprietary)

The proprietary information for which withholding is being requested in the subject document is further identified in Affidavit CAW-12-3513 signed by the owner of the proprietary information, Westinghouse Electric Company LLC. The affidavit, which accompanies this letter, sets forth the basis on which the information may be withheld from public disclosure by the Commission and addresses with specificity the considerations listed in paragraph (b)(4) of 10 CFR Section 2.390 of the Commission's regulations.

Accordingly, this letter authorizes the utilization of the accompanying affidavit by Florida Power and Light.

Correspondence with respect to the proprietary aspects of the application for withholding or the Westinghouse affidavit should reference CAW-12-3513, and should be addressed to J. A. Gresham, Manager, Regulatory Compliance, Westinghouse Electric Company, Suite 428, 1000 Westinghouse Drive, Cranberry Township, Pennsylvania 16066.

Very truly yours,

for J. A. Gresham, Manager
Regulatory Compliance

Enclosures

AFFIDAVIT

STATE OF CONNECTICUT:

ss

COUNTY OF HARTFORD:

Before me, the undersigned authority, personally appeared C. M. Molnar, who, being by me duly sworn according to law, deposes and says that he is authorized to execute this Affidavit on behalf of Westinghouse Electric Company LLC (Westinghouse), and that the averments of fact set forth in this Affidavit are true and correct to the best of his knowledge, information, and belief:

C. M. Molnar, Principal Engineer
Regulatory Compliance

Sworn to and subscribed before me
this 18th day of July 2012

Laurie J. White
Notary Public
My commission expires: 8/31/2014

(1) I am Principal Engineer, Regulatory Compliance, in Nuclear Services, Westinghouse Electric Company LLC (Westinghouse), and as such, I have been specifically delegated the function of reviewing the proprietary information sought to be withheld from public disclosure in connection with nuclear power plant licensing and rule making proceedings, and am authorized to apply for its withholding on behalf of Westinghouse.

(2) I am making this Affidavit in conformance with the provisions of 10 CFR Section 2.390 of the Commission's regulations and in conjunction with the Westinghouse Application for Withholding Proprietary Information from Public Disclosure accompanying this Affidavit.

(3) I have personal knowledge of the criteria and procedures utilized by Westinghouse in designating information as a trade secret, privileged or as confidential commercial or financial information.

(4) Pursuant to the provisions of paragraph (b)(4) of Section 2.390 of the Commission's regulations, the following is furnished for consideration by the Commission in determining whether the information sought to be withheld from public disclosure should be withheld.

(i) The information sought to be withheld from public disclosure is owned and has been held in confidence by Westinghouse.

(ii) The information is of a type customarily held in confidence by Westinghouse and not customarily disclosed to the public. Westinghouse has a rational basis for determining the types of information customarily held in confidence by it and, in that connection, utilizes a system to determine when and whether to hold certain types of information in confidence. The application of that system and the substance of that system constitutes Westinghouse policy and provides the rational basis required.

Under that system, information is held in confidence if it falls in one or more of several types, the release of which might result in the loss of an existing or potential competitive advantage, as follows:

(a) The information reveals the distinguishing aspects of a process (or component, structure, tool, method, etc.) where prevention of its use by any of

Westinghouse's competitors without license from Westinghouse constitutes a competitive economic advantage over other companies.

(b) It consists of supporting data, including test data, relative to a process (or component, structure, tool, method, etc.), the application of which data secures a competitive economic advantage, e.g., by optimization or improved marketability.

(c) Its use by a competitor would reduce his expenditure of resources or improve his competitive position in the design, manufacture, shipment, installation, assurance of quality, or licensing a similar product.

(d) It reveals cost or price information, production capacities, budget levels, or commercial strategies of Westinghouse, its customers or suppliers.

(e) It reveals aspects of past, present, or future Westinghouse or customer funded development plans and programs of potential commercial value to Westinghouse.

(f) It contains patentable ideas, for which patent protection may be desirable.

There are sound policy reasons behind the Westinghouse system which include the following:

(a) The use of such information by Westinghouse gives Westinghouse a competitive advantage over its competitors. It is, therefore, withheld from disclosure to protect the Westinghouse competitive position.

(b) It is information that is marketable in many ways. The extent to which such information is available to competitors diminishes the Westinghouse ability to sell products and services involving the use of the information.

(c) Use by our competitor would put Westinghouse at a competitive disadvantage by reducing his expenditure of resources at our expense.

(d) Each component of proprietary information pertinent to a particular competitive advantage is potentially as valuable as the total competitive advantage. If competitors acquire components of proprietary information, any one component may be the key to the entire puzzle, thereby depriving Westinghouse of a competitive advantage.

(e) Unrestricted disclosure would jeopardize the position of prominence of Westinghouse in the world market, and thereby give a market advantage to the competition of those countries.

(f) The Westinghouse capacity to invest corporate assets in research and development depends upon the success in obtaining and maintaining a competitive advantage.

(iii) The information is being transmitted to the Commission in confidence and, under the provisions of 10 CFR Section 2.390, it is to be received in confidence by the Commission.

(iv) The information sought to be protected is not available in public sources or available information has not been previously employed in the same original manner or method to the best of our knowledge and belief.

(v) The proprietary information sought to be withheld in this submittal is that which is appropriately marked in Florida Power and Light letter FPL-12-194 P-Attachment, "Impact of the Revised SCRAM Curve Used in the St. Lucie Unit 2 EPU License Amendment Request," (Proprietary), for submittal to the Commission, being transmitted by Florida Power and Light (FPL) letter FPL-12-194 and Application for Withholding Proprietary Information from Public Disclosure, to the Document Control Desk. The proprietary information as submitted by Westinghouse is that associated with the St. Lucie Unit 2 Extended Power Uprate (EPU), and may be used only for that purpose.

This information is part of that which will enable Westinghouse to:

(a) Support FPL's St. Lucie Unit 2 EPU license amendment request.

Further this information has substantial commercial value as follows:

(a) The information requested to be withheld reveals the distinguishing aspects of a methodology which was developed by Westinghouse.

Public disclosure of this proprietary information is likely to cause substantial harm to the competitive position of Westinghouse because it would enhance the ability of competitors to provide similar technical evaluation justifications and licensing defense services for commercial power reactors without commensurate expenses. Also, public disclosure of the information would enable others to use the information to meet NRC requirements for licensing documentation without purchasing the right to use the information.

The development of the technology described in part by the information is the result of applying the results of many years of experience in an intensive Westinghouse effort and the expenditure of a considerable sum of money.

In order for competitors of Westinghouse to duplicate this information, similar technical programs would have to be performed and a significant manpower effort, having the requisite talent and experience, would have to be expended.

Further the deponent sayeth not.

Proprietary Information Notice

Transmitted herewith are proprietary and/or non-proprietary versions of documents furnished to the NRC in connection with requests for generic and/or plant-specific review and approval.

In order to conform to the requirements of 10 CFR 2.390 of the Commission's regulations concerning the protection of proprietary information so submitted to the NRC, the information which is proprietary in the proprietary versions is contained within brackets, and where the proprietary information has been deleted in the non-proprietary versions, only the brackets remain (the information that was contained within the brackets in the proprietary versions having been deleted). The justification for claiming the information so designated as proprietary is indicated in both versions by means of lower case letters (a) through (f) located as a superscript immediately following the brackets enclosing each item of information being identified as proprietary or in the margin opposite such information. These lower case letters refer to the types of information Westinghouse customarily holds in confidence identified in Sections (4)(ii)(a) through (4)(ii)(f) of the affidavit accompanying this transmittal pursuant to 10 CFR 2.390(b)(1).