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

April 30, 2012

L-2012-181
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

Extended Power Uprate License Amendment Request – Supplement to Proposed Technical Specification Changes Related to Spent Fuel Storage Requirements

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) R. L. Anderson (FPL) to U.S. Nuclear Regulatory Commission (L-2011-466), "Revision to Extended Power Uprate License Amendment Request Proposed Technical Specification 5.6, Design Features – Fuel Storage – Criticality ," November 4, 2011, Accession No. ML11314A111.

(3) Email from T. Orf (NRC) to L. Abbott (FPL). Subject: "St. Lucie 2 EPU RAIs – Reactor Systems (SRXB) re: spent fuel criticality," April 16, 2012.

(4) Email from T. Orf (NRC) to L. Abbott (FPL). Subject: "St. Lucie 2 EPU RAIs – Reactor Systems (SRXB) re: spent fuel criticality," April 17, 2012.

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).

A001
NRR

By letter L-2011-466 [Reference 2], FPL revised the EPU license amendment request (LAR) proposed changes to TS Section 5.6 regarding spent fuel pool storage requirements. In emails dated April 16 and 17, 2012 from NRC (T. Orf) to FPL (L. Abbott) [References 3and 4, respectively], NRC staff requested additional information regarding FPL's LAR to implement the EPU. The emails consisted of 30 requests for additional information (RAIs) from the NRC Reactor Systems Branch (SRXB). Responses to the 30 RAIs are being provided in separate submittals. This letter provides a revision to the proposed changes to TS Section 5.6 regarding spent fuel pool storage requirements.

Attachment 1 provides a description and justification for the proposed changes to TS Section 5.6. Attachment 2 provides the marked-up TS pages associated with the changes described in Attachment 1. Attachment 3 provides the processed or "clean" TS pages.

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. 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 30-April-2012

Very truly yours,

Richard L. Anderson
Site Vice President
St. Lucie Plant

Attachments (3)

cc: Mr. William Passetti, Florida Department of Health

Response to Request for Additional Information

By letter L-2011-466, dated November 4, 2011 [ML11314A111], Florida Power & Light Company (FPL) revised the EPU LAR proposed changes to TS Section 5.6 related to spent fuel pool storage requirements. In an email dated April 16, 2012, the NRC staff requested additional information regarding FPL's license amendment request (LAR) to implement the EPU. The email consisted of 28 requests for additional information (RAIs) from the NRC Reactor Systems Branch (SRXB). In an email dated April 17, 2012, the NRC staff provided two additional RAIs related to spent fuel pool criticality. The responses to the RAIs being submitted in separate correspondence require additional changes to the proposed changes to TS 5.6. The revision to the EPU LAR proposed TS 5.6 related to spent fuel pool criticality is provided below.

Description of the Change

Subsequent to the submittal of the EPU LAR, FPL updated the fuel loading curves to preclude the need to extrapolate the values associated with the determination of the minimum required fuel assembly burnup. As a result, FPL revised the EPU LAR proposed changes to TS Section 5.6, FUEL STORAGE – CRITICALITY by letter FPL-2011-466 dated November 4, 2011 [ML11314A111]. By emails dated April 16 and 17, 2012, the NRC identified 30 RAIs from the Reactor Systems Branch related to spent fuel criticality. The responses to the RAIs are being provided in separate submittals. As identified in the RAI responses, TS Section 5.6 is being revised as described below:

- Figure 5.6-1, Allowable Region 1 Storage Patterns and Fuel Arrangements
  - DEFINITIONS are revised as follows:
    a. Definition 1 is revised as follows: In the first sentence, insert "or burned" after word "fresh", delete the phrase "or fuel of lower reactivity", and in the second sentence delete the word "Fresh", such that the definition reads:

       "Allowable pattern is fresh or burned fuel checkerboarded with completely water-filled cells. Diagram is for illustration only, where F represents Fuel and WH represents a completely water-filled cell."

    b. Definition 2 - In the first sentence, delete the word "assembly", and the phrases "or fuel of lower reactivity" and "or equivalent (5 absorber rods)" and insert after "placement of fuel" the phrase "assemblies that meet the requirements of", such that the first sentence reads:

       "Allowable pattern is placement of fuel assemblies that meet the requirements of type 1 in each 2x2 array location with at least one full-length full strength CEA placed in any cell."

    c. Definition 3 - In the first sentence, delete the word "assembly", and the phrase "or fuel of lower reactivity", and insert after "placement of fuel" the phrase "assemblies that meet the requirements of", such that the first sentence reads:

"Allowable pattern is placement of fuel assemblies that meet the requirements of type 2 in three of the 2x2 array locations in combination with one completely water-filled cell."

- NOTES are revised as follows:
  a. Note 1 - Replace the second sentence with the following:

     "Each cell is a part of up to four 2x2 arrays, and each cell must simultaneously meet the requirements of all those arrays of which it is a part."

  b. Note 2 - Delete the word "Open" and replace it with "Completely water-filled," such that the note reads:

     "Completely water-filled cells within any pattern are acceptable."

