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

FPL **Proprietary Information – Withhold From Public Disclosure Under 10 CFR 2.390**

October 14, 2011

L-2011-409
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

Revision to Extended Power Uprate License Amendment Request Proposed Technical Specification Regarding Fuel Loading Curve and Areal Density Criteria for Metamic Inserts

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.

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).

FPL is proposing to revise the information presented in Attachment 1 of the St. Lucie Unit 1, EPU License Amendment Request (LAR), (Reference 1); specifically, Section 3.1, Renewed Facility Operating License and Technical Specification Changes, Item 31, TS 5.6 DESIGN FEATURES - FUEL STORAGE - CRITICALITY, Table 5.6-1.

In addition to the above, FPL is proposing to supplement EPU LAR Attachment 1, Section 3.1, Renewed Facility Operating License and Technical Specification Changes, TS 5.6, DESIGN FEATURES - FUEL STORAGE - CRITICALITY; to include ^{10}B Areal Density Criteria for Metamic Inserts.

The information in Attachment 1 to this letter presents the revision to the proposed TS change submitted by FPL (Reference 1) regarding the EPU LAR.

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Attachment 2 contains the marked-up and clean pages to support the proposed TS revision.

The proposed TS change to Table 5.6-1 is based upon the updated information provided in Attachment 3 which includes a copy of Holtec Report No. HI-2104714, Rev. 2, "St. Lucie Unit 1 Criticality Analysis for EPU and Non-EPU Fuel." Revision 1 of this report was previously submitted to the NRC under cover of Reference 1, as part of Appendix I, to Attachment 5 of the EPU LAR.

Attachment 3 contains Holtec Proprietary Information and is considered proprietary in its entirety. Attachment 4 contains the Holtec Proprietary Information Affidavit. The Affidavit, signed by Holtec 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 Holtec 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-2010-259 [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. 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 14-October-2011

Very truly yours,

Richard L. Anderson
Site Vice President
St. Lucie Plant

Attachments (4)

cc: Mr. William Passetti, Florida Department of Health

Attachment 1

St. Lucie Unit 1
Technical Specification Section 5.6
Design Features - Fuel Storage - Criticality
Revision To Proposed Change Submitted By FPL Letter L-2010-259
Regarding Extended Power Uprate License Amendment Request

By letter L-2010-259 dated November 22, 2010, 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). Included in the EPU License Amendment Request (LAR) were changes to TS 5.6 DESIGN FEATURES - FUEL STORAGE - CRITICALITY. FPL is modifying the proposed TS changes as described below:

Description of the Change

Subsequent to the submittal of the EPU LAR, FPL updated the fuel loading curves in order to preclude the need to extrapolate the values associated with the determination of the minimum required fuel assembly burnup. As a result, the changes proposed by FPL in EPU LAR Attachment 1, Section 3.1, Renewed Facility Operating License and Technical Specification Changes, Item 31, TS 5.6, DESIGN FEATURES - FUEL STORAGE - CRITICALITY; require that the entries under the "Coefficient" column in Table 5.6-1 be revised to reflect the new fuel loading curves and that the information under the "Minimum Burnup" column be deleted.

TS Table 5.6-1 Minimum Burnup as a Function of Enrichment – INSERT 14 submitted with the EPU LAR is replaced by new INSERT 14 provided in Attachment 2.

In addition to the above, FPL proposes to supplement EPU LAR Attachment 1, Section 3.1, Renewed Facility Operating License and Technical Specification Changes, TS 5.6, DESIGN FEATURES - FUEL STORAGE - CRITICALITY; in consideration of a recent TS change proposed for Turkey Point Units 3 and 4 (Reference 1) relative to the inclusion of a ^{10}B areal density criteria for Metamic inserts.

TS 5.6 DESIGN FEATURES - FUEL STORAGE – CRITICALITY is being revised to add TS 5.6.1.a.7 to read:

7. The Metamic neutron absorber inserts shall have a ^{10}B areal density greater than or equal to 0.015 grams $^{10}B/cm^2$.

Note that the marked-up TS pages in Attachment 2 are markups of the pages submitted in the EPU LAR. The remaining changes proposed for TS 5.6, as presented in EPU LAR Attachment 1, remain valid.

