

April 5, 1988

Docket No. 50-335

Mr. W. F. Conway
Acting Group Vice President
Nuclear Energy
Florida Power & Light Company
P. O. Box 14000
Juno Beach, Florida 33408

Dear Mr. Conway:

SUBJECT: ST. LUCIE UNIT 1 - ISSUANCE OF AMENDMENT RE: U-235 ENRICHMENT INCREASE (TAC NO. 67006)

The Commission has issued the enclosed Amendment No. 92 to Facility Operating License No. DPR-67 for the St. Lucie Plant, Unit No. 1. This amendment consists of changes to the Technical Specifications in response to your application dated January 20, 1988.

This amendment increases the maximum U-235 enrichment contained in unirradiated fuel stored in the new fuel storage racks from 4.0 to 4.5 weight percent.

A copy of the Safety Evaluation is also enclosed. The Notice of Issuance will be included in the Commission's biweekly Federal Register notice.

Sincerely,

Original signed by

E. G. Tourigny, Project Manager
Project Directorate II-2
Division of Reactor Projects-I/II
Office of Nuclear Reactor Regulation

Enclosures:

1. Amendment No. 92 to DPR-67
2. Safety Evaluation

cc w/enclosures:
See next page

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Mr. W. F. Conway
Florida Power & Light Company

St. Lucie Plant

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

FLORIDA POWER & LIGHT COMPANY

DOCKET NO. 50-335

ST. LUCIE PLANT UNIT NO. 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 92
License No. DPR-67

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by Florida Power & Light Company, (the licensee) dated January 20, 1988, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act) and the Commission's rules and regulations set forth in 10 CFR Chapter I;
 - B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;
 - C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;
 - D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and
 - E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

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2. Accordingly, Facility Operating License No. DPR-67 is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and by amending paragraph 2.C.(2) to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 92, are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of the date of its issuance.

FOR THE NUCLEAR REGULATORY COMMISSION



Herbert N. Berkow, Director
Project Directorate II-2
Division of Reactor Projects-I/II
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Technical
Specifications

Date of Issuance: April 5, 1988

ATTACHMENT TO LICENSE AMENDMENT NO. 92
TO FACILITY OPERATING LICENSE NO. DPR-67
DOCKET NO. 50-335

Replace the following page of the Appendix "A" Technical Specifications with the enclosed pages. The revised page is identified by amendment number and contain vertical lines indicating the area of change. The corresponding overleaf page is also provided to maintain document completeness.

Remove Pages

5-6

Insert Pages

5-6

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.

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

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

1. A k_{eff} equivalent to less than or equal to 0.95 when flooded with unborated water, which includes a conservative allowance of 0.0065 Δk for uncertainties.

DESIGN FEATURES

CRITICALITY (Continued)

2. A nominal 10.12 inches center to center distance between fuel assemblies in Region 1 of the storage racks and a nominal 8.86 inches center to center distance between fuel assemblies in Region 2 of the storage racks.
3. A boron concentration greater than or equal to 1720 ppm.
4. Neutron absorber (boraflex) installed between spent fuel assemblies in the storage racks in Region 1 and Region 2.

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.

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 is designed and shall be maintained with a storage capacity limited to no more than 1706 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.



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 92

TO FACILITY OPERATING LICENSE NO. DPR-67

FLORIDA POWER & LIGHT COMPANY

ST. LUCIE PLANT, UNIT NO. 1

DOCKET NO. 50-335

INTRODUCTION

By letter dated January 20, 1988, Florida Power and Light Company (FP&L) applied for an amendment to Facility Operating License No. DPR-67 for St. Lucie Unit 1 to increase the maximum fuel enrichment specified in Technical Specification 5.6.1.c. The revised limit would be changed from 4.0 weight percent to 4.5 weight percent of U-235. In support of this change, FP&L submitted Advanced Nuclear Fuels Corporation (ANF) (formally Exxon Nuclear Company) report number XN-NF-87-43 entitled, "Criticality Safety Analysis, St. Lucie New Fuel Storage Vault with 4.5% Enriched 14x14 Fuel Assemblies," dated March 1987.

FP&L's application deals with the criticality aspects of new fuel in storage and new fuel being handled. Criticality is the only parameter that needs to be evaluated when a slight U-235 enrichment increase is proposed. The fuel assembly weight and construction are not changed, and thus the structures/equipment which contain or handle the fuel assemblies do not need to be reevaluated. FP&L's application does not address the use of 4.5 weight percent fuel in the spent fuel pool. This was the subject of a separate application dated June 12, 1987, and was evaluated by the staff as a separate licensing action. Thus, the following evaluation only addresses criticality for the new fuel storage racks and the handling equipment.