- Figure 5.6-2, Allowable Region 2 Storage Patterns and Fuel Arrangements
  - DEFINITIONS are revised as follows:
    a. Definition 1 - In the first sentence, delete the word "assembly" and the phrase "or fuel of lower reactivity" and insert after "pattern is fuel", the phrase "assemblies that meet the requirements of", such that the sentence reads:

       "Allowable pattern is fuel assemblies that meet the requirements of type 3 in three of the 2x2 array locations in combination with one completely water-filled cell."

    b. Definition 2 - In the first sentence, delete the word "assembly" and the phrase "or fuel of lower reactivity" and insert after "pattern is fuel", the phrase "assemblies that meet the requirements of", such that the sentence reads:

       "Allowable pattern is fuel assemblies that meet the requirements of type 4 in each of the 2x2 array locations with at least two Metamic inserts placed anywhere in the 2X2 array."

    c. Definition 3 - In the first sentence, delete the word "assembly" and the phrase "or fuel of lower reactivity" and insert after "pattern is fuel", the phrase "assemblies that meet the requirements of", such that the sentence reads:

       "Allowable pattern is fuel assemblies that meet the requirements of type 5 in each of the 2x2 array locations with at least one Metamic insert placed anywhere in the 2X2 array."

    d. Definition 4 - In the first sentence, delete the word "assembly" and the phrases "or fuel of lower reactivity", and "or equivalent", and insert after "pattern is fuel", the phrase "assemblies that meet the requirements of", such that the sentence reads:

       "Allowable pattern is fuel assemblies that meet the requirements of type 6 in each of the 2x2 array locations with at least two full-length, full strength 5 finger CEAs placed anywhere in the 2x2 array."

e. Definition 5 - In the first sentence, delete the word "assembly" and the phrase "or equivalent" and insert after "pattern is fuel", the phrase "assemblies that meet the requirements of", such that the sentence reads:

"Allowable pattern is fuel assemblies that meet the requirements of type 7 in each of the 2x2 array locations with at least one full-length, full strength 5 finger CEA placed anywhere in the 2x2 array."

- SPECIAL ARRANGEMENTS (SR) are revised as follows:

a. SR1 - In the first sentence, add the phrase "or burned" between "fresh" and "fuel" and delete the term "or fuel of lower reactivity". In the second sentence, add the phrase "or burned" between "fresh" and "fuel". In the third sentence, delete the phrase "or fuel of lower reactivity" and add the phrase "that meets the requirements" between "assembly" and "of type 3". SR1 is revised to read:

"Allowable pattern is up to four fresh or burned fuel assemblies placed in a 3x3 array in combination with Pattern "D" placed outside the 3x3 array. Fresh or burned fuel shall be placed in the corners of the 3x3 array with completely water-filled cells placed face-adjacent on all sides. A fuel assembly that meets the requirements of type 3 shall be placed in the center of the 3x3 array. Minimum burnup for fuel assembly type 3 is defined in Table 5.6-1 as a function of maximum initial planar average enrichment. Diagram is for illustration only."

b. SR2 - In the first sentence, add the phrase "or burned" between "fresh" and "fuel" and delete the term "or fuel of lower reactivity". In the second sentence, add the phrase "or burned" between "fresh" and "fuel". In the third sentence, delete the phrase "or fuel of lower reactivity" and add the phrase "that meets the requirements" between "assembly" and "of type 4". SR2 is revised to read:

"Allowable pattern is up to four fresh or burned fuel assemblies placed in a 3x3 array in combination with Pattern "E" placed outside the 3x3 array. Fresh or burned fuel shall be placed in the corners of the 3x3 array with completely water-filled cells placed face-adjacent on all sides. A fuel assembly that meets the requirements of type 4 with a Metamic insert shall be placed in the center of the 3x3 array. Minimum burnup for fuel assembly type 4 is defined in Table 5.6-1 as a function of maximum initial planar average enrichment and cooling time. Diagram is for illustration only."

c. SR3 - In the first sentence, add the phrase "or burned" between "fresh" and "fuel" and delete the term "or fuel of lower reactivity". In the second sentence, add the phrase "or burned" between "fresh" and "fuel". In the third sentence, delete the phrase "or fuel of lower reactivity" and add the phrase "that meets the requirements" between "assembly" and "of type 5". SR3 is revised to read:

"Allowable pattern is up to four fresh or burned fuel assemblies placed in a 3x3 array in combination with Pattern "F" placed outside the 3x3 array. Fresh or burned fuel shall be placed in the corners of the 3x3 array with completely water-filled cells placed face-adjacent on all sides. A fuel assembly that meets the requirements of type 5 with a Metamic insert shall be placed in the center of the 3x3 array. Minimum burnup for fuel assembly type 5 is defined in Table 5.6-1 as a function of maximum initial planar average enrichment and cooling time. Diagram is for illustration only."

