May 18, 2026
L-2026-086
10 CFR 50.90

U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington D C 20555-0001

RE: St. Lucie Nuclear Plant, Unit 1
Docket No. 50-335
Renewed Facility Operating License DPR-67

Supplement to Response to Requests for Additional Information (RAIs) Regarding St. Lucie Unit 1 License Amendment Request L-2024-200, Updated Spent Fuel Pool Criticality Analysis in Support of St. Lucie Unit 1 Transition to 24 Month Fuel Cycles

References:

1. Florida Power & Light Company letter L-2024-200, License Amendment Request, Updated Spent Fuel Pool Criticality Analysis in Support of St. Lucie Unit 1 Transition to 24 Month Fuel Cycles, December 19, 2024 (ADAMS Accession Nos. ML24354A279, ML24354A278)

2. Florida Power & Light Company letter L-2026-057, Response to Requests for Additional Information (RAIs) Regarding St. Lucie Unit 1 License Amendment Request L-2024-200, Updated Spent Fuel Pool Criticality Analysis in Support of St. Lucie Unit 1 Transition to 24 Month Fuel Cycles April 17, 2026 (ADAMS Accession Nos. ML26107A140, ML26107A142)

In Reference 1, Florida Power & Light Company (FPL) requested an amendment to Renewed Facility Operating License (RFOL) DPR-67 for St. Lucie Nuclear Plant, Unit 1 (St. Lucie Unit 1). The proposed license amendment would revise St. Lucie Unit 1 Technical Specification (TS) 3.7.15, Spent Fuel Storage, and TS 4.3, Fuel Storage, to support updated spent fuel pool and new fuel vault criticality analyses which account for the impact of a proposed transition to 24-month fuel cycles at St. Lucie Unit 1.

In Reference 2, FPL responded to the NRC staff's requests additional information (RAIs) and confirmatory information (RCIs) deemed necessary to complete its review.

Following a May 7, 2026 meeting with the NRC staff, FPL is proposing additional changes to the St. Lucie Unit 1 TS and TS Bases from that provided in References 1 and 2. Specifically, clarifying changes are proposed to the allowable storage patterns of TS LCO 3.7.15, Spent Fuel Pool Storage, which provide further assurance that the storage of fresh and spent fuel in Region 1, Region 2, and the Region 1 to Region 2 interface will not result in reactivities in excess of the allowable limits. In addition, the first page of new TS LCO 3.7.18, New Fuel Rack Storage, is provided, which was missing from the Reference 2 submittal, and titles are added to the figures illustrating the new fuel rack allowable storage patterns.

Attachment 1 to this letter provides the revised TS mark-up pages showing the new changes in blue outline. Attachment 2 provides revised TS Bases mark-up pages correcting two typos. The revised TS and TS Bases mark-up pages supersede and replace in their entirety the corresponding TS and TS Bases mark-up pages of References 1 and 2. The TS Bases mark-up pages are provided for information only and will be incorporated in accordance with the St. Lucie Unit 1 TS Bases Control Program upon implementation of the approved license amendments.

The information in this supplemental response provides additional information that clarifies the application, does not expand the scope of the application as originally noticed, and should not change the NRC staff's originally proposed notice of determination of no significant hazards as published in the *Federal Register.*

This letter contains no regulatory commitments.

Should you have any questions regarding this submission, please contact Ms. Maribel Valdez, Fleet Licensing Manager, at 561-904-5164.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on the 18th day of May 2026.

Kenneth A. Mack
Director, Licensing and Regulatory Compliance
Florida Power & Light Company

cc: USNRC Regional Administrator, Region II
USNRC Project Manager, St. Lucie Nuclear Plant, Units 1 and 2
USNRC Senior Resident Inspector, St. Lucie Nuclear Plant, Units 1 and 2
Mr. Clark Eldredge, Florida Department of Health

Attachment 1, St. Lucie Unit 1, Technical Specifications Page Markups (revised)
Attachment 2, St. Lucie Unit 1, Technical Specifications Bases Page Markups (revised)

St. Lucie Unit 1 License Amendment Request L-2024-200, Updated Spent Fuel Pool Criticality Analysis in Support of St. Lucie Unit 1 Transition to 24 Month Fuel Cycles

St. Lucie Unit 1, Technical Specifications Page Markups (revised)

(19 pages follow)

Any 2x2 array of fuel assemblies that span the interface between Region 1 and Region 2 of the spent fuel pool storage racks shall comply with the requirements of Figure 3.7.15-3 and the minimum burnup requirements of Table 3.7.15-1, except as specified in LCO 3.7.15.g;

3.7 PLANT SYSTEMS

3.7.15 Spent Fuel Po

LCO 3.7.15 The combination of initial enrichment and burnup of each fuel assembly stored in Region 1, Region 2, or cask pit shall be in accordance with the following ~~configuration~~ requirements:

a. 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~~ 4.95 weight percent;

requirements

b. Fuel placed in Region 1 of the spent fuel pool storage racks shall comply with the ~~storage patterns and alignment restrictions~~ of Figure 3.7.15-1 and the minimum burnup requirements of Table 3.7.15-1;

, except as specified in LCO 3.7.15.g

requirements

c. Fuel placed in Region 2 of the spent fuel pool storage racks shall comply with the ~~storage patterns or allowed special arrangements~~ of Figure 3.7.15-2 and the minimum burnup requirements of Table 3.7.15-1;

, except as specified in LCO 3.7.15.g

---NOTE---

The allowed special arrangement for fresh fuel may be repeated provided the applicable interface requirements specified by the safety analysis are ~~met~~.

---

e

~~d~~. A fuel satisfying Specification 3.7.15.a, including fresh fuel, may be placed in the Region 1 cask pit storage rack;

assembly

---NOTE---

LCO 3.7.15.b, c, d, and f, do not apply to the Region 1 cask pit storage rack.

---

f

~~e~~. The same directional orientation of Metamic inserts is required for contiguous groups of 2X2 arrays where Metamic inserts are required; ~~and~~

d

~~f. Any 2X2 array of Region 2 storage cells that interface with Region 1 shall comply with the requirements of Figure 3.7.15-3.~~

---NOTE---

The allowed ~~special arrangement~~ in Region 2 as shown in Figure 3.7.15-2 shall not be placed adjacent to Region 1.

---

patterns for fresh fuel assemblies

Add new items from INSERT 1

INSERT 1

or an empty cell

pattern

pattern

g. Fresh or spent fuel in any allowed ~~configuration~~ may be replaced with non fuel hardware, and fresh fuel in any allowed ~~configuration~~ may be replaced with a fuel rod storage basket containing fuel rod(s); and

spent fuel or

----------NOTE----------

Storage of Metamic inserts or control rods, without any fissile material, is acceptable in locations designated as completely water-filled cells.