Basis for the Change - Fuel Loading Curve

The basis for the change is founded upon FPL updating the fuel loading curves to preclude the need to extrapolate the values associated with determining the minimum required fuel assembly burnup. Attachment 3 provides Revision 2 to Holtec Report No. HI-2104714 "St. Lucie Unit 1 Criticality Analysis for EPU and Non-EPU Fuel" and is the technical basis for the updated fuel loading curves. This analysis was previously submitted to the NRC under cover of Reference 1, as part of Appendix I to Attachment 5 of the EPU LAR. The results of this revised analysis are consistent with the results presented in the EPU LAR.

No Significant Hazards Consideration - Fuel Loading Curve

This change precludes the need to extrapolate data from the fuel loading curves in order to determine the minimum required fuel assembly burnup. The changes to TS Table 5.6-1 are administrative and provide revised inputs which are used to perform minimum required burnup calculations for fuel assemblies. As such, the conclusions of EPU LAR Attachment 1, Section 5.2, No Significant Hazards Consideration, Item P. Design Features - Fuel Storage, remain valid. Accordingly, the proposed change 1) does not involve a significant increase in the probability or consequences of an accident previously evaluated, 2) does not create the possibility of a new or different kind of accident from any previously evaluated, and 3) does not result in a significant reduction in a margin of safety.

Environmental Evaluation - Fuel Loading Curve

This change is administrative in that it provides data which is included in TS Table 5.6-1 which in turn is used to perform minimum required burnup calculations for fuel assemblies. The environmental considerations evaluation contained in the EPU LAR remain valid. Accordingly, the proposed license amendment is eligible for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 50.22(b), no environmental impact statement or environmental assessment is needed in connection with the approval of the proposed license amendment.

Basis for the Change - Areal Density of Metamic Inserts

This change is based upon industry trends to include information in the TS pertaining to Areal Density Criteria for Metamic Inserts. This change is consistent with the spent fuel pool criticality analysis provided in the Attachment 3, Holtec Report No. HI-2104714, "St. Lucie Unit 1 Criticality Analysis for EPU and Non-EPU Fuel," Revision 2.

No Significant Hazards Consideration - Areal Density of Metamic Inserts

This change supplements the proposed EPU LAR Attachment 1, Section 3.1, Renewed Facility Operating License and Technical Specification Changes, TS 5.6, DESIGN FEATURES - FUEL STORAGE - CRITICALITY; with information relative to Areal Density Criteria for Metamic Inserts. The change to TS 5.6 is administrative and provides a statement that the Metamic neutron absorber inserts shall have a ^{10}B areal density greater than or equal to 0.015 grams $^{10}B/cm^2$. As such, the conclusions of EPU LAR Attachment 1, Section 5.2, No Significant Hazards Consideration, Item P. Design Features - Fuel Storage, remain valid. Accordingly, the proposed change 1) does not involve a significant increase in the probability or consequences of an accident previously evaluated, 2) does not create the possibility of a new or different kind of accident from any previously evaluated, and 3) does not result in a significant reduction in a margin of safety.

Environmental Evaluation-Fuel Loading Curve - Areal Density of Metamic Inserts

This change is administrative in that it provides supplemental information which is included in TS 5.6 that establishes a ^{10}B areal density greater than or equal to 0.015 grams $^{10}B/cm^2$. The environmental considerations evaluation contained in the EPU LAR remain valid. Accordingly, the proposed license amendment is eligible for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 50.22(b), no environmental impact statement or environmental assessment is needed in connection with the approval of the proposed license amendment.

References

1. Letter from Michael Kiley (FPL) to NRC; "Fuel Storage Criticality Analysis Supplement 3," dated September 22, 2011, (L-2011-401)

ATTACHMENT 2

Technical Specifications Section 5.6
Design Features-Fuel Storage-Criticality
Revision To Proposed Change Submitted By FPL Letter L-2010-259
Regarding Extended Power Uprate License Amendment Request

Marked-up and Clean
Technical Specification Pages

This coversheet plus 8 pages

CRITICALITY (Continued)

3. A k_{eff} less than or equal to 0.95 when flooded with water containing 500 ppm boron, including an allowance for biases and uncertainties as described in Section 9.1 of the Updated Final Safety Analysis Report.