- NOTES are revised as follows:

  a. Note 1 - Replace the second sentence with the following:

     "Each cell is a part of up to four 2x2 arrays, and each cell must simultaneously meet the requirements of all those arrays of which it is a part."

  b. Note 2 - Delete the word "Open" and replace it with "Completely water-filled," such that the note reads:

     "Completely water-filled cells within any pattern are acceptable."

- Figure 5.6-3, Interface Requirements between Region 1 and Region 2

  - DEFINITIONS are revised as follows:

    Definition 1- In the third sentence, add the word "completely" such that the sentence reads:

    "Locations of completely water-filled cells or CEAs may be in either Region 1 or Region 2."

  - NOTES are revised as follows:

    Note 1 - Delete the word "Open" and replace it with "Completely water-filled," such that the note reads:

    "Completely water-filled cells within any pattern are acceptable."

- Figure 5.6-4, Allowable Cask Pit Storage Rack Patterns

  - DEFINITIONS are revised as follows:

    a. Definition 1 – In the first sentence, replace the phrase "Fresh Fuel or lower reactivity" with "fresh or burned". In the second sentence delete the word "Fresh", such that the definition reads:

       "Allowable pattern is fresh or burned fuel checkerboarded with completely water-filled cells. Diagram is for illustration only, where F represents Fuel and WH represents a completely water-filled cell."

    b. Definition 2 - In the first sentence, delete the word "assembly", and the phrase "or fuel of lower reactivity" and insert after "placement of fuel" the phrase "assemblies that meet the requirements of", such that the first sentence reads:

       "Allowable pattern is placement of fuel assemblies that meet the requirements of type 8 in three of the 2x2 array locations in combination with one completely water-filled cell in any location."

  - NOTES are revised as follows:

    a. Note 1 - Replace the second sentence with the following:

       "Each cell is a part of up to four 2x2 arrays, and each cell must simultaneously meet the requirements of all those arrays of which it is a part."

    b. Note 2 - Delete the word "Open" and replace it with "Completely water-filled," such that the note reads:

       "Completely water-filled cells within any pattern are acceptable."

- Table 5.6-1, Minimum Burnup Coefficients
  - Table 5.6-1 is replaced with new Table 5.6-1.
  - The new Table 5.6-1 is revised as follows:

    Fuel Type 6, Cooling Time – 0 years Coefficients are replaced with:
    A -32.4963
    B 25.3143
    C -1.5534
  - NOTE 1 is replaced with the following:

    "To qualify in a "fuel type", the burnup of a "fuel assembly must exceed the minimum burnup "BU" calculated by inserting the "coefficients" for the associated "fuel type" and "cooling time" into the following polynomial function:"

The revised marked-up TS pages are provided in Attachment 2. Note that the pages contain the applicable changes submitted in FPL letters L-2011-021, dated February 25, 2011, Accession No. ML110730116 and L-2011-466, dated November 4, 2011 Accession No. ML11314A111. The revised clean TS pages are provided in Attachment 3.

Basis for the Change

The statement "or equivalent" was originally included to allow an option to use equivalent poison rods as alternates to CEAs and Metamic™ inserts. Since the current plan is to go ahead with CEAs and Metamic™ inserts as poison in the spent fuel pool, this option of having equivalent poison rods is not being pursued and is considered no longer needed. With the deletion of "or equivalent", criticality analysis remains unaffected as only CEA and Metamic™ are credited as poison in the analysis. This change is therefore acceptable.

The changes in the allowable storage pattern definitions and notes improve the description of the fuel types that can be stored in each patterns and do not change the criticality analysis. This change is therefore acceptable.

Table 5.6-1 Minimum Burnup Coefficients is revised to correct an error in the Coefficients for Fuel Type 6 with 0 years Cooling Time. The analysis of record calculation has been revised. The criticality analysis is unaffected. This change is therefore acceptable.

No Significant Hazards Consideration

Removal of the option to use an equivalent CEA does not diminish the ability to ensure that spent fuel pool criticality remains within acceptable limits. The criticality analysis credits the use of Metamic™ inserts or full-length full-strength CEAs, which will be employed as required by the TS to ensure compliance with the spent fuel pool criticality analysis. The changes in the allowable storage pattern definitions and notes improve the description of the fuel types that can be stored in each patterns and do not change the criticality analysis. The correction to the minimum burnup coefficients is in accordance with the criticality analyses.

Based on the above, the proposed changes 1) do not involve a significant increase in the probability or consequences of an accident previously evaluated, 2) do not create the possibility of a new or different kind of accident from any previously evaluated, and 3) do not result in a significant reduction in a margin of safety.

Environmental Evaluation

The proposed changes are administrative and editorial in nature. Elimination of the option to use an equivalent full-length full-strength CEA, and the clarification of allowable storage patterns are editorial in that they do not impact the ability to comply with the TS requirements; the notes are revised to provide clarity. There are no technical changes associated with the proposed change. 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.