---

h. Removable burnable absorbers and startup sources are permitted to be stored in fresh or spent fuel in any allowed ~~configuration~~.

pattern

APPLICABILITY: Whenever any fuel assembly is stored in Region 1, Region 2, or cask pit storage rack of the fuel storage pool.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Requirements of the LCO not met.	A.1 ----------NOTE---------- LCO 3.0.3 is not applicable. ---------- Initiate action to move the noncomplying fuel assembly to an acceptable location.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.7.15.1	Verify by administrative means the initial enrichment and burnup of the fuel assembly is in accordance with Table 3.7.15-1 and the configuration requirements of LCO 3.7.15.a, b, c, d, e, ~~and f.~~ f, g, and h.	Prior to storing the fuel assembly in Region 1, Region 2, or cask pit storage rack

Replace Table with INSERT 2

Table 3.7.15-1 (page 1 of 1)
Minimum Burnup ~~as a Function of Enrichment~~ ← Coefficients

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 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 polynomial function:

   +D*E^3

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

   BU = Minimum Burnup (GWD/MTU)

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

   , D

   A, B, C = Coefficients

Add new NOTE 3 from INSERT 2

2. ~~Interpolation between values of cooling time is not permitted.~~ ← Replace with NOTE 2 from INSERT 2

3.

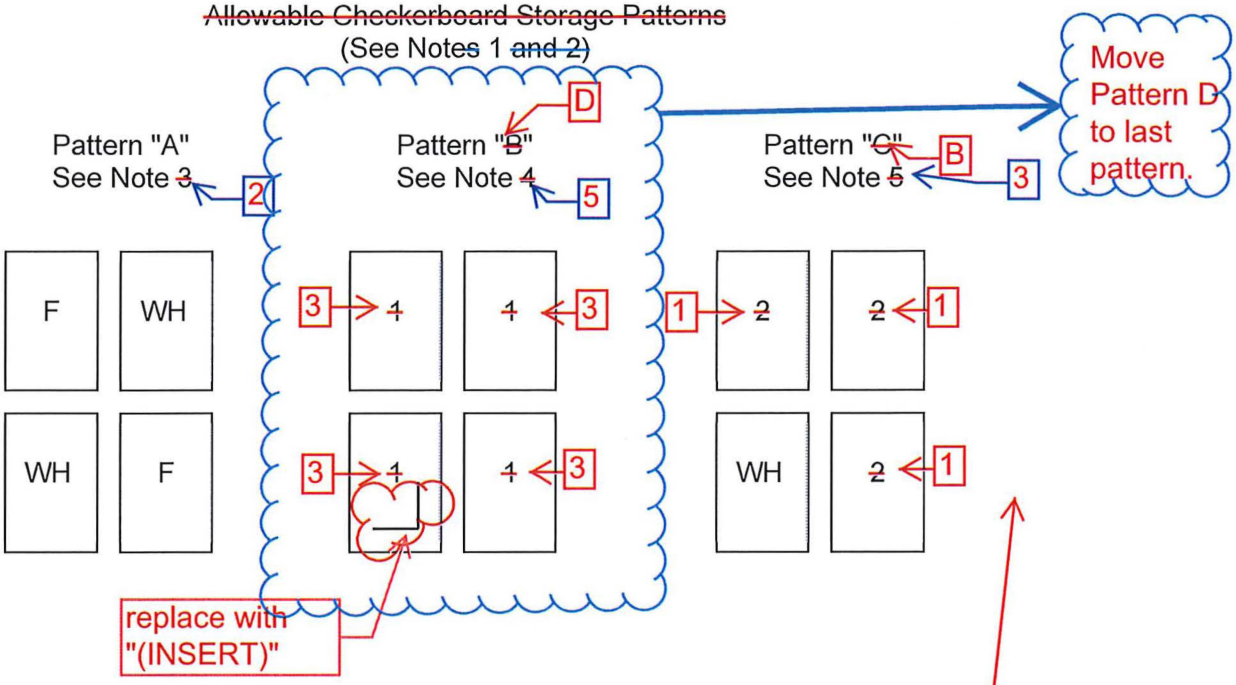
INSERT 2

Fuel Type	Cooling Time, years	A	B	C	D
Region 1					
1	0	-1.7371E+01	3.1752E+00	2.5361E+00	-2.6046E-01
2	0	-2.9880E+01	1.4629E+01	2.9307E-01	-1.1144E-01
3	0	-3.6089E+01	2.2683E+01	-1.4682E+00	1.5424E-02
Region 2					
4	0	-3.6129E+01	2.6384E+01	-2.5263E+00	1.0320E-01
5	0	-4.3902E+01	3.2782E+01	-4.5351E+00	3.2048E-01
	3.5	-4.0517E+01	2.9384E+01	-3.6798E+00	2.3542E-01
	7.5	-3.7577E+01	2.6807E+01	-3.0990E+00	1.8683E-01
	10	-3.7095E+01	2.6449E+01	-3.0471E+00	1.8037E-01
	15	-3.5048E+01	2.4872E+01	-2.7343E+00	1.5417E-01
	20	-3.4244E+01	2.4406E+01	-2.7110E+00	1.5562E-01
6	0	-5.1952E+01	4.7383E+01	-8.7477E+00	7.1339E-01
	3.5	-4.6427E+01	4.1490E+01	-7.2019E+00	5.6428E-01
	7.5	-4.2046E+01	3.6910E+01	-5.9111E+00	4.3339E-01
	10	-4.0056E+01	3.4840E+01	-5.3295E+00	3.7528E-01
	15	-3.7436E+01	3.2058E+01	-4.5295E+00	2.9264E-01
	20	-3.6251E+01	3.1042E+01	-4.3763E+00	2.8666E-01
7	0	-4.4537E+01	4.6575E+01	-8.7847E+00	7.5749E-01
	3.5	-4.4325E+01	4.5835E+01	-9.0192E+00	7.9526E-01
	7.5	-3.8619E+01	3.9065E+01	-6.8569E+00	5.5832E-01
	10	-3.7413E+01	3.7688E+01	-6.4900E+00	5.1949E-01
	15	-3.4786E+01	3.4781E+01	-5.7221E+00	4.4463E-01
	20	-3.3845E+01	3.3738E+01	-5.5073E+00	4.2312E-01

Note 2: Linear interpolation of calculated burnups between cooling times for a given fuel assembly enrichment and a given fuel type is permitted.

Note 3: Fuel assemblies that experienced inserted CEA during the irradiation history, but where it can be demonstrated, based on operating records, that the burnup-weighted average CEA insertion depth is less than 20.19 cm from the top of the active length, are permitted for storage in the spent fuel cells with the minimum burnup requirement increased by 5 GWD/MTU. Fuel assemblies that experienced inserted CEA during the irradiation history, but where the burnup weighted average CEA insertion depth is more than 20.19 cm from the top of the active length, are only permitted for storage in the fresh fuel cells (i.e., Region 1 Pattern "A" and cask pit racks).

~~Allowable Checkerboard Storage Patterns~~
(See Notes 1 ~~and 2~~)



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.

pattern

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

2 → ~~3~~. F represents Fresh Fuel. WH represents an empty cell. Allowable ~~Pattern~~ is Fresh Fuel checkerboarded with empty cells. Diagram is for illustration only.

5

~~4~~. Numbering denotes fuel assembly type. Minimum burnup for fuel assembly type ~~1~~ is defined in Table 3.7.15-1. Allowable pattern is at least one insert [either Metamic or full-length full-strength CEA] in any one of the 2x2 array locations. Diagram is for illustration only.

3

3

~~5~~. Numbering denotes fuel assembly type. WH represents an empty cell. Minimum burnup for fuel assembly type ~~2~~ is defined in Table 3.7.15-1. Allowable pattern is at least one empty cell in any of the 2x2 array locations. Diagram is for illustration only.

