

April 8, 1999

Mr. T. F. Plunkett  
President - Nuclear Division  
Florida Power and Light Company  
P.O. Box 14000  
Juno Beach, Florida 33408-0420

SUBJECT: ST. LUCIE, UNIT 2 - ISSUANCE OF AMENDMENT REGARDING SAFETY  
INJECTION TANKS - MODE 4 (TAC NO. MA2122)

Dear Mr. Plunkett:

The U.S. Nuclear Regulatory Commission (NRC) has issued the enclosed Amendment No. 100 to Facility Operating License No. NPF-16 for the St. Lucie Plant, Unit 2. This amendment consists of changes to the Technical Specifications (TSs) in response to your application dated May 27, 1998, and supplemented on October 9, 1998. This amendment revises the requirement for operability of the safety injection tanks in Mode 4 of reactor operation.

This amendment changes Unit 2 TS Section 3/4.5.1, "Safety Injection Tanks," by deleting the applicability requirement for Mode 4 from the limiting condition for operation, and modifying the associated note accordingly.

Much of Florida Power and Light Company's submittal could not be credited as justification for its request because it was inaccurate or inapplicable to St. Lucie, Unit 2. This situation complicated the NRC staff's review and extended both review time and effort. The inaccuracy and inapplicability issues are addressed in the enclosed Safety Evaluation.

The Notice of Issuance will be included in the Commission's biweekly Federal Register notice.

Sincerely,

**Original signed by:**

William C. Gleaves, Project Manager, Section 2  
Project Directorate II  
Division of Licensing Project Management  
Office of Nuclear Reactor Regulation

Docket No. 50-389

Enclosures: 1. Amendment No. 100 to NPF-16  
2. Safety Evaluation

cc w/encls: See next page

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UNITED STATES  
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

April 8, 1999

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President - Nuclear Division  
Florida Power and Light Company  
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Sincerely,

A handwritten signature in black ink, appearing to read "W. C. Gleaves".

William C. Gleaves, Project Manager, Section 2  
Project Directorate II  
Division of Licensing Project Management  
Office of Nuclear Reactor Regulation

Docket No. 50-389

Enclosures: 1. Amendment No. 100 to NPF-16  
2. Safety Evaluation

cc w/encls: See next page



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 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 100  
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 27, 1998 and supplemented October 9, 1998, 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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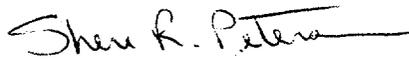
2. Accordingly, Facility Operating License No. NPF-16 is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and by amending paragraph 2.C.2 to read as follows:

2. Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 100, 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 of receipt.

FOR THE NUCLEAR REGULATORY COMMISSION



Sheri R. Peterson, Chief, Section 2  
Project Directorate II  
Division of Licensing Project Management  
Office of Nuclear Reactor Regulation

Attachment:  
Changes to the Technical  
Specifications

Date of Issuance: **April 8, 1999**

ATTACHMENT TO LICENSE AMENDMENT NO. 100

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 area of change.

Remove Pages

3/4 5-1

Insert Pages

3/4 5-1

## 3/4.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

### 3/4.5.1 SAFETY INJECTION TANKS (SIT)

#### LIMITING CONDITION FOR OPERATION

- 3.5.1 Each Reactor Coolant System safety injection tank shall be OPERABLE with:
- The isolation valve open,
  - A contained borated water volume of between 1420 and 1556 cubic feet,
  - A boron concentration of between 1720 and 2100 ppm of boron, and
  - A nitrogen cover-pressure of between 500 and 650 psig.

APPLICABILITY: MODES 1, 2, and 3\*.

ACTION:

- With one SIT inoperable due to boron concentration not within limits, or due to an inability to verify the required water volume or nitrogen cover-pressure, restore the inoperable SIT to OPERABLE status within 72 hours; otherwise, be in at least HOT STANDBY within the next 6 hours and in HOT SHUTDOWN within the following 6 hours.
- With one SIT inoperable due to reasons other than those stated in ACTION-a, restore the inoperable SIT to OPERABLE status within 24 hours; otherwise, be in at least HOT STANDBY within the next 6 hours and in HOT SHUTDOWN within the following 6 hours.