ATTACHMENT 2

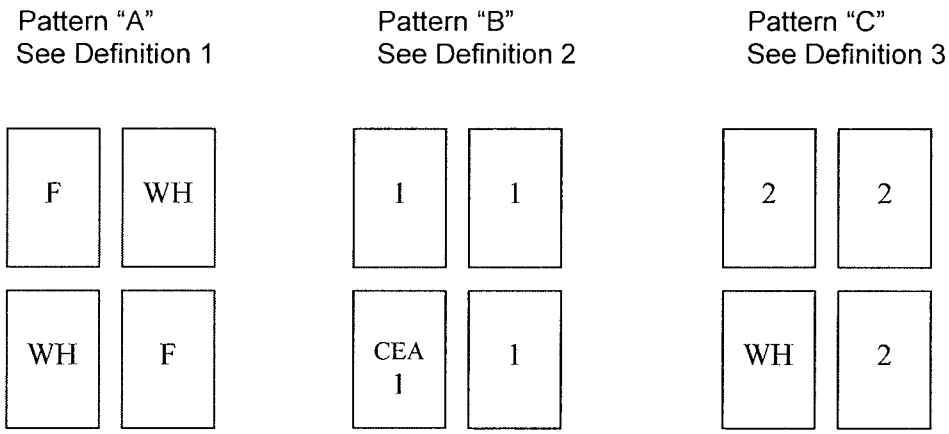
EXTENDED POWER UPRATE LICENSE AMENDMENT REQUEST
SUPPLEMENTAL INFORMATION TO
PROPOSED TECHNICAL SPECIFICATION CHANGES
SUBMITTED BY FPL LETTER L-2011-021

Technical Specifications Marked-Up Pages

Florida Power & Light
St. Lucie Unit 2

NEW FIGURE 5.6-1

Allowable Storage Patterns
(See Notes 1 and 2)



DEFINITIONS:

1. Allowable pattern is ~~Fresh Fuel or fuel of lower reactivity~~ checkerboarded with completely water-filled cells. Diagram is for illustration only, where F represents ~~Fresh~~ Fuel and WH represents a completely water-filled cell.

2. Allowable pattern is placement of fuel ~~assembly~~ type 1 ~~or fuel of lower reactivity~~ in each 2x2 array location with at least one full-length full-strength CEA ~~or equivalent (5 absorber rods)~~ placed in any cell. Minimum burnup for fuel assembly type 1 is defined in Table 5.6-1 as a function of maximum initial planar average enrichment. Diagram is for illustration only.

3. Allowable pattern is placement of fuel ~~assembly~~ type 2 ~~or fuel of lower reactivity~~ in three of the 2x2 array locations in combination with one completely water-filled cell. Minimum burnup for fuel assembly type 2 is defined in Table 5.6-1 as a function of maximum initial planar average enrichment. Diagram is for illustration only.

NOTES:

1. The storage arrangements of fuel within a rack module may contain more than one pattern. ~~There are no interface limitations within Region 1 between rack modules or within racks; however, each assembly must meet the burnup requirements of each 2x2 array that it resides within.~~

2. ~~Open~~ cells within any pattern are acceptable.

Completely water-filled

FIGURE 5.6-1
Allowable Region 1 Storage Patterns and Fuel Arrangements

DEFINITIONS for Figure 5.6-2

assemblies that meet the requirements of

1. Allowable pattern is fuel ~~assembly~~ type 3 ~~or fuel of lower reactivity~~ in three of the 2x2 array locations in combination with one completely water-filled cell. Minimum burnup for fuel assembly type 3 is defined in Table 5.6-1 as a function of maximum initial planar average enrichment. Diagram is for illustration only.

2. Allowable pattern is fuel ~~assembly~~ type 4 ~~or fuel of lower reactivity~~ in each of the 2x2 array locations with at least two Metamic inserts placed anywhere in the 2x2 array. Minimum burnup for fuel assembly type 4 is defined in Table 5.6-1 as a function of maximum initial planar average enrichment and cooling time. Diagram is for illustration only.

3. Allowable pattern is fuel ~~assembly~~ type 5 ~~or fuel of lower reactivity~~ in each of the 2x2 array locations with at least one Metamic insert placed anywhere in the 2x2 array. Minimum burnup for fuel assembly type 5 is defined in Table 5.6-1 as a function of maximum initial planar average enrichment and cooling time. Diagram is for illustration only.

4. Allowable pattern is fuel ~~assembly~~ type 6 ~~or fuel of lower reactivity~~ in each of the 2x2 array locations with at least two full-length, full strength 5 finger CEAs ~~or equivalent~~ placed anywhere in the 2x2 array. Minimum burnup for fuel assembly type 6 is defined in Table 5.6-1 as a function of maximum initial planar average enrichment and cooling time. Diagram is for illustration only.

