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

FPL

March 25, 2004

L-2004-063
10 CFR 50.90

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 20555

RE: St. Lucie Unit 1
Docket No. 50-335
Additional Information for Proposed Spent
Fuel Pool Soluble Boron Credit Amendment

By letter L-2002-221 dated November 25, 2002, Florida Power & Light (FPL) submitted a proposed license amendment (PLA) to revise the St. Lucie Unit 1 Technical Specifications (TS). The proposed amendment eliminates the need to credit Boraflex™ neutron absorbing material for reactivity control in the spent fuel pool (SFP) and instead credits a combination of soluble boron and fuel position in the storage racks to maintain reactivity within the effective neutron multiplication factor (k_{eff}) limits of 10 CFR 50.68. FPL provided two responses for additional information by letters L-2003-125 dated May 14, 2003 and L-2003-245 dated September 29, 2003.

Discussions with the NRC staff revealed that further clarification was required in order to integrate this proposed license amendment with the cask pit rack proposed license amendments requested by letter L- 2002-187, dated October 23, 2002. The original November 25, 2002, PLA limited the request for soluble boron and fuel position credit to the spent fuel pool storage racks. FPL now proposes that the cask pit storage rack also be included in the soluble boron credit licensing bases. The attachment provides FPL's justification that the criticality analysis for soluble boron credit bounds the criticality analysis for the Unit 1 cask pit rack such that the proposed Unit 1 Technical Specification changes would also be applicable for the Unit 1 cask pit rack. The initial cask pit rack PLA also proposed removing the description of the Boral poison material from the Technical Specifications. However, the NRC staff requested that a description of the Boral poison material be included in the proposed St. Lucie Unit 1 spent fuel pool design features Technical Specification. The Technical Specification markups and word-processed Technical Specification changes for Technical Specification pages 5-5, 5-6, and 5-6a integrate the soluble boron credit and cask pit rack proposed license amendments. These changes are provided in the same attachment, and are replacements for the those pages included in letter L-2002-221.

The original determination of No Significant Hazards Consideration bounds the information provided in this letter. In accordance with 10 CFR 50.91(b)(1), a copy is being forwarded to the State Designee for the State of Florida.

A001

Please contact us if there are any questions about this submittal.

Very truly yours,

William Jefferson, Jr.
Vice President
St. Lucie Plant

WJ/KWF

Attachment

cc: Mr. W. A. Passetti, Florida Department of Health

STATE OF FLORIDA)
)ss.
COUNTY OF ST. LUCIE)

William Jefferson, Jr. being first duly sworn, deposes and says:

That he is Vice President, St. Lucie Plant, of Florida Power and Light Company, the Licensee herein;

That he has executed the foregoing document; that the statements made in this document are true and correct to the best of his knowledge, information and belief, and that he is authorized to execute the document on behalf of said Licensee.

William Jefferson, Jr.

STATE OF FLORIDA

COUNTY OF ST. LUCIE

Subscribed and sworn to before me this

25 day of Mar., 2004.

Leslie J. Whitwell
MY COMMISSION # DD020212 EXPIRES
May 12, 2005
BONDED THRU TROY FAIN INSURANCE, INC.

Name of Notary Public (Type or Print)

William Jefferson, Jr. is personally known to me.

ADDITIONAL INFORMATION FOR THE

SPENT FUEL POOL SOLUBLE BORON CREDIT AMENDMENT

ST. LUCIE PLANT, UNIT 1

DOCKET NO. 50-335

References:

1. Attachments and Enclosures to FPL letter L-2002-221, November 25, 2002, *Proposed License Amendment, Spent Fuel Pool Soluble Boron Credit*
2. Attachments and Enclosures to FPL letter L-2002-187, October 23, 2002, *Proposed License Amendment, Addition of Cask Pit Spent Fuel Storage Racks*

Based on discussions with the NRC staff, minor changes to the proposed Technical Specification text would enhance integration of the cask pit rack and the soluble boron credit license amendments. Additionally, the cask pit rack was analyzed for optimal moderation at a soluble boron concentration of 0 ppm, and therefore is bounded by the soluble boron credit criticality analysis. As discussed later, there is justification for also applying the soluble boron credit acceptance criteria from 10CFR 50.68(b)(4) to the cask pit rack design.

The following paragraphs present the proposed revised text of Technical Specification Section 5.6.1 Design Features – Fuel Storage Criticality, which will replace the proposed changes to Technical Specification Section 5.6.1 included in letter L-2002-221. This revised wording achieves a thorough integration of cask pit rack and soluble boron credit amendments. It preserves a description of essential aspects of the cask pit rack design features after implementation of the soluble boron credit amendment. The baseline for the revised text is the Technical Specification changes proposed by letters L-2002-221 (the proposed changes made to Technical Specification Section 5.6.3 by letter L-2002-187 are shown for completeness).

