



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

May 31, 2010

Mr. Mano Nazar
Executive Vice President and
Chief Nuclear Officer
Florida Power and Light Company
P.O. Box 14000
Juno Beach, Florida 33408-0420

SUBJECT: ST. LUCIE PLANT, UNIT 2 - ISSUANCE OF AMENDMENT REGARDING
CONTROL ELEMENT ASSEMBLY DROP TIME (TAC NO. ME1338)

Dear Mr. Nazar:

The Commission has issued the enclosed Amendment No. 158 to Renewed Facility Operating License No. NPF-16 for the St. Lucie Plant, Unit 2. This amendment consists of changes to the Technical Specifications (TS) in response to your application dated May 21, 2009, as supplemented by letter dated June 22, 2009.

The amendment grants a change to TS Section 3.1.3.4, to modify the requirements for Control Element Assembly (CEA) drop time. The modification will increase the current CEA drop time of 3.1 seconds to a new value of 3.2 seconds to accommodate the observed increase CEA drop times.

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,

A handwritten signature in black ink that reads "Brenda Mozafari".

Brenda L. Mozafari, Senior Project Manager
Plant Licensing Branch II-2
Division of Operator Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-389

Enclosures:

1. Amendment No. 158 to NPF-16
2. Safety Evaluation

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

FLORIDA POWER & LIGHT COMPANY

ORLANDO UTILITIES COMMISSION OF

THE CITY OF ORLANDO, FLORIDA

AND

FLORIDA MUNICIPAL POWER AGENCY

DOCKET NO. 50-389

ST. LUCIE PLANT UNIT NO. 2

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 158
Renewed License No. NPF-16

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by Florida Power & Light Company, et al. (the licensee), dated May 21, 2009, as supplemented by letter dated June 22, 2009, 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.

2. Accordingly, Renewed Facility Operating License No. NPF-16 is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and by amending paragraph 3.B to read as follows:

B. Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 158, are hereby incorporated in the renewed license. FPL shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of its date of issuance and shall be implemented within 60 days of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION



Douglas A. Broaddus, Chief
Plant Licensing Branch II-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Operating License
and Technical Specifications

Date of Issuance: May 31, 2010

ATTACHMENT TO LICENSE AMENDMENT NO. 158
TO RENEWED FACILITY OPERATING LICENSE NO. NPF-16
DOCKET NO. 50-389

Replace Page 3 of Renewed Operating License NPF-16 with the attached Page 3.

Replace the following page of the Appendix A Technical Specifications with the attached page. The revised page is identified by amendment number and contains a marginal line indicating the area of change.

Remove Pages

3/4 1-24

Insert Pages

3/4 1-24

neutron sources for reactor startup, sealed sources for reactor instrumentation and radiation monitoring equipment calibration, and as fission detectors in amounts as required.

- D. Pursuant to the Act and 10 CFR Parts 30, 40, and 70, FPL to receive, possess, and use in amounts as required any byproduct, source, or special nuclear material without restriction to chemical or physical form, for sample analysis or instrument calibration or associated with radioactive apparatus or components; and
- E. Pursuant to the Act and 10 CFR Parts 30, 40, and 70, FPL to possess, but not separate, such byproduct and special nuclear materials as may be produced by the operation of the facility.

3. This renewed license shall be deemed to contain and is subject to the conditions specified in the following Commission's regulations: 10 CFR Part 20, Section 30.34 of 10 FR Part 30, Section 40.41 of 10 CFR Part 40, Section 50.54 and 50.59 of 10 CFR Part 50, and Section 70.32 of 10 CFR Part 70; and is subject to all applicable provisions of the Act and to the rules, regulations, and orders of the Commission now or hereafter in effect; and is subject to the additional conditions specified below:

A. Maximum Power Level

FPL is authorized to operate the facility at steady state reactor core power levels not in excess of 2700 megawatts (thermal).