4. For storage of enriched fuel assemblies, requirements of Criteria ~~1 and 3~~ shall be met by positioning fuel in the spent fuel storage racks consistent with the requirements of Specification 5.6.1.c.

5. Vessel Flux Reduction Assemblies (VFRAs), as defined in Section 9.1 of the Updated Final Safety Analysis Report, may be placed in any allowable fuel storage location.

Insert 5.6.1.a.7

in 5.6.1.a.1 and 5.6.1.a.3

6. Fissile material, not contained in a fuel assembly lattice, shall be stor accordance with the requirements of Criteria ~~1 and 3~~.

b. The Region 1 cask pit storage rack shall contain neutron absorbing material (Boral) between stored fuel assemblies when installed in the spent fuel pool.

c. Loading of spent fuel storage racks shall be controlled as described below. Criteria ~~2 and 3~~ do not apply to the Region 1 cask pit storage rack.

in 5.6.1.c.2, 5.6.1.c.3, 5.6.1.c.5 and 5.6.1.c.6

1. The maximum initial planar average U-235 enrichment of any fuel assembly inserted in a spent fuel storage rack shall be less than or equal to ~~4.5~~ weight percent.

4.6

2. Fuel placed in Region 1 of the spent fuel pool storage racks shall comply with the storage patterns and alignment restrictions of Figure 5.6-1 and the minimum burnup requirements of Table 5.6-1 ~~and Table 5.6-2~~.

Insert 11

3. Fuel placed in Region 2 of the spent fuel pool storage racks shall comply with the storage patterns or allowed special arrangements of Figure 5.6-2 and the minimum burnup requirements of Table 5.6-1 ~~and Table 5.6-2~~. The allowed special arrangement for fresh fuel may be repeated, provided the applicable interface requirements specified by the safety analysis are met.

4. Any fuel satisfying criteria 5.6.1.c.1, including fresh fuel, may be placed in the Region 1 cask pit storage rack.

d. The new fuel storage racks are designed for dry storage of unirradiated fuel assemblies having a U-235 enrichment less than or equal to ~~4.5~~ weight percent, while maintaining a k_{eff} of less than or equal to 0.98 under the most reactive condition.

maximum planar average

4.6

INSERT 11

5. The same directional orientation for Metamic inserts is required for contiguous groups of 2x2 arrays where Metamic inserts are required.

6. Any 2x2 array of Region 2 storage cells that interface with Region 1 shall comply with the rules of Figure 5.6-3. The allowed special arrangement in Region 2 as shown in Figure 5.6-2 shall not be placed adjacent to Region 1.

INSERT 5.6.1.a.7

7. The Metamic neutron absorber inserts shall have a ^{10}B areal density greater than or equal to 0.015 grams $^{10}B/cm^2$.

("INSERT 5.6.1.a.7" supplements EPU LAR Attachment 1, Section 3.1, Renewed Facility Operating License and Technical Specification Changes, TS 5.6, DESIGN FEATURES - FUEL STORAGE - CRITICALITY).

