

December 2, 1992

Docket Nos. 50-335  
and 50-389

DISTRIBUTION  
See attached sheet

Mr. J. H. Goldberg  
President - Nuclear Division  
Florida Power and Light Company  
P.O. Box 14000  
Juno Beach, Florida 33408-0420

Dear Mr. Goldberg:

SUBJECT: ST. LUCIE UNITS 1 AND 2 - ISSUANCE OF AMENDMENTS RE: CONTROL ELEMENT ASSEMBLY (TAC NOS. M82160 AND M82161)

The Commission has issued the enclosed Amendment Nos. 117 and 59 to Facility Operating License Nos. DPR-67 and NPF-16 for the St. Lucie Plant, Unit Nos. 1 and 2. These amendments consist of changes to the Technical Specifications in response to your application dated February 12, 1990.

These amendments to the St. Lucie Units 1 and 2 Technical Specifications (TS) revise the requirement to determine control element assembly (CEA) operability from at least once per 31 days to once per 92 days. Additionally, the surveillance interval for the performance of the functional test of the CEA block circuit, which is performed as part of the CEA operability test, is revised to be performed on a quarterly basis, rather than the existing monthly basis.

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 F. Rinaldi For)

Jan A. Norris, Senior Project Manager  
Project Directorate II-2  
Division of Reactor Projects - I/II  
Office of Nuclear Reactor Regulation

Enclosures:

1. Amendment No. 117 to DPR-67
2. Amendment No. 59 to NPF-16
3. Safety Evaluation

cc w/enclosures:

See next page

\*See previous concurrence

LA:PDII-2  
DMiller *ETI*  
11/16/92

PM:PDII-2  
JNorris:kdi  
11/09/92 *for*

D:PDII-2  
HBerkow  
11/10/92

OTSB\*  
CGrimes  
11/03/92

OGC *JK*  
J Full  
11/13/92

Document Name - SL82160.AMD

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THIS DOCUMENT CONTAINS NEITHER RECOMMENDATIONS NOR CONCLUSIONS OF THE NATIONAL BUREAU OF STANDARDS

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*DF-1*

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Florida Power and Light Company

St. Lucie Plant

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DATED: December 2, 1992

AMENDMENT NO. 117 TO FACILITY OPERATING LICENSE NO. DPR-67 - ST. LUCIE, UNIT 1  
AMENDMENT NO. 59 TO FACILITY OPERATING LICENSE NO. NPF-16 - ST. LUCIE, UNIT 2

~~Docket File~~

NRC & Local PDRs

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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. 117  
License No. DPR-67

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 February 12, 1990, 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.

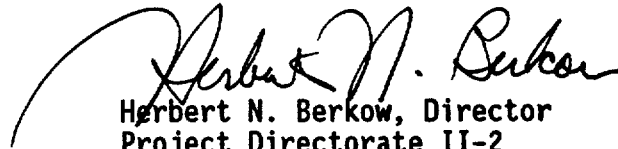
2. Accordingly, Facility Operating License No. DPR-67 is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and by amending paragraph 2.C.(2) to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 117, 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 its date of issuance and shall be implemented within 30 days.

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: December 2, 1992

ATTACHMENT TO LICENSE AMENDMENT NO. 117  
TO FACILITY OPERATING LICENSE NO. DPR-67  
DOCKET NO. 50-335

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

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## REACTIVITY CONTROL SYSTEMS