Proposed new Section 5.6.1 for the Soluble Boron Credit Amendment Considering the presence of a Cask Pit Rack
(text only - revised or newly added text is underlined)

5.6.1.a The spent fuel pool and spent fuel storage racks shall be maintained with:

1. *k_{eff} less than 1.0 when fully flooded with unborated water, which includes an allowance for biases and uncertainties as described in Section 9.1 of the Updated Final Safety Analysis Report.*

2. *A nominal 10.12 inches center to center distance between fuel assemblies in Region 1 of the spent fuel pool storage racks, a nominal 10.30 inches center to center distance between fuel assemblies in the Region 1 cask pit storage rack, and a nominal 8.86 inches center to center distance between fuel assemblies in Region 2 of the spent fuel pool storage racks.*

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.

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

5.6.1.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.

5.6.1.c Loading of spent fuel storage racks shall be controlled as described below. Criteria 2 and 3 ~~below~~ 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 4.5 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 and Table 5.6-2.

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.

5.6.1.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.*

The only substantive differences between the text presented above and text presented as a part of letter L-2002-221 are: 1) the description of certain cask pit rack features contained in proposed Item 5.6.1.b, and 2) addition of the cask pit rack storage pitch dimension in Item 5.6.1.a.2 (taken from Reference 2). None of these underlined text changes modify any aspect of the 10CFR 50.92 No Significant Hazards Determination presented in letter L-2002-221.

Basis for Application of Soluble Boron Credit Acceptance Criteria to Cask Pit Rack

As discussed in Reference 2, criticality analyses of the Unit 1 cask pit rack were performed considering only the 0 ppm soluble boron condition with a ≤0.95 acceptance criterion. Table 4.1.6.4 of this reference documents that the neutron multiplication factor is 0.9061, (i.e., much less than 1.0) when the cask pit rack is filled with fresh fuel of the limiting enrichment, considering the presence of pure water with optimal moderation characteristics and other conservative assumptions. In part, cask pit rack criticality analyses did not explicitly consider soluble boron because the specified storage cell pitch and the density of fixed neutron absorber material integral to the cask pit rack were sufficient to fully meet published criticality acceptance criteria with no credit for soluble boron. Further, cask pit rack analyses did not explicitly consider soluble boron because these criticality calculations were performed several months prior to developing the methodology used when crediting soluble boron. Criticality analysis calculations performed as part of the soluble boron credit amendment request defined the fuel pool boron concentration required to control k_{eff} during non-accident conditions. Results from the soluble boron calculations were not explicitly incorporated back into the cask pit rack analysis (e.g., through a revision) because of the obvious nature of the incremental effect.

Including soluble boron from the surrounding water in the cask pit rack criticality analysis will not increase the neutron multiplication factor of the cask pit rack, since boron represents neither a source of neutrons nor fissionable material. Recognizing the presence of soluble boron in the cask pit rack analysis would not accelerate or promote the deterioration of the rack's Boral absorber material or otherwise lessen its effectiveness. Since the presence of soluble boron will not increase the effective neutron multiplication factor of the cask pit fuel array, it is logical to conclude that the Reference 2 analysis result complies with both k_{eff} limits proposed for TS 5.6.1.a.

Secondly, it is appropriate to apply consistent TS criticality criteria to the cask pit rack and other Unit 1 spent fuel storage racks because the cask storage and loading area constitutes an integral part of the Unit 1 spent fuel pool. No mechanism is available to isolate the Unit 1 cask pit from the remainder of the spent fuel pool. Further, no mechanism exists to reduce the soluble boron concentration in the cask pit without inducing an equivalent change to the soluble boron concentration in the remainder of the spent fuel pool. For these reasons, it was appropriate to perform the analysis of postulated boron dilution events (provided in Reference 1) considering water volumes in the cask pit area of the pool when computing dilution times and volumes.

Invoking the acceptance criteria for soluble boron credit in the pool cask pit area ensures a consistent design basis with respect to neutron multiplication across all areas of the fuel pool.

DESIGN FEATURES

CONTROL ELEMENT ASSEMBLIES

5.3.2 The reactor core shall contain 73 full length and no part length control element assemblies. The control element assemblies shall be designed and maintained in accordance with the original design provisions contained in Section 4.2.3.2 of the FSAR with allowance for normal degradation pursuant to the applicable Surveillance Requirements.