INSERT 14

TABLE 5.6-1

Minimum Burnup as a Function of Enrichment ~~for Non-Blanketed Assemblies~~

Fuel Type	Cooling Time	Coefficients			Minimum Burnup (GWd/MTU) for Initial Enrichment			
		A	B	C	1.9 w/o	2.5 w/o	3.0 w/o	3.8 w/o
1	0 years	0.00	9.31	-24.39	0.00	0.00	3.54	10.99
2	0 years	0.00	10.51	-22.35	0.00	3.93	9.18	17.59
3	0 years	0.00	10.97	-14.71	6.13	12.72	18.20	26.98
4	0 years	-0.41	17.00	-21.39	9.43	18.55	25.92	37.29
	12 years	-0.54	16.22	-20.63	8.24	16.55	23.17	33.21
	15 years	-0.53	15.86	-20.07	8.15	16.27	22.74	32.54
	20 years	-0.46	15.11	-18.80	8.25	16.10	22.39	31.98
5	0 years	-0.74	17.49	-19.72	10.84	19.38	26.09	36.06
	5 years	-0.56	15.64	-17.65	10.04	17.95	24.23	33.70
6	0 years	-0.41	17.70	-17.97	14.18	23.72	31.44	43.37
	12 years	0.04	13.10	-12.56	12.47	20.44	27.10	37.80
	15 years	0.13	12.38	-11.83	12.16	19.93	26.48	37.09
	20 years	0.26	11.56	-11.16	11.74	19.37	25.86	36.52
7	0 years	-0.65	20.08	-16.52	19.29	29.62	37.87	50.40
	12 years	-0.65	17.76	-15.58	15.82	24.76	31.85	42.52
	15 years	-0.43	16.25	-13.84	15.48	24.10	31.04	41.70
	20 years	0.12	12.90	-9.61	15.33	23.39	30.17	41.14

NOTES:

1. ~~Enter this table for a "non-blanketed assembly"; defined as a fuel assembly without any designed axial variation in uranium-235 enrichment to control the axial burnup distribution.~~

2. To qualify in a fuel type, the calculated burnup of a fuel assembly must exceed the "minimum burnup" ~~given in the table~~ for the "cooling time" and "initial enrichment" of the fuel assembly. Alternatively, for fuel assembly characteristics between the increments depicted in the table, "minimum burnup" ~~may be~~ is calculated by inserting the "coefficients" for the associated "type" ~~and "cooling~~ time" into the polynomial function:

   BU = ~~$A*E^2 + B*E + C$ where~~: $A + B*E + C*E^2$, where:

   BU = Minimum Burnup (GWD/MTU)

   E = Initial Maximum Planar Average Enrichment (weight percent uranium-235)

   A, B, C = Coefficients

3. Interpolation between values of cooling time is not permitted.

INSERT 14

Fuel Type	Cooling Time (Years)	Coefficients		
		A	B	C
1	0	-36.7201	22.5106	-1.4432
2	0	-36.9025	16.9500	-0.9375
3	0	-35.3906	23.4636	-1.6594
4	0	-25.1619	21.6515	-1.2814
	2.5	-27.3081	22.7538	-1.5302
	5	-25.5969	21.5923	-1.4262
	10	-26.9644	22.6140	-1.7264
	15	-24.8666	21.0657	-1.5480
	20	-26.3328	22.4101	-1.8494
5	0	-8.1856	14.5275	-0.0719
	2.5	-12.0213	16.2700	-0.4187
	5	-16.4669	18.4855	-0.7744
	10	-15.1293	17.2785	-0.7340
	15	-13.4031	16.0925	-0.6594
	20	-14.3527	16.5743	-0.8445

The above text was submitted with the EPU LAR and is to be deleted

INSERT 14

Fuel Type	Cooling Time (Years)	Coefficients		
		A	B	C
1	0	-36.6860	22.4942	-1.4413
2	0	-36.1742	16.6000	-0.8958
3	0	-34.7091	23.1361	-1.6204
4	0	-24.5145	21.3404	-1.2444
	2.5	-26.8311	22.5246	-1.5029
	5	-24.7233	20.9763	-1.3246
	10	-23.6285	19.9541	-1.2505
	15	-23.5458	19.9336	-1.3180
	20	-22.4382	19.2460	-1.2629
5	0	-8.1856	14.5275	-0.0719
	2.5	-11.8506	16.1475	-0.3969
	5	-16.5196	18.5309	-0.7837
	10	-13.6831	16.3475	-0.5844
	15	-12.5819	15.6175	-0.5656
	20	-12.6469	15.4575	-0.5906

("Insert 14" replaces like insert which was submitted with the EPU LAR Attachment 1, Section 3.1, Renewed Facility Operating License and Technical Specification Changes, TS 5.6, DESIGN FEATURES-FUEL STORAGE-CRITICALITY)

CRITICALITY (Continued)

3. A k_{eff} less than or equal to 0.95 when flooded with water containing 500 ppm boron, including an allowance for biases and uncertainties as described in Section 9.1 of the Updated Final Safety Analysis Report.