EVALUATION

The new (unirradiated) fuel storage racks consist of a 10x10 fuel assembly array with the two middle rows removed from service. The cells are spaced on 21-inch centers and 80 cells are available for storage. The new fuel is normally stored in a dry (air) environment. This results in an extremely subcritical configuration. The handling equipment consists of the fuel elevator, the fuel upender, and the fuel transfer tube. The criticality evaluation assumes that this equipment is handling the fuel assembly in a 68°F water environment containing a minimum of 1720 ppm soluble boron. The assembly will be handled for a few minutes in an air environment upon transfer from the new fuel storage racks to the spent fuel pool/refueling cavity (a distance of a number of feet depending upon where in the storage array the assembly is stored); however, the evaluation in the water environment is limiting.

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The staff utilizes two criticality acceptance criteria to determine that General Design Criterion 62 is met. The first requires the storage array to have a k-effective of less than 0.95 when fully loaded and when flooded with potential moderators such as nonborated water or fire extinguishant aerosols. The second requires the storage array to have a k-effective of less than 0.98 when fuel of the highest anticipated reactivity is in place assuming optimum moderation.

The staff reviewed FP&L's safety evaluation and ANF's criticality safety analysis. The staff did not perform any audit calculations to confirm FP&L's or ANF's k-values. Thus, the staff's evaluation is based solely on the statements made and analyses performed by FP&L and ANF.

FP&L's safety evaluation contains a summary of the criticality calculations. FP&L states that the analysis of the proposed increase in fuel enrichment has been accomplished using currently accepted codes and standards, and the applicable criticality acceptance criteria are met. Calculations performed for the new fuel storage racks at various degrees of moderation, including full flooding, indicate that the limiting k-effective occurs for a moderator void fraction of 0.91 and has a value of 0.974 at the 95% confidence level. This meets the acceptance criteria of 0.98.

The FP&L evaluation did not specifically state that k-effective is less than 0.95 with storage racks fully loaded and under flooded conditions. However, the staff reviewed the ANF analysis, which confirmed that this acceptance criterion was met. Page 12 of the ANF analysis states that an infinite array of flooded infinite length bundles is adequately subcritical (k-effective less than 0.95) at all bundle pitches greater than 14 inches. The bundle pitch for the new fuel storage racks is 21 inches, and the assumed fuel storage conditions for the calculations are more conservative than the actual fuel storage conditions.

FP&L stated that the most reactive situation during normal fuel handling operations was conservatively assumed to occur when two assemblies are located 4 inches edge-to-edge from each other. The resulting k-effective for this scenario is 0.929 at the 95% confidence level. For postulated accidents such as having two assemblies accidentally achieve a bundle-to-bundle spacing of less than 4 inches, credit may be taken for realistic water conditions (e.g., water containing at least 1720 ppm soluble boron). The use of realistic water conditions would reduce the k-effective by approximately 0.20. Thus, FP&L meets the standard review plan acceptance criterion of less than 0.95.

ANF's safety analysis contains a description of the calculations used and a summary of major calculational results. The computer codes and cross-sections have been benchmarked against critical experiment data, and evidence of methods verification is contained in Section 6 of ANF's report. The staff's review of the safety analysis indicates that the methods are appropriate and subsequent results are reasonable.

In summary, the staff reviewed FP&L's safety evaluation and concluded that appropriate acceptance criteria have been met to support 4.5 weight percent fuel to be (1) stored in the new fuel storage racks and (2) handled in the fuel elevator, upender, and fuel transfer tube. The staff further concludes that ANF's supporting analysis describes methods that are appropriate and contains results that are reasonable. On this basis, FP&L's proposed Technical Specification change is acceptable.

ENVIRONMENTAL CONSIDERATION

This amendment involves a change in the installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20. The staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously published a proposed finding that the amendment involves no significant hazards consideration and there has been no public comment on such finding. Accordingly, the amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendment.

It should be noted that the new enrichment is slightly above that used in Table S-4 of 10 CFR §51.52, entitled "Environmental Effects of Transportation of Fuel and Waste." Current operating parameters with respect to Table S-4 were evaluated in the Environmental Assessment prepared by the NRC staff in connection with St. Lucie's application to extend its operating license (Environmental Assessment dated May 29, 1987). The staff concluded that current St. Lucie operating parameters, although slightly higher in some cases, e.g., enrichment, continue to meet Table S-4. More recently, in a Generic Statement on Extended Burnup Fuel Use in Commercial LWRs, the NRC concluded that the environmental impacts summarized in Tables S-3 and S-4 for a burnup level of 33 Gwd/MtU are conservative and bound the corresponding impacts for burnup levels up to 60 Gwd/MtU and Uranium-235 enrichments up to 5 percent by weight. 53 Fed. Reg. 6040 at 6041 (February 29, 1988).

CONCLUSION

We have concluded, based on the considerations discussed above, that (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, and (2) such activities will be conducted in compliance with the Commission's regulations, and the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

Date: April 5, 1988

Principal Contributor: E. Tourigny