### FULL LENGTH CEA POSITION (Continued)

#### LIMITING CONDITION FOR OPERATION (Continued)

2. Declared inoperable and satisfy SHUTDOWN MARGIN requirements of Specification 3.1.1.1. After declaring the CEA inoperable, operation in MODES 1 and 2 may continue pursuant to the requirements of Specification 3.1.3.6 for up to 7 days per occurrence with a total accumulated time of  $\leq 14$  days per calendar year provided all of the following conditions are met:
  - a) Within 1 hour, the remainder of the CEAs in the group with the inoperable CEA shall be aligned to within 7.5 inches of the inoperable CEA while maintaining the allowable CEA sequence and insertion limits shown on Figure 3.1-2; the THERMAL POWER level shall be restricted pursuant to Specification 3.1.3.6 during subsequent operation.
  - b) The SHUTDOWN MARGIN requirement of Specification 3.1.1.1 is determined at least once per 12 hours; otherwise, be in at least HOT STANDBY within 6 hours.
- e. With one full length CEA misaligned from any other CEA in its group by 15 or more inches, operation in MODES 1 and 2 may continue provided that the misaligned CEA is positioned within 7.5 inches of other CEAs in its group in accordance with the time constraints shown in Figure 3.1-1a.
- f. With one full-length CEA misaligned from any other CEA in its group by 15 or more inches beyond the time constraints shown in Figure 3.1-1a, reduce power to  $\leq 70\%$  of RATED THERMAL POWER prior to completing ACTION f.1 or f.2.
  1. Restore the CEA to OPERABLE status within its specified alignment requirements, or
  2. Declare the CEA inoperable and satisfy the SHUTDOWN MARGIN requirements of Specification 3.1.1.1. After declaring the CEA inoperable, operation in MODES 1 and 2 may continue pursuant to the requirements of Specification 3.1.3.6 provided:
    - a) Within 1 hour the remainder of the CEAs in the group with the inoperable CEA shall be aligned to within 7.5 inches of the inoperable CEA while maintaining the allowable CEA sequence and insertion limits shown on Figure 3.1-2; the THERMAL POWER level shall be restricted pursuant to Specification 3.1.3.6 during subsequent operation.

## REACTIVITY CONTROL SYSTEMS

### FULL LENGTH CEA POSITION (Continued)

#### LIMITING CONDITION FOR OPERATION (Continued)

- b) The SHUTDOWN MARGIN requirement of Specification 3.1.1.1 is determined at least once per 12 hours.
- g. With more than one full length CEA inoperable or misaligned from any other CEA in its group by 15 inches (indicated position) or more, be in HOT STANDBY within 6 hours.
- h. With one full-length CEA inoperable due to causes other than addressed by ACTION a above, and inserted beyond the long term steady state insertion limits but within its above specified alignment requirements, operation in MODES 1 and 2 may continue pursuant to the requirements of Specification 3.1.3.6.

#### SURVEILLANCE REQUIREMENTS

4.1.3.1.1 The position of each full-length CEA shall be determined to be within 7.5 inches (indicated position) of all other CEAs in its group at least once per 12 hours except during time intervals when the Deviation Circuit and/or CEA Block Circuit are inoperable, then verify the individual CEA positions at least once per 4 hours.

4.1.3.1.2 Each full-length CEA not fully inserted shall be determined to be OPERABLE by inserting it at least 7.5 inches at least once per 92 days.

4.1.3.1.3 The CEA Block Circuit shall be demonstrated OPERABLE at least once per 92 days by a functional test which verifies that the circuit prevents any CEA from being misaligned from all other CEAs in its group by more than 7.5 inches (indicated position).

4.1.3.1.4 The CEA Block Circuit shall be demonstrated OPERABLE by a functional test which verifies that the circuit maintains the CEA group overlap and sequencing requirements of Specification 3.1.3.6 and that the circuit prevents the regulating CEAs from being inserted beyond the Power Dependent Insertion Limit of Figure 3.1-2:

- \*a. Prior to each entry into MODE 2 from MODE 3, except that such verification need not be performed more often than once per 92 days, and
- b. At least once per 6 months.

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\*The licensee shall be excepted from compliance during the startup test program for an entry into MODE 2 from MODE 3 made in association with a measurement of power defect.





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

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 FACILITY OPERATING LICENSE

Amendment No. 59  
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 February 12, 1990, 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.