5.4 REACTOR COOLANT SYSTEM

DESIGN PRESSURE AND TEMPERATURE

5.4.1 The reactor coolant system is designed and shall be maintained:

a. In accordance with the code requirements specified in Section 5.2 of the FSAR with allowance for normal degradation pursuant to the applicable Surveillance Requirements,

b. For a pressure of 2485 psig, and

c. For a temperature of 650°F, except for the pressurizer which is 700°F.

VOLUME

5.4.2 The total water and steam volume of the reactor coolant system is 11,100 ± 180 cubic feet at a nominal T_{avg} of 567°F, when not accounting for steam generator tube plugging.

5.5 EMERGENCY CORE COOLING SYSTEMS

5.5.1 The emergency core cooling systems are designed and shall be maintained in accordance with the original design provisions contained in Section 6.3 of the FSAR with allowance for normal degradation pursuant to the applicable Surveillance Requirements.

5.6 FUEL STORAGE

CRITICALITY

(pool and spent fuel)

5.6.1.a The spent fuel storage racks ~~are designed and~~ shall be maintained with:

(1.0 when)

1. k_{eff} less than ~~or equal to 0.95~~ 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.

(biases and)

DESIGN FEATURES

CRITICALITY (Continued)

2. A nominal 10.12 inches center to center distance between fuel assemblies in Region 1 of the [spent fuel pool] storage racks, [a nominal 10.30 inches center to center distance between fuel assemblies in the Region 1 cask pit storage rack,] and a nominal 8.86 inches center to center distance ~~between fuel assemblies~~ in Region 2 of the [spent fuel pool] storage racks.

3. ~~A boron concentration greater than or equal to 1720 ppm.~~ Insert A

4. ~~Neutron absorber (boraflex) installed between spent fuel assemblies in the storage racks in Region 1 and Region 2.~~ Insert B

b. ~~Region 1 of the spent fuel storage racks can be used to store fuel which has a U-235 enrichment less than or equal to 4.5 weight percent. Region 2 can be used to store fuel which has achieved sufficient burnup such that storage in Region 1 is not required. The initial enrichment vs. burnup requirements of Figure 5.6-1 shall be met prior to storage of fuel assemblies in Region 2. Freshly discharged fuel assemblies may be moved temporarily into Region 2 for purposes of fuel assembly inspection and/or repair, provided that the configuration is maintained in a checkerboard pattern (i.e., fuel assemblies and empty locations aligned diagonally). Following such inspection/repair activities, all such fuel assemblies shall be removed from Region 2 and the requirements of Figure 5.6-1 shall be met for fuel storage.~~ replace with Insert C

d ~~c.~~ 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.

DRAINAGE

5.6.2 The fuel pool is designed and shall be maintained to prevent inadvertent draining of the pool below elevation 56 feet.

CAPACITY

5.6.3 The spent fuel pool [storage racks are] ~~is~~ designed and shall be maintained with a storage capacity limited to no more than 1706 fuel assemblies[, and the cask pit storage rack is designed and shall be maintained with a storage capacity limited to no more than 143 fuel assemblies. The total Unit 1 spent fuel pool and cask pit storage capacity is limited to no more than 1849 fuel assemblies.]

5.7 SEISMIC CLASSIFICATION

5.7.1 Those structures, systems and components identified as seismic Class I in Section 3.2.1 of the FSAR shall be designed and maintained to the original design provisions contained in Section 3.7 of the FSAR with allowance for normal degradation pursuant to the applicable Surveillance Requirement.

Insert A:

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.

Insert B:

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.

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

Insert C:

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.

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.

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.

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.

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DESIGN FEATURES

CRITICALITY (Continued)

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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.

DESIGN FEATURES

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5.6.3 The spent fuel pool storage racks are designed and shall be maintained with a storage capacity limited to no more than 1706 fuel assemblies, and the cask pit storage rack is designed and shall be maintained with a storage capacity limited to no more than 143 fuel assemblies. The total Unit 1 spent fuel pool and cask pit storage capacity is limited to no more than 1849 fuel assemblies.

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5.7.1 Those structures, systems and components identified as seismic Class I in Section 3.2.1 of the FSAR shall be designed and maintained to the original design provisions contained in Section 3.7 of the FSAR with allowance for normal degradation pursuant to the applicable Surveillance Requirement.

5.8 METEOROLOGICAL TOWER LOCATION

5.8.1 The meteorological tower location shall be as shown on Figure 5.1-1.

5.9 COMPONENT CYCLE OR TRANSIENT LIMITS

5.9.1 The components identified in Table 5.9-1 are designed and shall be maintained within the cyclic or transient limits of Table 5.9-1.