5. Allowable pattern is fuel ~~assembly~~ type 7 in each of the 2x2 array locations with at least one full-length, full strength 5 finger CEA ~~or equivalent~~ placed anywhere in the 2x2 array. Minimum burnup for fuel assembly type 7 is defined in Table 5.6-1 as a function of maximum initial planar average enrichment and cooling time. Diagram is for illustration only.

that meets the requirements

or burned

SR1. Allowable pattern is up to four fresh fuel assemblies ~~or fuel of lower reactivity~~ placed in a 3x3 array in combination with Pattern "D" placed outside the 3x3 array. Fresh fuel shall be placed in the corners of the 3x3 array with completely water-filled cells placed face-adjacent on all sides. A fuel assembly of type 3 ~~or fuel of lower reactivity~~ shall be placed in the center of the 3x3 array. Minimum burnup for fuel assembly type 3 is defined in Table 5.6-1 as a function of maximum initial planar average enrichment. Diagram is for illustration only.

SR2. Allowable pattern is up to four fresh fuel assemblies ~~or fuel of lower reactivity~~ placed in a 3x3 array in combination with Pattern "E" placed outside the 3x3 array. Fresh fuel shall be placed in the corners of the 3x3 array with completely water-filled cells placed face-adjacent on all sides. A fuel assembly of type 4 ~~or fuel of lower reactivity~~ with a Metamic insert shall be placed in the center of the 3x3 array. Minimum burnup for fuel assembly type 4 is defined in Table 5.6-1 as a function of maximum initial planar average enrichment and cooling time. Diagram is for illustration only.

FIGURE 5.6-2 (Sheet 2 of 3)
Allowable Region 2 Storage Patterns and Fuel Arrangements

or burned

SR3. Allowable pattern is up to four fresh fuel assemblies ~~or fuel of lower reactivity~~ placed in a 3x3 array in combination with Pattern "F" placed outside the 3x3 array. Fresh fuel shall be placed in the corners of the 3x3 array with completely water-filled cells placed face-adjacent on all sides. A fuel assembly of type 5 ~~or fuel of lower reactivity~~ with a Metamic insert shall be placed in the center of the 3x3 array. Minimum burnup for fuel assembly type 5 is defined in Table 5.6-1 as a function of maximum initial planar average enrichment and cooling time. Diagram is for illustration only.

that meets the reqiurements

NOTES

1. The storage arrangements of fuel within a rack module may contain more than one pattern. ~~There are no interface limitations within Region 2 between rack modules or within racks. However, each assembly must meet the burnup requirements of each 2x2 array or allowed special arrangement that it resides within.~~

2. ~~Open~~ cells within any pattern are acceptable.

Completely water-filled

Each cell is a part of up to four 2x2 arrays, and each cell must simultaneously meet the requirements of all those arrays of which it is a part.

FIGURE 5.6-2 (Sheet 3 of 3)
Allowable Region 2 Storage Patterns and Fuel Arrangements

NEW FIGURE 5.6-3
SHEET 2 of 2

DEFINITION:

1. Each 2x2 array that spans Region 1 and Region 2 shall match one of the Region 2 allowable storage patterns as defined by Specification 5.6.1.c.3. Any required Metamic inserts must be placed into the fuel assemblies in Region 2. Locations of water-filled cells or CEAs may be in either Region 1 or Region 2. For interface assemblies, the requirements of Specifications 5.6.1.c.2 and Specification 5.6.1.c.3 shall be followed within Region 1 and Region 2, respectively. The Diagrams are for illustration only.

completely

NOTES:

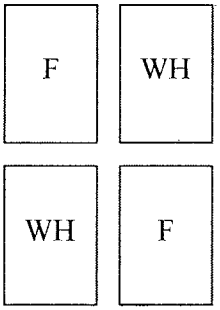
1. ~~Open~~ cells within any pattern are acceptable.

Completely water-filled

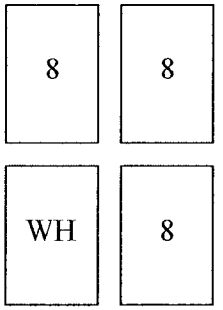
FIGURE 5.6-3 (Sheet 2 of 2)
Interface Requirements between Region 1 and Region 2

Allowable Storage Patterns
(See Notes 1 and 2)

Pattern "A"
See Definition 1



Pattern "B"
See Definition 2



DEFINITIONS:

1. Allowable pattern is ~~Fresh Fuel or lower reactivity~~ fuel checkerboarded with completely water-filled cells. Diagram is for illustration only, where F represents ~~Fresh~~ Fuel and WH represents a completely water-filled cell.

2. Allowable pattern is placement of fuel ~~assembly~~ type 8 ~~or fuel of lower reactivity~~ in three of the 2x2 array locations in combination with one completely water-filled cell in any location. Minimum burnup for fuel assembly type 8 is defined in Table 5.6-1 as a function of maximum initial planar average enrichment. Diagram is for illustration only.

NOTES:

1. The storage arrangements of fuel within a rack module may contain more than one pattern. ~~There are no interface limitations within the cask pit storage rack, however, each assembly must meet the burnup requirements of each 2x2 array that it resides within.~~

2. ~~Open~~ cells within any pattern are acceptable.

fresh or burned

assemblies that meet the requirements of

Completely water-filled

Each cell is a part of up to four 2x2 arrays, and each cell must simultaneously meet the requirements of all those arrays of which it is a part.