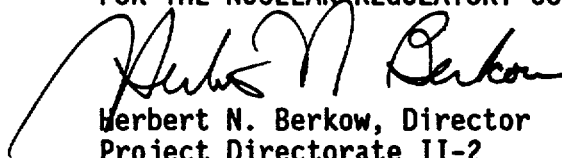
2. Accordingly, Facility Operating License No. NPF-16 is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and by amending paragraph 2.C.2 to read as follows:

2. Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 59, 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 its date of issuance and shall be implemented within 30 days.

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: December 2, 1992

ATTACHMENT TO LICENSE AMENDMENT NO. 59  
TO FACILITY OPERATING LICENSE NO. NPF-16  
DOCKET NO. 50-389

Replace the following page of the Appendix "A" Technical Specifications with the enclosed page. The revised page is identified by amendment number and contains vertical lines indicating the areas of change.

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## REACTIVITY CONTROL SYSTEMS

### ACTION: (Continued)

- h. With one full-length CEA inoperable due to causes other than addressed by ACTION a., above, but within its above specified alignment requirements and either fully withdrawn or within the Long Term Steady State Insertion Limits if in full-length CEA group 5, operation in MODES 1 and 2 may continue.

### SURVEILLANCE REQUIREMENTS

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4.1.3.1.1 The position of each full-length CEA shall be determined to be within 7.0 inches (indicated position) of all other CEAs in its group at least once per 12 hours except during time intervals when the Deviation Circuit and/or CEA Block Circuit are inoperable, then verify the individual CEA positions at least once per 4 hours.

4.1.3.1.2 Each full-length CEA not fully inserted in the core shall be determined to be OPERABLE by movement of at least 7.0 inches in any one direction at least once per 92 days.

4.1.3.1.3 The CEA Block Circuit shall be demonstrated OPERABLE at least once per 92 days by a functional test which verifies that the circuit prevents any CEA from being misaligned from all other CEAs in its group by more than 7.0 inches (indicated position).

4.1.3.1.4 The CEA Block Circuit shall be demonstrated OPERABLE by a functional test which verifies that the circuit maintains the CEA group overlap and sequencing requirements of Specification 3.1.3.6 and that the circuit prevents the regulating CEAs from being inserted beyond the Power Dependent Insertion Limit of Figure 3.1-2:

- \*a. Prior to each entry into MODE 2 from MODE 3, except that such verification need not be performed more often than once per 92 days, and
- b. At least once per 6 months.

-----  
\*The licensee shall be excepted from compliance during the initial startup test program for an entry into MODE 2 from MODE 3 made in association with a measurement of power defect.



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NOS. 117 AND 59

TO FACILITY OPERATING LICENSE NO. DPR-67 AND NO. NPF-16

FLORIDA POWER AND LIGHT COMPANY, ET AL.

ST. LUCIE PLANT, UNIT NOS. 1 AND 2

DOCKET NOS. 50-335 AND 50-389

1.0 INTRODUCTION

The NRC staff has studied the control rod movement test problems in pressurized water reactors (PWRs) by various vendors including Combustion Engineering (CE). St. Lucie 1 and 2 units were designed using the CE technology. In the CE technology, control rods are referred to as Control Element Assemblies (CEAs). For that reason, throughout this safety evaluation the terms "control rod" and "CEA" are used interchangeably.

By letter dated February 12, 1990, Florida Power and Light Company (FPL, the licensee) submitted proposed changes to the Technical Specifications (TS) for St. Lucie Units 1 and 2 concerning the frequency of CEA operability testing at power. Specifically, the TS 4.1.3.1.2 requirement that each full length CEA which is not fully inserted shall be moved at short distance into the core and back to its starting position "at least once per 31 days" would be changed to "at least once per 92 days." Additionally, the frequency of functional testing of the CEA Block Circuit (TS 4.1.3.1.3, 4.1.3.1.4a) performed as part of the CEA operability test, would be similarly changed from "once per 31 days" to "once per 92 days."