1

Note 4: Numbering denotes fuel assembly type. Minimum burnup for fuel assembly type 2 is defined in Table 3.7.15-1. Allowable pattern is at least two inserts [either Metamic or full-length full-strength CEA] in any two of the 2x2 array locations. Diagram is for illustration only.

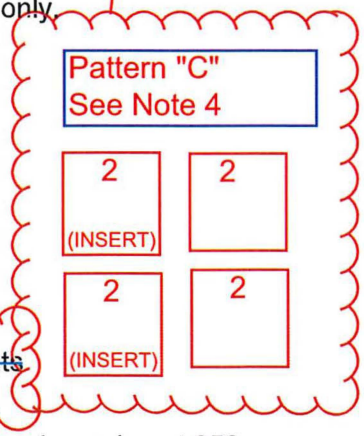


Figure 3.7.15-1 (page 1 of 1)
Allowable Region 1 Storage Patterns ~~and Fuel Arrangements~~

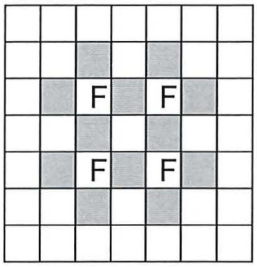
Relocate to top of page

Replace with Insert 3

ALLOWED SPECIAL ARRANGEMENT

~~Fresh Fuel Assemblies in Pattern "C", "D", or "E" Racks~~

Fresh Fuel Assemblies in Region 2 Racks (See Note 1)



F = FRESH FUEL ASSEMBLY

= EMPTY CELL

~~ALLOWABLE CHECKERBOARD STORAGE PATTERNS~~ (See Notes 1 and 2)

Add "Spent Fuel Assemblies in Region 2 Racks (See Note 2)"

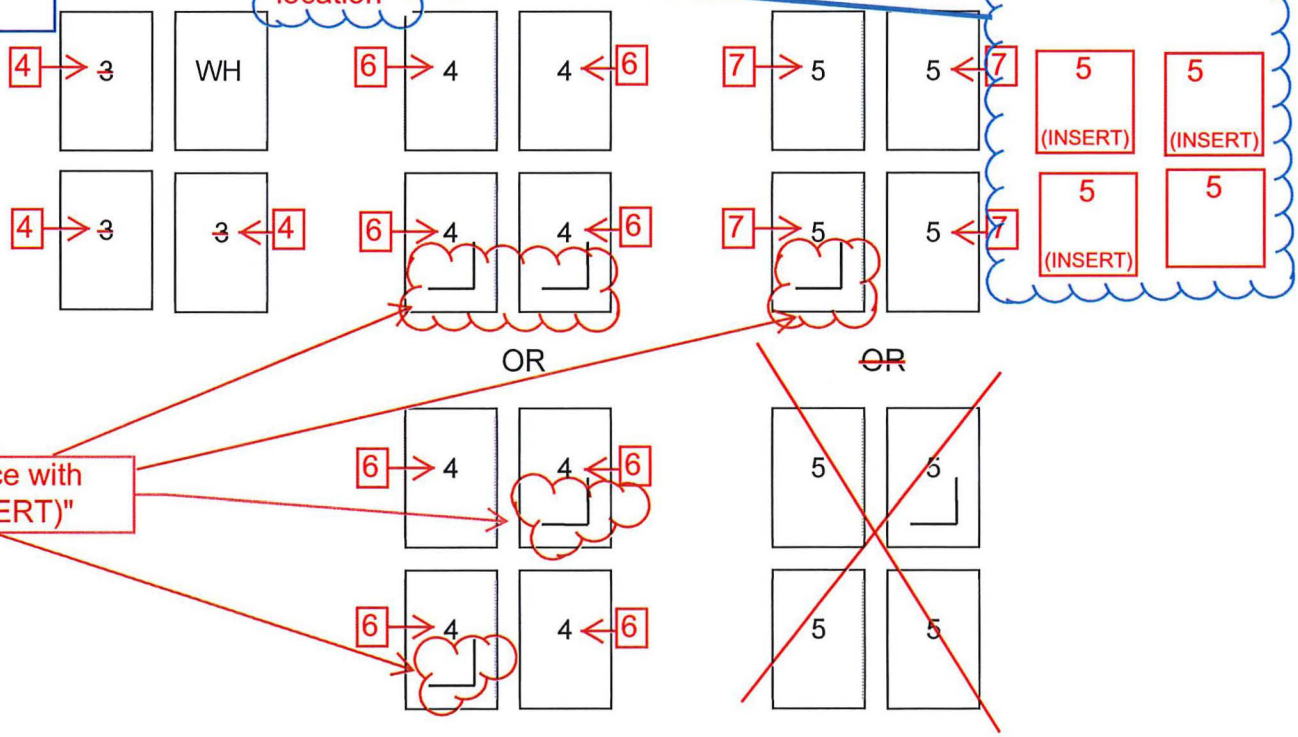
E Pattern "~~C~~" See Note 3

Move Pattern F to this location

G Pattern "~~D~~" See Note ~~4~~ 5

H Pattern "~~E~~" See Note ~~5~~ 6

Pattern "F" See Note 4



replace with "(INSERT)"

Figure 3.7.15-2 (page 1 of 2)
Allowable Region 2 Storage Patterns ~~and Fuel Alignments~~

~~Arrangements~~

Relocate to top of page

1. Allowable pattern is up to four fresh fuel assemblies placed in the corners of a 3x3 array. Each fresh fuel assembly must have completely water-filled cells placed face-adjacent on all sides. Each of the 2x2 arrays outside the 3x3 array must meet the requirements of one of the Region 2 allowed patterns (E, F, G or H).

torage
3.7.15

Not

2 → ~~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. Empty cells within any pattern are acceptable.~~

4 → 3. Numbering denotes fuel assembly type. WH represents an empty cell. Minimum burnup for fuel assembly type ~~3~~ is defined in Table 3.7.15-1. Allowable pattern is at least one empty cell in any of the 2x2 array locations. Diagram is for illustration only.

6 → ~~4.~~ Numbering denotes fuel assembly type. Minimum burnup for fuel assembly type ~~4~~ is defined in Table 3.7.15-1. Allowable pattern is at least two inserts, (either Metamic or full-length, full-strength CEA) in the 2x2 array. Diagrams are for illustration only.

5 →

7 → 6 → ~~5.~~ Numbering denotes fuel assembly type. Minimum burnup for fuel assembly type ~~5~~ is defined in Table 3.7.15-1. Allowable pattern is one insert, (either Metamic or full-length, full-strength CEA) in the 2x2 array. Diagrams are for illustration only.

4. Numbering denotes fuel assembly type. Minimum burnup for fuel assembly type 5 is defined in Table 3.7.15-1. Allowable pattern is at least three inserts [either Metamic or full-length, full-strength CEA] in any three of the 2x2 array locations. Diagram is for illustration only.