FIGURE 5.6-4
Allowable Cask Pit Storage Rack Patterns

NEW TABLE 5.6-1

TABLE 5.6-1
Minimum Burnup Coefficients

Fuel Type	Cooling Time (Years)	Coefficients		
		A	B	C
1	0	-33.4237	25.6742	-1.6478
2	0	-25.3198	14.3200	-0.4042
3	0	-23.4150	16.2050	-0.5500
4	0	-33.6414	25.0670	-1.5551
	2.5	-32.3764	23.9988	-1.5075
	5	-30.9234	22.9382	-1.4372
	10	-28.4951	21.1511	-1.3029
	15	-27.2024	20.2802	-1.2479
	20	-25.2009	18.6218	-1.0364
5	0	-24.8402	23.5991	-1.2082
	2.5	-23.0170	21.6493	-1.0298
	5	-21.9293	20.6257	-0.9730
	10	-20.0813	19.0808	-0.9022
	15	-19.5503	18.5429	-0.9129
	20	-18.7485	17.7308	-0.8390
6	0	-32.4900	25.3077	-1.5518
	2.5	-31.1598	23.9185	-1.4435
	5	-29.2169	22.5424	-1.3274
	10	-26.8886	20.6662	-1.1425
	15	-25.5703	19.7629	-1.1129
	20	-24.5754	18.9056	-1.0147
7	0	-24.6989	24.1660	-1.2578
	2.5	-23.0399	22.3047	-1.0965
	5	-21.3290	20.7413	-0.9613
	10	-20.0836	19.4780	-0.8949
	15	-19.2480	18.5880	-0.8685
	20	-18.6424	18.1241	-0.8950
8	0	-47.5000	12.5000	0.0000

NOTES:

1. ~~To qualify in a fuel type, the calculated burnup of a fuel assembly must exceed the "minimum burnup" determined for the "cooling time" and "maximum initial planar enrichment" of the fuel assembly. The "minimum burnup" for any fuel type is determined from the following polynomial function:~~

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

   BU = Minimum Burnup (GWD/MTU)

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

   A, B, C = Coefficients for each fuel type

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

To qualify in a "fuel type", the burnup of a fuel assembly must exceed the minimum burnup "BU" calculated by inserting the "coefficients" for the associated "fuel type" and "cooling time" into the following polynomial function:

The data presented below replaces the data in NEW TABLE 5.6-1, there are no changes to the balance of the table.

Fuel Type	Cooling Time (Years)	Coefficients		
		A	B	C
1	0	-33.4237	25.6742	-1.6478
2	0	-25.3198	14.3200	-0.4042
3	0	-23.4150	16.2050	-0.5500
4	0	-33.2205	24.8136	-1.5199
	2.5	-31.4959	23.4776	-1.4358
	5	-30.4454	22.7456	-1.4147
	10	-28.4361	21.2259	-1.2946
	15	-27.2971	20.3746	-1.2333
	20	-26.1673	19.4753	-1.1403
5	0	-24.8402	23.5991	-1.2082
	2.5	-22.9981	21.6295	-1.0249
	5	-21.8161	20.5067	-0.9440
	10	-20.0864	19.0127	-0.8545
	15	-19.4795	18.3741	-0.8318
	20	-18.8225	17.7194	-0.7985
6	0	~~-33.1568~~	~~26.0086~~	~~-1.7227~~
	2.5	-30.6688	23.6229	-1.4025
	5	-29.2169	22.5424	-1.3274
	10	-27.2539	21.0241	-1.2054
	15	-25.7327	19.8655	-1.1091
	20	-25.2717	19.5222	-1.1163
7	0	-24.6989	24.1660	-1.2578
	2.5	-23.0399	22.3047	-1.0965
	5	-21.2473	20.6553	-0.9403
	10	-20.1775	19.5506	-0.9015
	15	-19.4037	18.6626	-0.8490
	20	-18.3326	17.7040	-0.7526
8	0	-43.4750	11.6250	0.0000

-32.4963 25.3143 -1.5534

ATTACHMENT 3

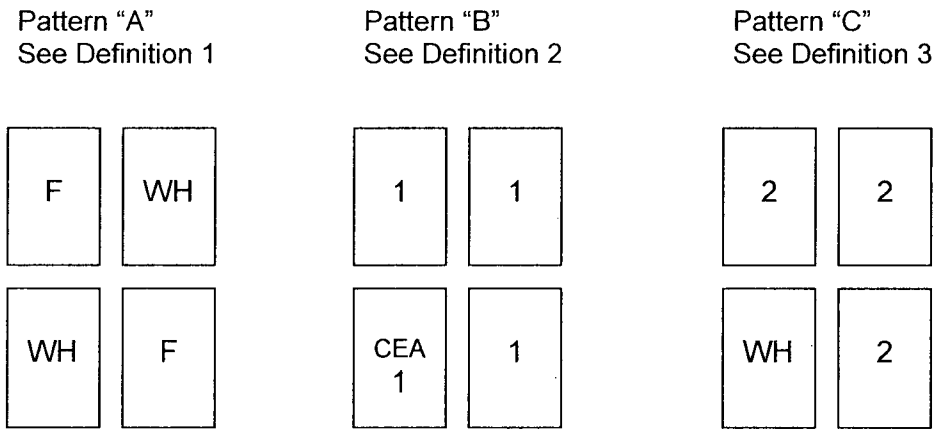
EXTENDED POWER UPRATE LICENSE AMENDMENT REQUEST
SUPPLEMENTAL INFORMATION TO
PROPOSED TECHNICAL SPECIFICATION CHANGES
SUBMITTED BY FPL LETTER L-2011-021