Commencing with the startup for Cycle 16 and until the Combustion Engineering Model 3410 Steam Generators are replaced, the maximum reactor core power shall not exceed 89 percent of 2700 megawatts (thermal) if:

- a. The Reactor Coolant System Flow Rate is less than 335,000 gpm but greater than or equal to 300,000 gpm, or
- b. The Reactor Coolant System Flow Rate is greater than or equal to 300,000 gpm AND the percentage of steam generator tubes plugged is greater than 30 percent (2520 tubes/SG) but less than or equal to 42 percent (3532 tubes/SG).

This restriction in maximum reactor core power is based on analyses provided by FPL in submittals dated October 21, 2005 and February 28, 2006, and approved by the NRC in Amendment No. 145, which limits the percent of steam generator tubes plugged to a maximum of 42 percent (3532 tubes) in either steam generator and limits the plugging asymmetry between steam generators to a maximum of 600 tubes.

B. Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 158 are hereby incorporated in the renewed license. FPL shall operate the facility in accordance with the Technical Specifications.

REACTIVITY CONTROL SYSTEMS

CEA DROP TIME

LIMITING CONDITION FOR OPERATION

3.1.3.4 The individual full-length (shutdown and regulating) CEA drop time, from a fully withdrawn position, shall be less than or equal to 3.2 seconds from when the electrical power is interrupted to the CEA drive mechanism until the CEA reaches its 90% insertion position with:

- a. T_{avg} greater than or equal to 515°F, and
- b. All reactor coolant pumps operating.

APPLICABILITY: MODES 1 and 2.

ACTION:

- a. With the drop time of any full-length CEA determined to exceed the above limit:
 1. If in MODE 1 or 2, be in at least HOT STANDBY within 6 hours, or
 2. If in MODE 3, 4, or 5, restore the CEA drop time to within the above limit prior to proceeding to MODE 1 or 2.
- b. With the CEA drop times within limits but determined at less than full reactor coolant flow, operation may proceed provided THERMAL POWER is restricted to less than or equal to the maximum THERMAL POWER level allowable for the reactor coolant pump combination operating at the time of CEA drop time determination.

SURVEILLANCE REQUIREMENTS

4.1.3.4 The CEA drop time of full-length CEAs shall be demonstrated through measurement prior to reactor criticality:

- a. For all CEAs following each removal and installation of the reactor vessel head,
- b. For specifically affected individuals CEAs following any maintenance on or modification to the CEA drive system which could affect the drop time of those specific CEAs, and
- c. At least once per 18 months.



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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 158

TO RENEWED FACILITY OPERATING LICENSES NO. NPF-16

FLORIDA POWER AND LIGHT COMPANY, ET AL.

ST. LUCIE PLANT, UNIT NO. 2

DOCKET NO. 50-389

1.0 INTRODUCTION

By letter dated May 21, as supplemented by letter dated June 22, 2009, Florida Power and Light Company, the licensee, submitted a request to amend Renewed Operating License NPF-16 for St. Lucie Plant, Unit No. 2. The proposed amendment would change Technical Specification (TS) Section 3.1.3.4 to modify the Control Element Assembly (CEA) drop time. The modification will increase the current CEA drop time of 3.1 seconds to a new value of 3.2 seconds but maintains adequate margin against observed increases in CEA drop times.

The CEAs add negative reactivity to shutdown the reactor and maintain it in a shutdown condition. CEA drop time affects the rate of negative reactivity addition, which is an input to the safety analysis for certain postulated events in Updated Final Safety Analysis Report (UFSAR) Chapter 15. In general, there is significant margin between the rate of negative reactivity insertion assumed in the UFSAR safety analysis and the actual cycle-specific reactivity insertion determined for any cycle.

The licensee's supplement dated June 22, 2009, provided additional information that clarified the application, did not expand the scope of the application as originally noticed, and did not change the staff's original proposed no significant hazards consideration determination as published in the *Federal Register* on June 1, 2009 (74 FR 26261).