INSERT 3a

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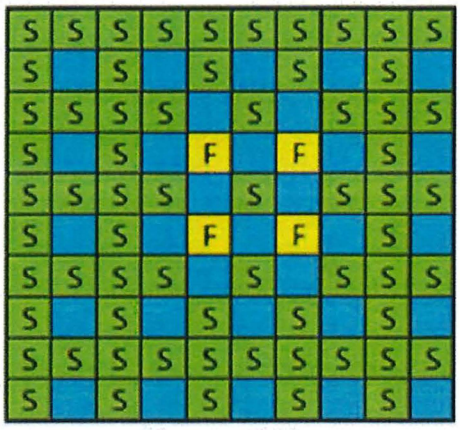
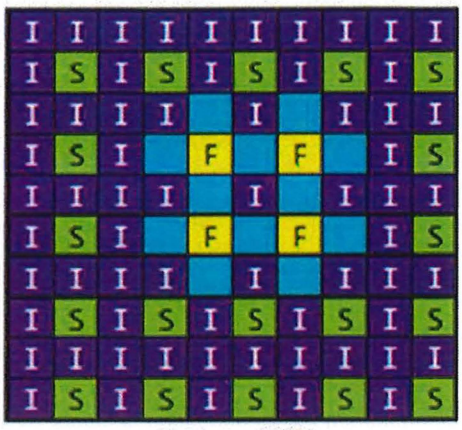
Figure 3.7.15-2 (page 2 of 2)
Allowable Region 2 Storage Patterns ~~and Fuel Arrangements~~

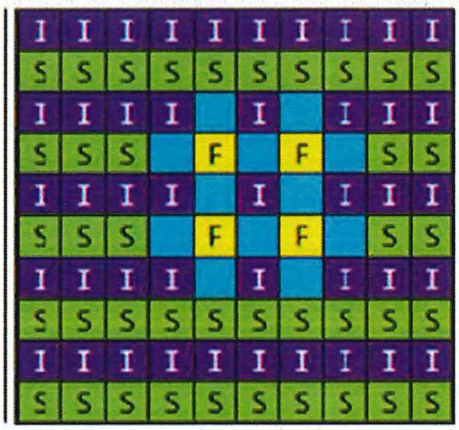
INSERT 3



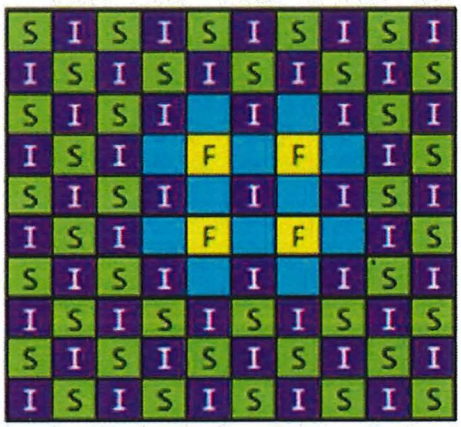
Pattern SR1
(See Note SR1)



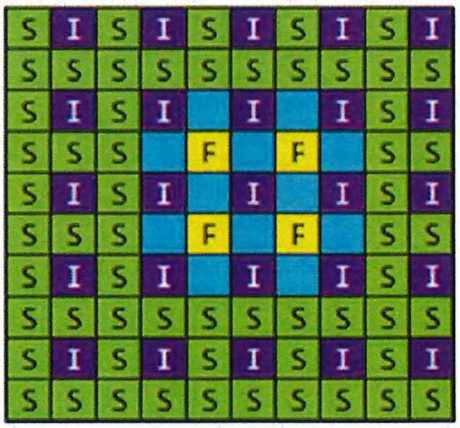
Pattern SR2
(See Note SR2)



Pattern SR3a
(See Note SR3)



Pattern SR3b
(See Note SR3)



Pattern SR4
(See Note SR4)

S Spent Fuel, No Insert
I Spent Fuel, Poison Insert
F Fresh Fuel
Empty SFR Cell

INSERT 3a

The 3x3 array is placed in combination with Pattern E.

SR1. ~~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 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 shall be placed in the center of the 3x3 array. Minimum burnup for fuel assembly type 4 is defined in Table 3.7.15-1 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 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 that meets the requirements of type 5 with a Metamic insert or a full length, full strength 5-finger CEA shall be placed in the center of the 3x3 array. Minimum burnup for fuel assembly type 5 is defined in Table 3.7.15-1 as a function of maximum initial planar average enrichment and cooling time. Diagram is for illustration only.

SR3. ~~Allowable pattern is up to four fresh or burned fuel assemblies placed in a 3x3 array in combination with Pattern G 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 that meets the requirements of type 6 with a Metamic insert or a full length, full strength 5-finger CEA shall be placed in the center of the 3x3 array. Minimum burnup for fuel assembly type 6 is defined in Table 3.7.15-1 as a function of maximum initial planar average enrichment and cooling time. Diagram is for illustration only.

SR4. ~~Allowable pattern is up to four fresh or burned fuel assemblies placed in a 3x3 array in combination with Pattern H 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 that meets the requirements of type 7 with a Metamic insert or a full length, full strength 5-finger CEA can be placed in the center of the 3x3 array. Minimum burnup for fuel assembly type 7 is defined in Table 3.7.15-1 as a function of maximum initial planar average enrichment and cooling time. Diagram is for illustration only.

The 3x3 array is placed in combination with Pattern F.

The 3x3 array is placed in combination with Pattern G.

The 3x3 array is placed in combination with Pattern H.