Technical Specifications Clean Pages

Florida Power & Light
St. Lucie Unit 2

This coversheet plus 6 pages.

Allowable Storage Patterns
(See Notes 1 and 2)



DEFINITIONS:

1. Allowable pattern is fresh or burned fuel checkerboarded with completely water-filled cells. Diagram is for illustration only, where F represents Fuel and WH represents a completely water-filled cell.

2. Allowable pattern is placement of fuel assemblies that meet the requirements of type 1 in each 2x2 array location with at least one full-length full-strength CEA placed in any cell. Minimum burnup for fuel assembly type 1 is defined in Table 5.6-1 as a function of maximum initial planar average enrichment. Diagram is for illustration only.

3. Allowable pattern is placement of fuel assemblies that meet the requirements of type 2 in three of the 2x2 array locations in combination with one completely water-filled cell. Minimum burnup for fuel assembly type 2 is defined in Table 5.6-1 as a function of maximum initial planar average enrichment. Diagram is for illustration only.

NOTES:

1. The storage arrangements of fuel within a rack module may contain more than one pattern. Each cell is a part of up to four 2x2 arrays, and each cell must simultaneously meet the requirements of all those arrays of which it is a part.

2. Completely water-filled cells within any pattern are acceptable.

FIGURE 5.6-1
Allowable Region 1 Storage Patterns and Fuel Arrangements

DEFINITIONS for Figure 5.6-2

1. Allowable pattern is fuel assemblies that meet the requirements of type 3 in three of the 2x2 array locations in combination with one completely water-filled cell. Minimum burnup for fuel assembly type 3 is defined in Table 5.6-1 as a function of maximum initial planar average enrichment. Diagram is for illustration only.

2. Allowable pattern is fuel assemblies that meet the requirements of type 4 in each of the 2x2 array locations with at least two Metamic inserts placed anywhere in the 2x2 array. Minimum burnup for fuel assembly type 4 is defined in Table 5.6-1 as a function of maximum initial planar average enrichment and cooling time. Diagram is for illustration only.

3. Allowable pattern is fuel assemblies that meet the requirements of type 5 in each of the 2x2 array locations with at least one Metamic insert placed anywhere in the 2x2 array. Minimum burnup for fuel assembly type 5 is defined in Table 5.6-1 as a function of maximum initial planar average enrichment and cooling time. Diagram is for illustration only.

4. Allowable pattern is fuel assemblies that meet the requirements of type 6 in each of the 2x2 array locations with at least two full-length, full strength 5 finger CEAs placed anywhere in the 2x2 array. Minimum burnup for fuel assembly type 6 is defined in Table 5.6-1 as a function of maximum initial planar average enrichment and cooling time. Diagram is for illustration only.

5. Allowable pattern is fuel assemblies that meet the requirements of type 7 in each of the 2x2 array locations with at least one full-length, full strength 5 finger CEA placed anywhere in the 2x2 array. Minimum burnup for fuel assembly type 7 is defined in Table 5.6-1 as a function of maximum initial planar average enrichment and cooling time. Diagram is for illustration only.

SR1. Allowable pattern is up to four fresh or burned fuel assemblies placed in a 3x3 array in combination with Pattern "D" placed outside the 3x3 array. Fresh or burned fuel shall be placed in the corners of the 3x3 array with completely water-filled cells placed face-adjacent on all sides. A fuel assembly that meets the requirements of type 3 shall be placed in the center of the 3x3 array. Minimum burnup for fuel assembly type 3 is defined in Table 5.6-1 as a function of maximum initial planar average enrichment. Diagram is for illustration only.

SR2. Allowable pattern is up to four fresh or burned fuel assemblies placed in a 3x3 array in combination with Pattern "E" placed outside the 3x3 array. Fresh or burned fuel shall be placed in the corners of the 3x3 array with completely water-filled cells placed face-adjacent on all sides. A fuel assembly that meets the requirements of type 4 with a Metamic insert shall be placed in the center of the 3x3 array. Minimum burnup for fuel assembly type 4 is defined in Table 5.6-1 as a function of maximum initial planar average enrichment and cooling time. Diagram is for illustration only.