2.0 REGULATORY EVALUATION

The regulations in Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.90, "Application for amendment of license, or construction permit, or early site permit," allow a licensee to amend or change the operating license. Section 50.92 of 10 CFR, "Issuance of amendment," specifies that the staff will be guided by the considerations that govern the issuance of initial licenses to the extent applicable and appropriate in determining whether an amendment to the license will be issued. Appendix A to 10 CFR Part 50, "General Design Criteria for Nuclear Power Plants," provides the criteria to be met in licensing applications. General Design Criterion (GDC) 10, "Reactor Design," requires that the reactor core and associated coolant, control, and protection systems shall be designed with appropriate margin to verify that the specified acceptable fuel design limits are not exceeded during any conditions of normal operation, including the effects of anticipated operational occurrences. GDC 27,

“Combined Reactivity Control Systems,” requires that the reactivity control systems be designed with appropriate margin, and in conjunction with the emergency core cooling system, to be capable of controlling reactivity and cooling the core under post-accident conditions.

3.0 TECHNICAL EVALUATION

The licensee proposed to change TS 3.1.3.4 to specify that the drop time for each full length CEA (shutdown and regulating) shall be less than or equal to 3.2 seconds from the time electrical power is interrupted to the CEA drive mechanism, from fully withdrawn to 90 percent insertion, with average reactor coolant temperature of 515 degrees Fahrenheit and all reactor coolant pumps running. The current requirement is a CEA drop time of 3.1 seconds under the same conditions. The licensee stated that the change is to accommodate observed increases in CEA drop times. The proposed amendment does not support changes to the design or operation of the St. Lucie Plant Unit 2 reactor, protection system, or reactivity systems. The licensee evaluated the change with respect to the St. Lucie Plant Unit 2 reactor design and safety analyses.

The licensee evaluated the effect of increased CEA drop time on the core thermal-hydraulic design. The core thermal-hydraulic design depends, in part, on the power shapes and statepoints. The licensee stated that the increased CEA drop time does not impact the power shapes (assumed for relaxed axial offset control or the safety analyses) or the statepoints, and therefore there is no impact on the thermal-hydraulic or fuel rod design for Cycle 18. The power shapes and statepoints are determined by core design and initial CEA position, not CEA drop time; therefore, the staff concurs with the licensee’s conclusion that increasing the allowable CEA drop time will not impact the thermal-hydraulic design or fuel rod-design.

The licensee evaluated the effect on the core mechanical design. The licensee stated that the slightly slower CEA drop time would produce a smaller impact on the fuel assembly and lower stresses on the CEA. The staff considers that increased CEA drop time will result in lower stresses on the CEAs and fuel due to slower thermal and mechanical responses and lower impact forces; therefore, the staff concurs with the licensee’s conclusion that increasing the allowable CEA drop time will not adversely affect the core mechanical design.

Regarding the loss-of-coolant-accident (LOCA) analyses, the licensee evaluated the slower CEA drop time against the limits that support the Cycle 18 analysis. The LOCA analysis includes trip reactivity (negative reactivity from CEA insertion) as a function of time after reactor trip. The licensee noted that the normalized trip reactivity worth vs. CEA position (percent insertion) does not change with CEA drop time. However, the trip reactivity insertion rate decreases as CEA drop time increases. The licensee compared the Cycle 18 trip reactivity as a function of time against the assumptions used in the LOCA analyses. The licensee determined that the Cycle 18 trip reactivity with 3.2 seconds drop time remained bounded by the trip reactivity assumed in the UFSAR safety analysis. Thus the existing LOCA safety analyses were not impacted by the increased CEA drop time. The staff reviewed the licensee’s evaluation of scram worth, as shown in Figures 1 and 2 of the licensee’s letter dated June 22, 2009, and verified that the LOCA analyses has margin to accommodate the increased CEA drop time; therefore, the staff concurs with the licensee’s evaluation.