#### SURVEILLANCE REQUIREMENTS

- 4.5.1.1 Each safety injection tank shall be demonstrated OPERABLE:
- At least once per 12 hours by:
    - Verifying that the contained borated water volume and nitrogen cover-pressure in the tanks are within their limits, and
    - Verifying that each safety injection tank isolation valve is open.

\* With pressurizer pressure greater than or equal to 1750 psia. When pressurizer pressure is less than 1750 psia, at least three safety injection tanks shall be OPERABLE, each with a minimum pressure of 235 psig and a maximum pressure of 650 psig and a contained water volume of between 1250 and 1556 cubic feet with a boron concentration of between 1720 and 2100 ppm of boron. With all four safety injection tanks OPERABLE, each tank shall have a minimum pressure of 235 psig and a maximum pressure of 650 psig and a contained water volume of between 833 and 1556 cubic feet with a boron concentration of between 1720 and 2100 ppm of boron.



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION  
RELATED TO AMENDMENT NO. 100 TO FACILITY OPERATING LICENSE NO. NPF-16

FLORIDA POWER AND LIGHT COMPANY, ET AL.

ST. LUCIE PLANT, UNIT NO. 2

DOCKET NO. 50-389

1.0 INTRODUCTION

By a letter dated May 27, 1998, as supplemented by a letter dated October 9, 1998, Florida Power and Light Company (FPL) requested an amendment to its Facility Operating License No. NPF-16 for St. Lucie, Unit 2, to remove the technical specification (TS) requirement for safety injection tank (SIT) operability in Mode 4 (hot shutdown). This safety evaluation (SE) constitutes the Nuclear Regulatory Commission's (NRC or Commission) evaluation of FPL's request.

The October 9, 1998 supplemental letter provided clarifying information that did not change the initial proposed no significant hazards consideration determination.

In the 1970s, there was little consideration of loss of coolant accidents (LOCAs) during Mode 4 operation because Mode 1 LOCAs were assumed to be limiting, and many operating licenses and TSs were based on this assumption. As a result, typical licensing bases did not include LOCA analyses for Mode 3 (hot standby) and Mode 4 operation, and emergency core cooling system (ECCS) TS requirements are less stringent during Modes 3 and 4 consistent with the reduced safety concern.

Aspects of the potential need for ECCS capability changed in the mid-1980s with consideration of such actions as blocking safety injection (SI) at approximately 2000 psig when reducing reactor coolant system (RCS) pressure, constraints due to locking out some high pressure SI (HPSI) pumps because of low temperature - high pressure concerns, use of low pressure SI (LPSI) pumps for shutdown cooling (SDC), and the potential need for operator action to initiate SI during Mode 3 and Mode 4 operation. The Westinghouse (W) Owners Group applied probabilistic risk assessment techniques to large break LOCA during Mode 3 and Mode 4 operation and concluded that the risk of core damage is significantly smaller in these modes than during Mode 1 (power operation). It then performed thermal-hydraulic analyses for small-break LOCA and concluded there was at least 10 minutes available for operators to take action to mitigate the potential effects of such a LOCA during shutdown operation. In 1995, NRC review of this work was postponed due to the staff's plan to address this issue as part of a potential shutdown operations rule. In 1997, the Commission decided to address shutdown issues as part of the maintenance rule activities, and the shutdown rule was not issued. Although the staff has not written specific guidance for the ECCS capability required to meet the maintenance rule during Modes 3 and 4 operation, it has approved standard TSs (STs)

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which, for example, state that the single failure criterion is not applicable to the ECCS during Mode 4 operation. The bases for the STSs are applicable to the licensee's request.

W SITs are typically pressurized to approximately 600 psig and are isolated at approximately 1000 psig to prevent injection during routine RCS depressurization. Some Combustion Engineering (CE) plants, such as St. Lucie Unit 1, have SIT pressures of approximately 200 psig and SITs are not required by TSs for Mode 4 operation. This is not the case for St. Lucie, Unit 2, where nominal SIT pressure is approximately 500 psig and SITs are presently required during Mode 4 operation. Consequently, St. Lucie, Unit 2, SIT pressure is reduced during RCS depressurization to prevent injection while the SITs remain capable of injecting if a LOCA occurs, and SITs are isolated at 276 psia when SDC can be initiated. The requested change would allow Unit 2's SITs to be isolated earlier, and the SIT depressurization process to prevent an inadvertent discharge would no longer be necessary.