2.0 EVALUATION

This test is performed to determine if the control rods are immovable. The control rods may be immovable either because of an electrical problem in the control rod drive circuitry or because the control rod is mechanically stuck. Following discovery, the licensee must determine whether the control rod is capable of being tripped, since the action requirements differ depending on that determination. As long as a control rod can be tripped, shutdown margin is not as great a concern; however, requirements for rod misalignment and rod insertion limits must still be followed with an immovable control rod.

The concern with this test is that it causes reactor trips or dropped rods. Control rods are designed to be moved and this test does not involve moving the control rods in any way that differs from the way the rods would be moved

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when controlling power or power distribution. However, rod drive mechanisms and control systems are complex and their mechanical movements and timing requirements are exacting. Most PWRs, except for these tests, operate with both the regulating rods and the shutdown rods withdrawn during normal operation.

Electrical problems with the control rod drive system, in general, do not prevent insertion of a control rod into the core when the reactor trip breakers are opened.

Mechanical problems are much less common. The NRC staff has investigated the mechanically stuck PWR control rods and has compiled the attached Table A. Table A lists cases in which the control rods were mechanically stuck or, at least, behaved as though they were. For these cases, a reactor trip signal would not have resulted in these rods inserting fully into the core.

Two observations can be made about the events listed in Table A in which a control rod was found mechanically immovable. First, not all of these stuck control rods were found during the control rod movement surveillance tests. Most were discovered during control rod drop timing tests performed during startup physics testing or when the rods were withdrawn from the core during plant startup.

Second, accident analyses assume that the single highest worth control rod is stuck and will not insert. In only one of these events was a second rod involved (Point Beach Nuclear Plant, May 1985) and in this case both of the rods were partially inserted.

A review of plant trip data from 1986 through July 1988 found three reactor trips that occurred during fuel rod motion testing.

In view of the successful operational record demonstrated by the control rod movement tests during power operation, the NRC staff finds the proposed change to frequency of CEA testing from once per 31 days to once per 92 days acceptable.

With regard to the proposed changes in the CEA Block Circuit surveillance interval, the licensee states that:

On each St. Lucie unit, there are two different mechanisms for determining CEA position. The Digital Data Processor provides CEA position information based on the number of pulses generated by the Coil Power Programmer on Unit 1 and by the subgroup logic of the Control Element Drive Mechanism Control System on Unit 2. The CEA Position Display on Unit 1, and the Analog Display System on Unit 2 are graphic displays of CEA position based on input generated by the reed switch position transmitter on each CEA. CEA position is verified every 12 hours using both the reed switch position indication and the pulse count

position indication in accordance with Surveillance Requirements 4.1.3.1.1 and 4.1.3.6. Therefore, should there be a problem with the CEA block circuit which allowed one CEA to become misaligned from the other CEAs in its group, or which allowed the regulating CEAs to be inserted beyond the Power-Dependent Insertion Limit, the maximum amount of time which could pass before this discrepancy was noted would be 12 hours.

The staff has reviewed and agrees with the licensee's discussion and, therefore, finds the proposed change of the CEA Block Circuit testing from once per 31 days to once per 92 days acceptable.

### 3.0 STATE CONSULTATION

In accordance with the Commission's regulations the Florida State Official was notified of the proposed issuance of the amendments. The State Official had no comments.

### 4.0 ENVIRONMENTAL CONSIDERATION

These amendments change the surveillance requirements. The NRC staff has determined that the amendments involve 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 amendments involve no significant hazards consideration and there has been no public comment on such finding (57 FR 710). Accordingly, these amendments meet 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 these amendments.