~~Allowed Region 2 to Region 1 Fuel Alignments~~
~~(See Notes 1 and 2)~~

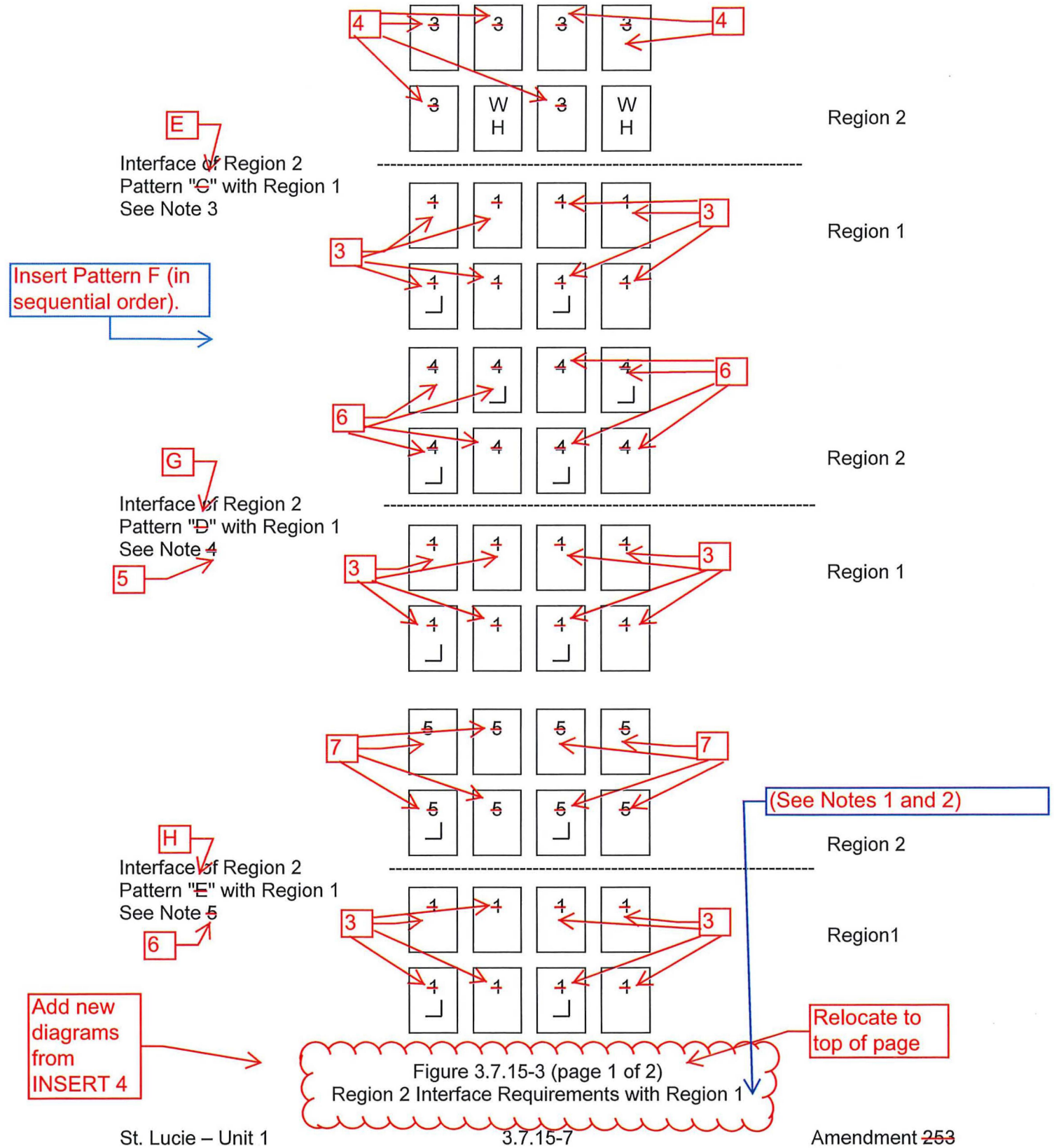
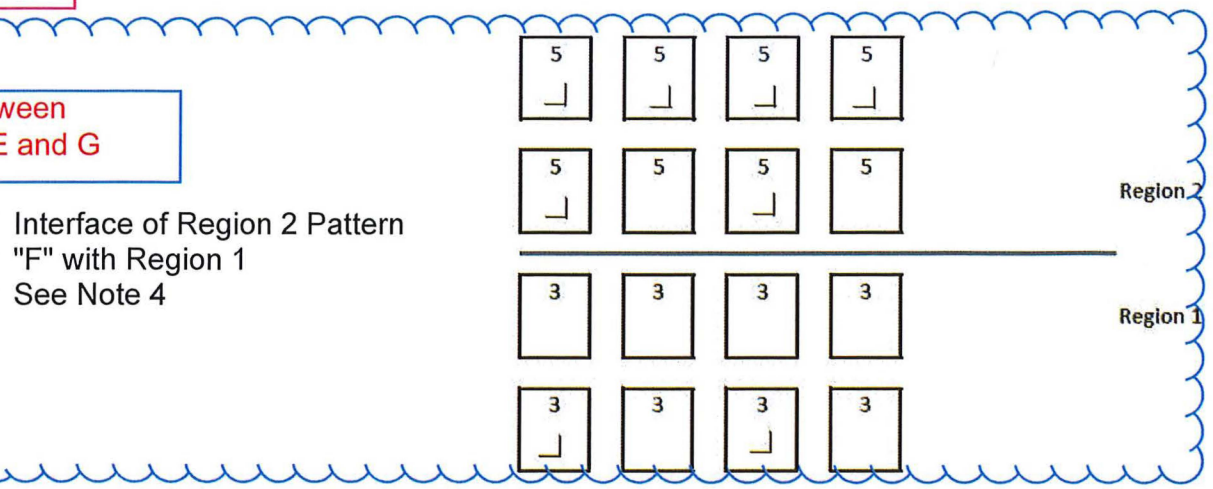
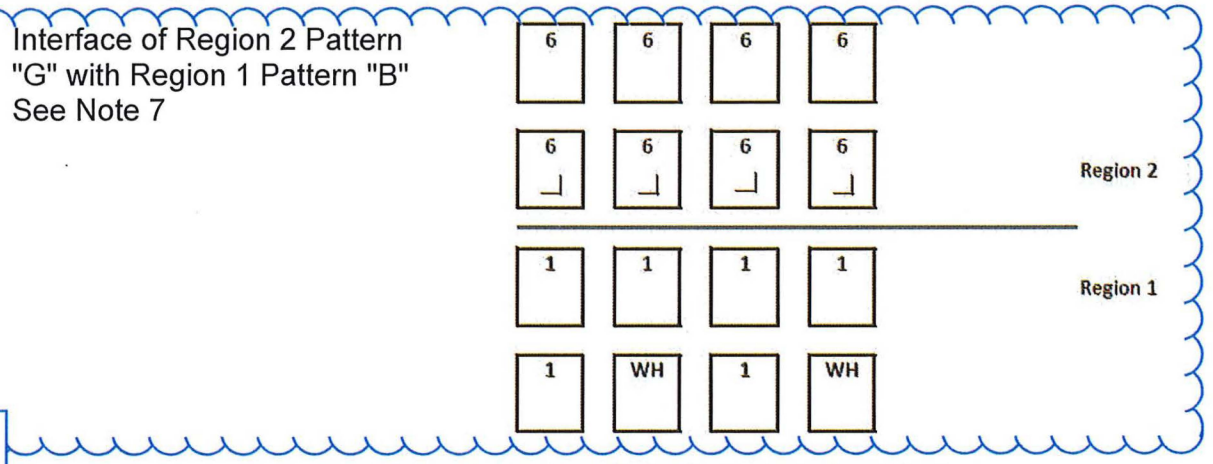


Figure 3.7.15-3 (page 1 of 2)
Region 2 Interface Requirements with Region 1

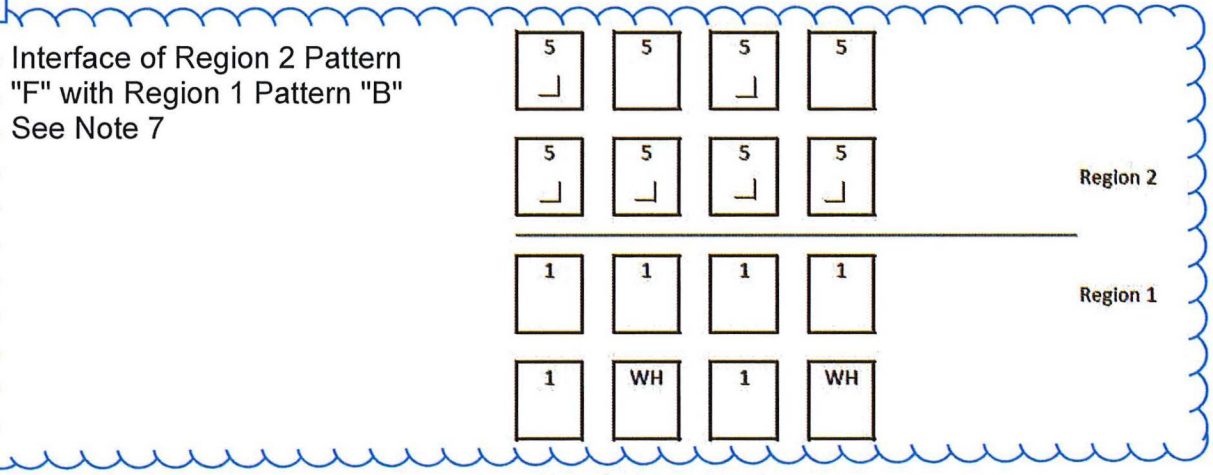
INSERT 4

Insert between Patterns E and G





Swap these two patterns



4. For the interface of Pattern "F" with Region 1, at least one cell on the rack periphery facing Region 1 rack must contain an insert (either Metamic of full-length full-strength CEA) in the 2x2 array. If the insert is Metamic, the insert must be oriented so that the corner of the L-shape is located closest to the Region 1 rack. Diagram is for illustration only.