FIGURE 5.6-2 (Sheet 2 of 3)
Allowable Region 2 Storage Patterns and Fuel Arrangements

SR3. Allowable pattern is up to four fresh or burned fuel assemblies placed in a 3x3 array in combination with Pattern "F" placed outside the 3x3 array. Fresh or burned fuel shall be placed in the corners of the 3x3 array with completely water-filled cells placed face-adjacent on all sides. A fuel assembly that meets the requirements of type 5 with a Metamic insert shall be placed in the center of the 3x3 array. Minimum burnup for fuel assembly type 5 is defined in Table 5.6-1 as a function of maximum initial planar average enrichment and cooling time. Diagram is for illustration only.

NOTES

1. The storage arrangements of fuel within a rack module may contain more than one pattern. Each cell is a part of up to four 2x2 arrays, and each cell must simultaneously meet the requirements of all those arrays of which it is a part.

2. Completely water-filled cells within any pattern are acceptable.

FIGURE 5.6-2 (Sheet 3 of 3)
Allowable Region 2 Storage Patterns and Fuel Arrangements

DEFINITION:

1. Each 2x2 array that spans Region 1 and Region 2 shall match one of the Region 2 allowable storage patterns as defined by Specification 5.6.1.c.3. Any required Metamic inserts must be placed into the fuel assemblies in Region 2. Locations of completely water-filled cells or CEAs may be in either Region 1 or Region 2. For interface assemblies, the requirements of Specifications 5.6.1.c.2 and Specification 5.6.1.c.3 shall be followed within Region 1 and Region 2, respectively. The Diagrams are for illustration only.

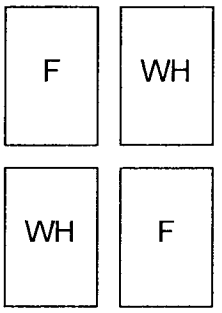
NOTES:

1. Completely water-filled cells within any pattern are acceptable.

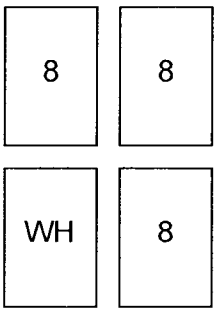
FIGURE 5.6-3 (Sheet 2 of 2)
Interface Requirements between Region 1 and Region 2

Allowable Storage Patterns
(See Notes 1 and 2)

Pattern "A"
See Definition 1



Pattern "B"
See Definition 2



DEFINITIONS:

1. Allowable pattern is fresh or burned fuel checkerboarded with completely water-filled cells. Diagram is for illustration only, where F represents Fuel and WH represents a completely water-filled cell.

2. Allowable pattern is placement of fuel assemblies that meet the requirements of type 8 in three of the 2x2 array locations in combination with one completely water-filled cell in any location. Minimum burnup for fuel assembly type 8 is defined in Table 5.6-1 as a function of maximum initial planar average enrichment. Diagram is for illustration only.

NOTES:

1. The storage arrangements of fuel within a rack module may contain more than one pattern. Each cell is a part of up to four 2x2 arrays, and each cell must simultaneously meet the requirements of all those arrays of which it is a part.

2. Completely water-filled cells within any pattern are acceptable.

FIGURE 5.6-4
Allowable Cask Pit Storage Rack Patterns

TABLE 5.6-1
Minimum Burnup Coefficients

Fuel Type	Cooling Time (Years)	Coefficients		
		A	B	C
1	0	-33.4237	25.6742	-1.6478
2	0	-25.3198	14.3200	-0.4042
3	0	-23.4150	16.2050	-0.5500
4	0	-33.2205	24.8136	-1.5199
	2.5	-31.4959	23.4776	-1.4358
	5	-30.4454	22.7456	-1.4147
	10	-28.4361	21.2259	-1.2946
	15	-27.2971	20.3746	-1.2333
	20	-26.1673	19.4753	-1.1403
5	0	-24.8402	23.5991	-1.2082
	2.5	-22.9981	21.6295	-1.0249
	5	-21.8161	20.5067	-0.9440
	10	-20.0864	19.0127	-0.8545
	15	-19.4795	18.3741	-0.8318
	20	-18.8225	17.7194	-0.7985
6	0	-32.4963	25.3143	-1.5534
	2.5	-30.6688	23.6229	-1.4025
	5	-29.2169	22.5424	-1.3274
	10	-27.2539	21.0241	-1.2054
	15	-25.7327	19.8655	-1.1091
	20	-25.2717	19.5222	-1.1163
7	0	-24.6989	24.1660	-1.2578
	2.5	-23.0399	22.3047	-1.0965
	5	-21.2473	20.6553	-0.9403
	10	-20.1775	19.5506	-0.9015
	15	-19.4037	18.6626	-0.8490
	20	-18.3326	17.7040	-0.7526
8	0	-43.4750	11.6250	-0.0000

NOTES:

1. To qualify in a "fuel type", the burnup of a fuel assembly must exceed the minimum burnup "BU" calculated by inserting the "coefficients" for the associated "fuel type" and "cooling time" into the following polynomial function:

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

   BU = Minimum Burnup (GWD/MTU)

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

   A, B, C = Coefficients for each fuel type

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