### 5.0 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 amendments will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributor: J. A. Norris  
Attachment: Table A

Date: December 2, 1992

Table A Mechanically stuck PWR control rods

Plant	Date	Reference	Power level	Discovered by TS rod motion surveillance	Description
Haddam Neck	08/69	See Note 1	-	No	Radial vane of spider, to which 2 rodlets were attached had broken. Found during startup.
Pt. Beach 1	10/70	See Note 1	Before criticality	No	During rod drop testing, several shutdown criticality bank A rods stuck intermittently. More than 20 milling chips were found in upper internals. One chip was found lodged between the guide tube assembly and one control rod spider arm.
Robinson	11/70	See Note 1	Trip	No	Piece of foreign material was found in guide tube.
Indian Pt. 2	04/72- 05/72	See Note 1	Before power escalation testing	No	Malfunction of movement of 4 CRDs. Two were caused by foreign matter. Two were caused by locally reduced section of guide tube in dash pot area.
Yankee Rowe	05/72- 08/72	See Note 1	-	No	Rod 18 could withdraw but would not drop properly. Failed to drop completely during an October scram. Loose fasteners suspected of causing difficulties.
St. Lucie 1	01/79	See Note 1	Trip	No	Two control element assemblies (CEAs) stuck at 8 inches withdrawn when CEAs were tripped. Manual lifting freed CEAs. Cause not determined.
Davis-Besse	06/81	LER 81-038	-	No	Control rod 5-8 was not withdrawing with the rest of its group. Leaf spring anti-rotational device of the lead screw nut assembly had fractured into several pieces preventing lead screw from rising.
San Onofre 1	12/81	LER 82-003	-	No	Rod cluster control (RCC) assembly stuck. Freed after repeated manipulation. Probable cause: failure of weld attaching a vane supporting two rodlets to the RCC hub.
Calvert Cliffs 2	02/82	LER 82-10, Rev. 1	Shutdown	No	CEA-19 stuck following trip at 8 inches withdrawn. Seven days later CEA-19 was "freed" and tested satisfactorily. Inspection at following refueling failed to find a cause.

Attachment



Table A (Continued)

Plant	Date	Reference	Power level	Discovered by TS rod motion surveillance	Description
Turkey Pt. 3	12/82	LER 82-109	-	Yes	While performing periodic exercise, RCC J3 of shutdown bank A failed to show proper movement. It was verified that J3 stayed in fully within position. 12/28/82 unrelated trip occurred. J3 remained withdrawn. Root cause not determined. On 12/31/82, RCC J3 began to move normally.
Surry 1	06/84	LER 84-017	29%	Yes	Control rod B-6 became stuck. One of two holddown spring clamps had separated from the top of a fuel assembly and had become lodged between two RCC assembly rodlets.
McGuire 2	12/84	LER 84-032	-	No	Duke notified by Westinghouse that a Korean reactor control rod drive mechanism (CRDM) guide screw rotated out of position, fell, and became lodged on top of CRDM latch assembly. Loose guide screws could cause bending and prevent driveline motion. 5 out of 53 guide screws on McGuire 2 did not meet acceptance criteria and were replaced. 14 drive rods replaced on Catawba 1.
Catawba 1	12/84	LER 84-029	-	No	
Davis-Besse	03/85	LER 85-006	0%	No	Set screw frequently jammed inside CRDM, preventing disengagement of the latching assembly during control rod drop testing.
Pt. Beach 1	05/85	See Note 1	-	No	Control rod stuck at mid-height during rod drop testing. Second rod stuck at 90 inches out.
McGuire 2	06/86	LER 86-008	0%	No	Control rod L-3 stuck and unable to drop into core. On 6/21/86 while inserting all control rods into core, control rod L-3 inserted with other rods. Sticking attributed to small particle of debris.
Palo Verde 1	01/88	See Note 2	-	No	CEA-56 did not drop during rod drop testing. Bearings from multi-stud tensioner machine lodged in guide tube.

1. *Nuclear Power Experience*, Volume PWR-2; Book-1, "Experiences"; IV-"Control Rods and Drives"; Section A-"Control Rods," pp. 1-14 (January 1973-July 1988); S. M. Stoller Corp., Boulder, Colorado.
2. Letter from E. E. Van Brunt, Jr. (Arizona Nuclear Power Project), to J. B. Martin, Region V Administrator (NRC), February 25, 1988.