7. For the interface of Region 2 Patterns "F" and "G" with Region 1 Pattern "B", no less than two cells on the rack periphery facing Region 1 rack must contain inserts (either Metamic of full-length full-strength CEA) in the 2x2 array. If the insert is Metamic, the insert must be oriented so that the corner of the L-shape is located closest to the Region 1 rack. Diagram is for illustration only.

Notes:

1. ~~Empty cells with any pattern are acceptable.~~ D

2. There are no interface requirements within Region 1. Any ~~Pattern~~ pattern within Region 1 may be used for the interface. Pattern "~~B~~" was used only as an illustration. for the first four sketches

3. WH represents an empty cell. For the interface of Pattern "~~C~~" with Region 1, the empty cell must be on the rack periphery facing Region 1 racks. Diagrams ~~are~~ is for illustration only. Pattern G E

5 → ~~4~~. For the interface of ~~pattern~~ "~~D~~" with Region 1, at least one cell on the rack periphery facing Region 1 rack must contain an insert (either Metamic of full-length full-strength CEA) in the 2x2 array. If the insert is Metamic, the insert must be oriented so that the corner of the L-shape is located closest to the Region 1 rack. Diagram is for illustration only.

6 → ~~5~~. For the interface of Pattern "~~E~~" with Region 1, the insert must be on the rack periphery facing the Region 1 rack. The insert may be either a Metamic of full-length full strength CEA. If the insert is Metamic, the insert must be oriented so that the corner of the L-shape is located closest to the Region 1 rack. Diagram is for illustration only. H

Add NOTES 4 and 7 from INSERT 4

The interface requirements noted herein are for 2x2 arrays that are across the interface between Region 1 and Region 2 of the spent fuel pool racks, with 2 cells on the Region 1 side and 2 cells on the Region 2 side. Any 2x2 array of fuel assemblies in Region 1 adjacent to the interface shall comply with the requirements of LCO 3.7.15.b. Any 2x2 array of fuel assemblies in Region 2 adjacent to the interface shall comply with the requirements LCO 3.7.15.c.

Relocate to top of page

Figure 3.7.15-3 (page 2 of 2)
Region 2 Interface requirements with Region 1

3.7 PLANT SYSTEMS

3.7.18 New Fuel Rack Storage

LCO 3.7.18 The combination of initial enrichment and integral burnable absorbers of each fuel assembly stored in the new fuel racks shall be in accordance with the following ~~configuration~~ requirements:

a. The maximum initial planar average U-235 enrichment of any fuel assembly inserted in a new fuel storage rack shall be less than or equal to 4.95 weight percent;

b. Fuel with a maximum initial planar average U-235 enrichment less than or equal to 3.9 weight percent can be stored in any location of the new fuel racks;

c. Fuel with a maximum initial planar average U-235 enrichment higher than 3.9 and less than or equal to 4.95 weight percent that meets the requirement for integral burnable absorber credit in LCO 3.7.18.e can be stored in any location of the new fuel racks;

d. Fuel with a maximum initial planar average U-235 enrichment higher than 3.9 and less than or equal to 4.95 weight percent that does not meet the requirement for integral burnable absorber credit in LCO 3.7.18.e can only be stored on the periphery of the short sides of the new fuel storage racks as shown in Figure 3.7.18-1. A maximum of 16 fuel assemblies in this category can be stored in the new fuel storage racks;

e. Fuel meets the integral burnable absorber credit requirement when the conditions below are met:

   i. The Gadolinia loading is not less than 2.0 wt% Gd_2O_3;

   ii. The layout of the Gd rods is symmetric with respect to both diagonals or both principal axes of a fuel lattice;

   iii. The number of Gd rods is not less than:

      1. Four (4), if they are located in the specified cells in Figure 3.7.18-2(a), or
      2. Eight (8):
         a. if they are ~~present~~ located in the inner 12x12 array of the fuel lattice, while not less than four (4) of them are located on the periphery of the inner 12x12 array, as shown in Figure 3.7.18-2(b);
         b. if they are located on the periphery of the inner 10x10 array of the fuel lattice, as shown in Figure 3.7.18-2(c);
         c. if they are located in the specified cells in Figure 3.7.18-2(d).

APPLICABILITY: Whenever any fuel assembly is stored in the new fuel storage racks.

ACTIONS

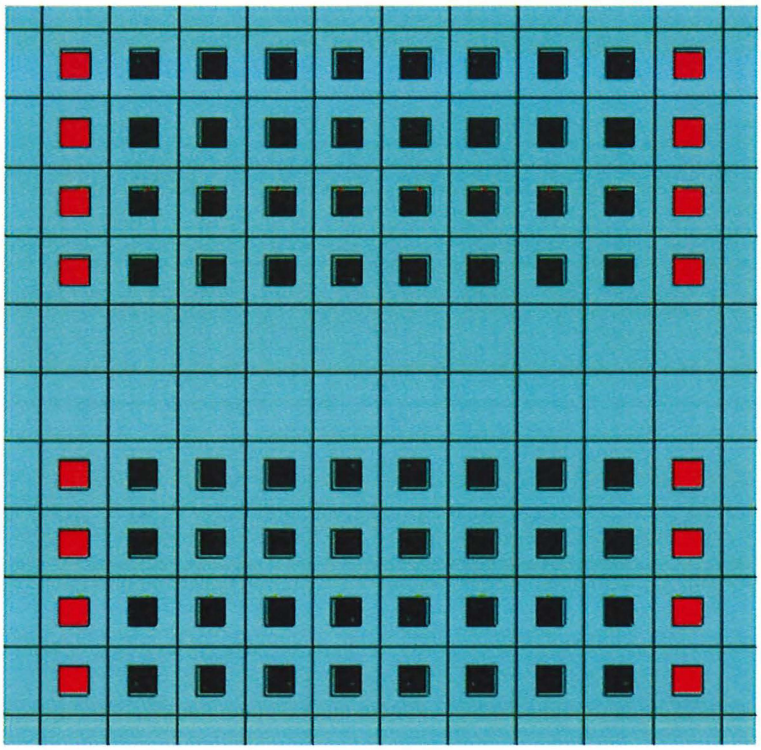
CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Requirements of the LCO not met.	A.1 ----------NOTE---------- LCO 3.0.3 is not applicable. ---------- Initiate action to move the noncomplying fuel assembly to an acceptable location.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.7.18.1	Verify by administrative means the initial enrichment and integral burnable absorbers of the fuel assembly is in accordance with the ~~configuration~~ requirements of LCO 3.7.18.a, b, c, d, and e.	Prior to storing the fuel assembly in the new fuel rack.
SR 3.7.18.2	Verify the fuel assemblies stored in the new fuel storage racks are in accordance with the ~~configuration~~ requirements of LCO 3.7.18.a, b, c, d, and e.	After completing a set of moves into the new fuel storage racks.