## 2.0 EVALUATION

The proposed license amendment would change the Limiting Condition for Operation Applicability found in TS Section 3/4.5.1, "Safety Injection Tanks," on page 3/4 5-1, by modifying limiting condition for operation 3.5.1, applicability statement, which currently reads, "APPLICABILITY: MODES 1, 2, 3\*, and 4\*." to now read, "APPLICABILITY: MODES 1, 2, and 3\*." The paragraph at the bottom of page 3/4 5-1, designated with an asterisk to be associated with the previously mentioned applicability statements, will be modified to remove the last sentence. The last sentence in that paragraph currently reads, "In Mode 4 with pressurizer pressure less than 276 psia, the safety injection tanks may be isolated."

The requested change removes the operability requirement for SITs during Mode 4. The following paragraphs evaluate separately the information provided in the two referenced FPL letters. In its letter of May 27, 1998, the licensee stated that removal of the SIT requirement is consistent with both the standard TSs for CE plants and the TSs for St. Lucie Unit 1.

FPL's May 27, 1998 letter stated that removing the Mode 4 operability requirement for SITs was based on an engineering evaluation which concluded that, in the event of a large-break LOCA, the flow rate from one HPSI pump was sufficient to meet applicable requirements. It apparently used this justification on the basis of the original licensing analyses that addressed SIT operation. However, FPL based its evaluation on initiation of HPSI at 30 seconds following initiation of the break, consistent with automatic initiation. Automatic HPSI initiation in Mode 4 would not normally be expected and operator initiation would normally be necessary. Since the information and justifications are based upon a 30-second initiation time to justify this proposal, the staff requested that FPL address manual initiation of HPSI in a supplemental submittal.

The 30 second response time is associated with the automatic initiation of safety injection equipment in response to a large break LOCA condition. In order to depressurize the reactor coolant system during a normal shutdown, it is necessary to block this initiation since failure to do so would result in inappropriate safety injection and numerous complications. Requiring an operator response in 30 seconds has been recognized for years as impractical and is not required.

In its October 9, 1998 supplement, FPL addressed HPSI initiation at 10 minutes and referenced a study of W plants and a CE study that FPL claimed to be bounding for St. Lucie, Unit 2.

Although some rationalization was provided that the W results apply to St. Lucie, the logic was insufficient for NRC to accept applicability of W plant calculations to St. Lucie. The CE calculations were stated to have been performed "... with the realistic evaluation model (REM) for small-break LOCA that was submitted to the NRC for review in 1988" and "A calculational uncertainty of 150°F, determined for the licensing application of the REM model, was applied to the shutdown LOCA analysis." Although this model was submitted to the NRC for review, the submittal was withdrawn before the NRC issued an acceptability finding. The referenced material provides a general background of behavior typical of Mode 4 operation, but it may not be specifically applicable to St. Lucie, Unit 2. Consequently, the NRC has not credited these analysis results for purposes of meeting licensing requirements.

For Mode 4, the CE standard TSs reflect a reduction in ECCS operational requirements from Mode 3 requirements that is justified by the reduced probability of a design basis accident, the availability of sufficient time for manual actuation of the required ECCS, and the stable conditions associated with Mode 4 operation. Consequently, only one ECCS train, consisting of one HPSI system, is required by standard TS in this mode and it is recognized that automatic SI actuation signals will not be available. The LPSI pumps may therefore be released from the ECCS train for use in shutdown cooling. The standard TS also states that protection against single failures is not relied upon during this Mode of operation.

At St. Lucie, Unit 2, water makeup following LOCAs would be provided by HPSI, a capability addressed by the TSs which requires one operable HPSI pump and one operable LPSI pump. The LPSI pump, operating in shutdown heat removal mode, may be lost as a result of the LOCA. Consequently, the HPSI pump may represent the TS-required means of adding water to the RCS. As previously mentioned, operator action is assumed to be necessary to initiate HPSI. Further, in LOCAs where pressurization occurs, operator action may be necessary to control RCS pressure while continuing to assure core cooling. Consequently, the NRC conducted a brief audit of FPL Off-Normal Procedure 2-ONP-01.01, Revision 4, with respect to HPSI, LPSI, and RCS pressure control actions to assess the licensee's provision for HPSI operation. The staff finds these actions are addressed and are consistent with the CE methodology of ensuring control of the safety functions of reactivity, electrical power, RCS inventory, RCS pressure, RCS and core heat removal, containment isolation, and containment temperature and pressure. Potential changes in this procedure would be controlled by 10 CFR 50.59 and thus the procedure will continue to be applicable.