Regarding other transient analyses (non-LOCA), the licensee stated that the non-LOCA safety analyses use a combination of the CEA insertion fraction as a function of time and the normalized reactivity insertion as a function of CEA insertion fraction. An increase in the CEA

drop time would decrease the reactivity inserted for a given time. However, the licensee verified that the slower insertion of the CEA by 0.1 seconds did not adversely affect the reactivity insertion assumed in the non-LOCA transient analyses. The licensee analyzed ten potentially impacted non-LOCA transient events from Chapter 15 of the UFSAR. The results showed that the Cycle 18 trip reactivity with 3.2 seconds drop time continued to be greater than (i.e., remained bounded by) the trip reactivity assumed in the UFSAR safety analyses. The licensee concluded that the existing non-LOCA safety analyses were not impacted by the increased CEA drop time. The staff reviewed the licensee's evaluation of scram worth, as shown in Figures 1 and 2 of the licensee's letter dated June 22, 2009, and verified that the UFSAR Chapter 15 non-LOCA analyses have sufficient margin to accommodate the increased CEA drop time. Therefore, the staff concludes that the increased CEA drop time is acceptable for the non-LOCA transient analyses for St. Lucie Plant Unit 2.

The staff notes that much of the licensee's evaluation was based on Cycle 18 of St. Lucie Plant Unit 2. The staff notes that CEA drop time is evaluated in the cycle-specific reload analyses to verify the acceptability of reactor design and safety analyses. The power shapes and statepoints are reflected in the safety analyses, and limits on power peaking and axial offset are included in TS Section 3/4.2, "Power Distribution Limits." As part of the cycle-specific reload analysis, the licensee is required to evaluate the power shapes and statepoints for each cycle to verify that the assumptions in the safety analyses, thermal-hydraulic design, and fuel-mechanical design remain valid, in accordance with the methodologies listed in TS 6.9.1.11, "Core Operating Limits Report (COLR)." Similarly, the licensee is required to determine rod worths and scram insertion worth for each cycle to verify that the safety analysis assumptions are maintained. The licensee notes that the reactivity insertion with the increased CEA drop time will be verified every cycle as part of the cycle-specific reload analysis to comply with the proposed CEA drop time increase. Therefore, the staff finds that the CEA drop time of 3.2 seconds will continue to be acceptable for St. Lucie Plant Unit 2.

The NRC staff reviewed the licensee's proposed revision to TS 3.1.3.4. The staff finds that the proposed TS adequately reflects the change in CEA drop time and is therefore acceptable.

4.0 STATE CONSULTATION

Based upon a letter dated May 2, 2003, from Michael N. Stephens of the Florida Department of Health, Bureau of Radiation Control, to Brenda L. Mozafari, Senior Project Manager, U.S. Nuclear Regulatory Commission, the State of Florida does not desire notification of issuance of license amendments.

5.0 ENVIRONMENTAL CONSIDERATION

This amendment changes a requirement with respect to installation or use of a facility component located within the restricted area, as defined in 10 CFR 20. The NRC 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 issued a proposed finding that the amendment involves no significant hazards consideration and there has been no public comment on such finding (74 FR 26261, dated June 1, 2009). Accordingly, this 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 this amendment.

6.0 CONCLUSION

The Commission has 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, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributor: S. Wu

Date: May 31, 2010

Mr. Mano Nazar
 Executive Vice President and
 Chief Nuclear Officer
 Florida Power and Light Company
 P.O. Box 14000
 Juno Beach, Florida 33408-0420

SUBJECT: ST. LUCIE PLANT, UNIT 2 - ISSUANCE OF AMENDMENT REGARDING
 CONTROL ELEMENT ASSEMBLY DROP TIME (TAC NO. ME1338)

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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,

/RA/

Brenda L. Mozafari, Senior Project Manager
 Plant Licensing Branch II-2
 Division of Operator Reactor Licensing
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Docket No. 50-389

Enclosures:

1. Amendment No. 158 to NPF-16
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