Figure 3.7.18-1

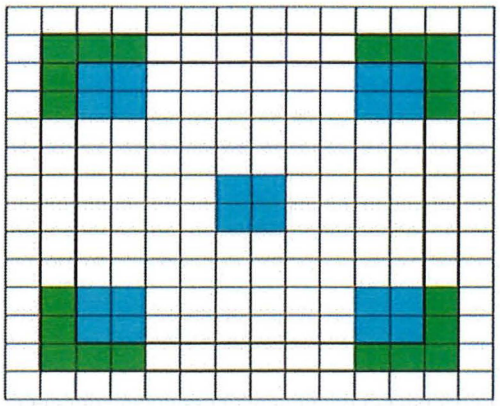
New Fuel Storage Racks (See Note 1)



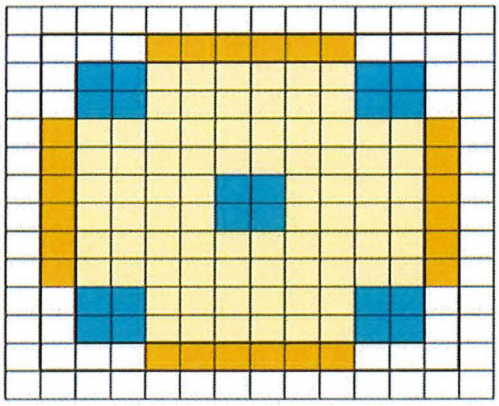
Notes:
1. Red cells are peripheral locations on the short side of the racks.

Figure 3.7.18-2

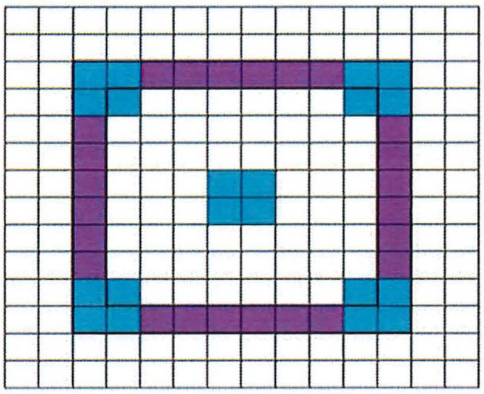
Integral Burnable Absorber Locations



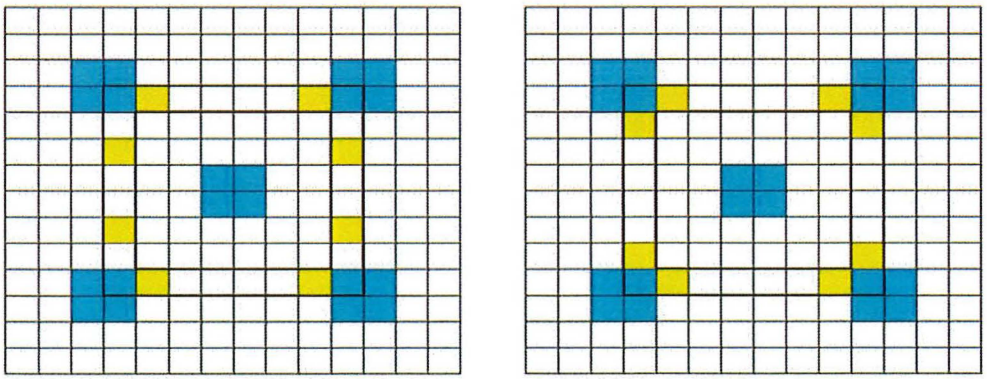
(a) Layouts with 4 Gd Rods



(b) Layouts with 8 Gd Rods in the inner 12x12 Array



(c) Layouts with 8 Gd rods on the periphery of the inner 10x10 Array



(d) Layouts with 8 Gd rods on the periphery of the inner 8x8 Array

4.0 DESIGN FEATURES

4.1 Site Location

The St. Lucie Plant nuclear units are located on Hutchinson Island in St. Lucie County, about halfway between the cities of Fort Pierce and Stuart on the east coast of Florida. The radius of the exclusion area is 0.97 miles from the center of the St. Lucie Plant. The low population zone is the area within a radius of one mile from the center of the St. Lucie Plant.

4.2 Reactor Core

4.2.1 Fuel Assemblies

The reactor shall contain 217 fuel assemblies. Each assembly shall consist of a matrix of Zircaloy or M5 clad fuel rods with an initial composition of natural or slightly enriched uranium dioxide (UO_2) as fuel material. Limited substitutions of zirconium alloy or stainless steel filler rods for fuel rods, in accordance with approved applications of fuel rod configurations, may be used. Fuel assemblies shall be limited to those fuel designs that have been analyzed with applicable NRC staff approved codes and methods and shown by tests or analyses to comply with all fuel safety design bases. A limited number of lead test assemblies that have not completed representative testing may be placed in nonlimiting core regions.

4.2.2 Control Element Assemblies

The reactor core shall contain 73 control element assemblies (CEAs). The control material shall be silver indium cadmium or boron carbide as approved by the NRC.

4.3 Fuel Storage

4.3.1 Criticality

4.3.1.1 The spent fuel storage racks are designed and shall be maintained with:

a. Fuel assemblies having a maximum planar average U-235 enrichment of ~~4.6~~ 4.95 weight percent,

b. $k_{eff} < 1.0$ if fully flooded with unborated water, which includes an allowance for uncertainties as described in Section 9.1 of the Updated Final Safety Analysis Report (UFSAR),

c. $k_{eff} \leq 0.95$ if flooded with borated water at a soluble boron concentration of ~~500~~ 550 ppm, which includes an allowance for uncertainties as described in Section 9.1 of the UFSAR,

4.0 DESIGN FEATURES

4.3 Fuel Storage (continued)

d. A nominal 10.12 inch center to center distance between fuel assemblies placed in the Region 1 spent fuel pool storage racks,

e. A nominal 8.86 inch center to center distance between fuel assemblies placed in the Region 2 spent fuel pool storage racks, and

f. A nominal 10.30 inch center to center distance between fuel assemblies placed in the Region I cask pit storage rack.

4.3.1.2 The new fuel storage racks are designed and shall be maintained with:

a. Fuel assemblies having a maximum planar average U-235 enrichment of ~~4.6~~ 4.95 weight percent,

b. $k_{eff} \leq 0.95$ if fully flooded with unborated water, which includes an allowance for uncertainties as described in Section 9.1 of the UFSAR,

c. $k_{eff} \leq 0.98$ if moderated by aqueous foam, which includes an allowance for uncertainties as described in Section 9.1 of the UFSAR, and

d. A nominal 21 inch center to center distance between fuel assemblies placed in the storage racks.

4.3.2 Drainage

The spent fuel storage pool is designed and shall be maintained to prevent inadvertent draining of the pool below elevation 56 ft.