4. For storage of enriched fuel assemblies, requirements of Criteria in 5.6.1.a.1 and 5.6.1.a.3 shall be met by positioning fuel in the spent fuel storage racks consistent with the requirements of Specification 5.6.1.c.

5. Vessel Flux Reduction Assemblies (VFRAs), as defined in Section 9.1 of the Updated Final Safety Analysis Report, may be placed in any allowable fuel storage location.

6. Fissile material, not contained in a fuel assembly lattice, shall be stored in accordance with the requirements of Criteria in 5.6.1.a.1 and 5.6.1.a.3.

7. The Metamic neutron absorber inserts shall have a ^{10}B areal density greater than or equal to 0.015 grams $^{10}B/cm^2$.

b. The Region 1 cask pit storage rack shall contain neutron absorbing material (Boral) between stored fuel assemblies when installed in the spent fuel pool.

c. Loading of spent fuel storage racks shall be controlled as described below. Criteria in 5.6.1.c.2, 5.6.1.c.3, 5.6.1.c.5 and 5.6.1.c.6 do not apply to the Region 1 cask pit storage rack.

1. The maximum initial planar average U-235 enrichment of any fuel assembly inserted in a spent fuel storage rack shall be less than or equal to 4.6 weight percent.

2. Fuel placed in Region 1 of the spent fuel pool storage racks shall comply with the storage patterns and alignment restrictions of Figure 5.6-1 and the minimum burnup requirements of Table 5.6-1.

3. Fuel placed in Region 2 of the spent fuel pool storage racks shall comply with the storage patterns or allowed special arrangements of Figure 5.6-2 and the minimum burnup requirements of Table 5.6-1. The allowed special arrangement for fresh fuel may be repeated, provided the applicable interface requirements specified by the safety analysis are met.

4. Any fuel satisfying criteria 5.6.1.c.1, including fresh fuel, may be placed in the Region 1 cask pit storage rack.

5. The same directional orientation for Metamic inserts is required for contiguous groups of 2x2 arrays where Metamic inserts are required.

6. Any 2x2 array of Region 2 storage cells that interface with Region 1 shall comply with the rules of Figure 5.6-3. The allowed special arrangement in Region 2 as shown in Figure 5.6-2 shall not be placed adjacent to Region 1.

CRITICALITY (Continued)

d. The new fuel storage racks are designed for dry storage of unirradiated fuel assemblies having a maximum planar average U-235 enrichment less than or equal to 4.6 weight percent, while maintaining a k_{eff} of less than or equal to 0.98 under the most reactive condition.

TABLE 5.6-1
Minimum Burnup as a Function of Enrichment

Fuel Type	Cooling Time (Years)	Coefficients		
		A	B	C
1	0	-36.6860	22.4942	-1.4413
2	0	-36.1742	16.6000	-0.8958
3	0	-34.7091	23.1361	-1.6204
4	0	-24.5145	21.3404	-1.2444
	2.5	-26.8311	22.5246	-1.5029
	5	-24.7233	20.9763	-1.3246
	10	-23.6285	19.9541	-1.2505
	15	-23.5458	19.9336	-1.3180
	20	-22.4382	19.2460	-1.2629
5	0	-8.1856	14.5275	-0.0719
	2.5	-11.8506	16.1475	-0.3969
	5	-16.5196	18.5309	-0.7837
	10	-13.6831	16.3475	-0.5844
	15	-12.5819	15.6175	-0.5656
	20	-12.6469	15.4575	-0.5906

NOTES:

1. To qualify in a fuel type, the calculated burnup of a fuel assembly must exceed the "minimum burnup" for the "cooling time" and "initial enrichment" of the fuel assembly. Alternatively, for fuel assembly characteristics between the increments depicted in the table, "minimum burnup" is calculated by inserting the "coefficients" for the associated "type" and "cooling time" into the polynomial function:

   $BU = A + B*E + C*E^2$, where:

   BU = Minimum Burnup (GWD/MTU)

   E = Initial Maximum Planar Average Enrichment (weight percent uranium-235)

   A, B, C = Coefficients

2. Interpolation between values of cooling time is not permitted.