10 CFR 50.36(c)(2)(ii) states that a TS must be established for each item that meets any one of four criteria. The criteria and the staff finding with respect to each are as follows:

- (1) **Installed instrumentation that is used to detect, and indicate in the control room, a significant abnormal degradation of the reactor coolant pressure boundary.** The licensee request does not involve instrumentation.
- (2) **A process variable, design feature, or operating restriction that is an initial condition of a design basis accident or transient analysis that either assumes the failure of or presents a challenge to the integrity of a fission product barrier.** There are no design basis or transient analyses in the licensing basis that are directly applicable to Mode 4 operation. The Mode 1 analyses are assumed to be bounding for Mode 4 operation.

- (3) **A structure, system, or component that is part of the primary success path and which functions or actuates to mitigate a design basis accident or transient that either assumes the failure of or presents a challenge to the integrity of a fission product barrier.** There are no design basis or transient analyses in the licensing basis that are directly applicable to Mode 4 operation. The Mode 1 analyses are assumed to be bounding for Mode 4 operation.
- (4) **A structure, system, or component which operating experience or probabilistic risk assessment has shown to be significant to public health and safety.** To our knowledge, there is no operating experience or probabilistic risk assessment that shows the safety injection tank has significance during Mode 4 operation with respect to public health and safety.

Consequently, there is no 10 CFR 50.36 requirement for a TS applicable to the SIT during Mode 4 operation.

### 3.0 STAFF CONCLUSION

The proposed amendment is consistent with the requirements of 10 CFR 50.36 since the proposed amendment is consistent with analyses and evaluations included in the safety analysis report and amendments thereto, it only applies when the reactor is in the referenced shutdown modes, appropriate modal inter-relationships are referenced, automatic actuation of safety injection equipment is not required, and planned operator action is consistent with correction of an abnormal situation before a safety limit is exceeded.

The 30 second response time is associated with the automatic initiation of safety injection equipment in response to a large break LOCA condition. An operator response in 30 seconds has been recognized for years as impractical and is not required. Consequently, the 30 second response requirement as a license condition would be inappropriate and is not required for the staff to approve the amendment request.

The NRC finds that, consistent with the CE standard TSs, the TSs for St. Lucie Unit 1, and the requirements of 10 CFR 50.36, the previous considerations justify the licensee's request for St. Lucie Unit 2. Therefore, the proposed change is acceptable.

### 4.0 STATE CONSULTATION

Based upon a letter dated March 8, 1991, from Mary E. Clark of the State of Florida, Department of Health and Rehabilitative Services, to Deborah A. Miller, Licensing Assistant for the U.S. Nuclear Regulatory Commission, the State of Florida does not desire notification of issuance of license amendments.

### 5.0 ENVIRONMENTAL CONSIDERATION

These amendments change a requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20. 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 (63 FR 40556). 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.

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

Principal Contributor: W. Lyon

Date: April 8, 1999

REFERENCES

1. Walsh, Lawrence A., "Submittal of WCAP-12476, 'Evaluation of LOCA During Mode 3 and Mode 4 Operation for Westinghouse NSSS,'" letter to Chief, Regulatory Publications Branch, NRC, from Chairman, W Owners Group, OG-91-61, November 21, 1991.
2. Liberatori, Louis F. Jr., "Review of WCAP-12476, 'Evaluation of LOCA During Mode 3 and Mode 4 Operation for Westinghouse NSSS,'" letter to Robert C. Jones, Chief, Reactor Systems Branch, Office of Nuclear Reactor Regulation, NRC, from W Owners Group Analysis Subcommittee Chairman, OG-95-069, August 25, 1995.

Mr. T. F. Plunkett  
Florida Power and Light Company

**ST. LUCIE PLANT**

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