4.3.3 Capacity

The spent fuel storage pool and cask pit are designed and shall be maintained with a total storage capacity limited to no more than 1849 fuel assemblies with the spent fuel pool storage racks limited to no more than 1706 fuel assemblies and the cask pit storage rack limited to no more than 143 fuel assemblies.

St. Lucie Unit 1 License Amendment Request L-2024-200, Updated Spent Fuel Pool Criticality Analysis in Support of St. Lucie Unit 1 Transition to 24 Month Fuel Cycles

St. Lucie Unit 1, Technical Specifications Bases Page Markups (revised)

(4 pages follow)

B 3.7 PLANT SYSTEMS

B 3.7.15 Spent Fuel Pool Storage

BASES

BACKGROUND

The spent fuel pool is designed for the underwater storage of 1706 spent fuel assemblies plus 143 fuel assemblies in the cask pit storage rack, when installed. The total storage capability is 1849 assemblies with the cask pit rack installed.

The spent fuel storage pool high density spent fuel storage racks are divided into three separate and distinct regions. Region 1, with a maximum storage capacity of 342 fuel assemblies, is designed to accommodate new fuel with a maximum U-235 enrichment up to 4.95 weight percent (wt%) or spent fuel ~~regardless of the discharge fuel burnup~~. Region 2, with a maximum storage capacity of 1364 fuel assemblies, is designed to accommodate high burnup fuel. The cask pit rack, with a maximum storage capacity of 143 fuel assemblies, is a Region 1 design capable of storing either new fuel or spent fuel regardless of the discharge fuel burnup.

Criticality is precluded by the spacing and geometrically safe configurations of new and spent fuel assemblies with a maximum initial planar average U-235 enrichment up to ~~4.6~~ wt% to ensure a subcritical array of $k_{eff} \leq 0.95$ is maintained, assuming ~~500~~ ppm of soluble boron is present in the fuel pool water.

4.95

550

APPLICABLE SAFETY ANALYSES

The misplacement of a fresh (unburned) fuel assembly with a minimum soluble poison of ~~500~~ ppm in the spent fuel storage pool could result in exceeding the regulatory limit of $K_{eff} \leq 0.95$. This could possibly occur if a fresh fuel assembly of the highest permissible enrichment (~~4.6~~ wt%) were to be inadvertently misloaded into a Region 2 storage cell intended to be empty, or into a cell intended to hold a low reactivity fuel assembly. The reactivity consequences of these situations determined that the misloading of a fresh assembly into a cell intended to remain empty is the bounding condition. A boron concentration of ~~1500~~ ppm is required to ensure a $K_{eff} \leq 0.95$ is maintained in the event of a misloaded fuel assembly.

The spent fuel pool storage satisfies Criterion 2 of 10 CFR 50.36(c)(2)(ii).

550

4.95

1376

LCO

The restrictions on the placement of fuel assemblies within the spent fuel pool, according to criteria for Region 1, Region 2, and cask pit specified in the LCO, ensures that the k_{eff} of the spent fuel pool will always remain ≤ 0.95. The restrictions are consistent with the criticality safety analysis performed for the spent fuel pool.

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INSERT A

Figures 3.7.15-1 and 3.7.15-2 provide examples of the allowable spent fuel and fresh fuel assembly loading patterns for the Region 1 and Region 2 storage racks. These diagrams are for illustrative purposes only and do not reflect all authorized loading patterns. Refer to the applicable provisions of LCO 3.7.15 and the associated notes for the allowable Region 1, Region 2 and Cask Pit storage rack loading patterns.

B 3.7 PLANT SYSTEMS

B 3.7.18 New Fuel Rack Storage

BASES

BACKGROUND

The St. Lucie Unit 1 new fuel vault storage racks are designed to store 80 fuel assemblies with sufficient spacing between assemblies to maintain a subcritical array of at least 2 percent during flooding with non-borated water under all design loadings, including the design basis earthquake.

The new fuel storage racks are located within the Fuel Handling Building (FHB) and extend vertically to an elevation which precludes flooding during the probable maximum hurricane. The new fuel storage racks consist of 80 square cavities in two separate 4 by 10 arrays separated by an aisle about 42 inches wide, formed by sealing off two central rows of storage ports. The size of the cavities is sufficient to hold one fuel assembly in a vertical position. Each cavity has a hinged plate cover. The new fuel storage rack complies with the requirements of 10 CFR 50.68(b) which establishes restrictions on the reactivity of stored fresh fuel.

Criticality is precluded by the spacing and geometrically safe configurations of new fuel assemblies with a maximum initial planar average U-235 enrichment of up to 4.95 wt% to ensure that a subcritical array of $k_{eff} \leq 0.98$ is maintained assuming optimum moderation and $k_{eff} \leq 0.95$ is maintained assuming full moderation.

APPLICABLE SAFETY ANALYSIS

The misplacement of a fresh (unburned) fuel assembly in the new fuel storage racks could result in new fuel storage racks exceeding the regulatory limit of $k_{eff} \leq 0.98$ assuming optimum moderation or $k_{eff} \leq 0.95$ assuming full moderation.. This could occur if the highest permissible enrichment (4.95 wt%) were to be inadvertently misloaded into new fuel storage vault cell intended to be empty, or into a cell intended to hold a low reactivity fuel assembly. The reactivity consequences of these situations determined that the multiple misloading of fresh fuel assemblies into cells intended to remain empty is the bounding condition. The loading of fresh fuel assemblies into their designated cell locations is required to ensure a $k_{eff} \leq 0.98$ is maintained in the event of a misloading event.

The new fuel rack storage satisfies Criterion 2 of 10 CFR 50.36(c)(2)(ii).

LCO

The restrictions on the placement of fresh fuel assemblies within the new fuel vault storage racks according to the criteria in the LCO ensures that the k_{eff} of the new fuel vault storage rack will always remain ≤ 0.98 assuming optimum moderation and ≤ 0.95 assuming full moderation.. The restrictions are consistent with the criticality safety analysis performed for the new fuel vault storage racks.

APPLICABILITY

This LCO applies whenever any fresh fuel assembly is stored in the new fuel storage racks.

ACTIONS

A.1

When the configuration of fresh fuel assemblies stored in the new fuel storage racks is not in accordance with the criteria specified in the LCO, immediate action must be taken to make the necessary fresh fuel assembly movement(s) to bring the configuration into compliance.

Required Action A.1 is modified by a Note indicating that LCO 3.0.3 does not apply. If moving fresh fuel assemblies while in MODE 5 or 6, LCO 3.0.3 would not specify any action. If moving fresh fuel assemblies while in MODE 1, 2, 3, or 4, the fuel movement is independent of reactor operation. Therefore, in either case, the inability to move fresh fuel assemblies is not sufficient reason to require a reactor shutdown.

SURVEILLANCE REQUIREMENTS

SR 3.7.18.1

This SR verifies by administrative means that, prior to storing each fresh fuel assembly in the new fuel storage racks, the combination of initial enrichment and integral burnable adsorbers is in accordance with the configuration requirements specified in the LCO.

SR 3.7.18.2

This SR verifies by administrative means that, after completing a set of moves into the new fuel storage racks, the fresh fuel assemblies are verified in accordance with the configuration requirements specified in the LCO.

REFERENCES

None