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

October 16, 1[illegible]

SUBJECT: ST. LUCIE PLANT UNITS 1 AND 2 - ISSUANCE OF AMENDMENTS REGARDING SAFETY INJECTION TANKS - ALLOWED OUTAGE TIME (TAC NOS. M93379 AND M93380)

Dear Mr. Plunkett:

The Commission has issued the enclosed Amendment Nos. 157 and 96 to Facility Operating License Nos. DPR-67 and NPF-16 for the St. Lucie Plant, Unit Nos. 1 and 2, respectively. These amendments consist of changes to the Technical Specifications (TS) in response to your application dated June 21, 1995, regarding safety injection tank allowed outage time extensions for St. Lucie Units 1 and 2.

The amendments revise the TS action statements and certain surveillance requirements of TS 3/4.5.1, Safety Injection Tanks (SITs). These revisions include a two-tiered extension of the action completion/allowed outage time for the SITs. The revisions are also consistent with the guidance provided in Generic Letter 93-05, "Line-Item Technical Specifications Improvements to Reduce Surveillance Requirements for Testing During Power Operation."

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:

William C. Gleaves, Project Manager
Project Directorate II-3
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

9810210272 981016
PDR ADOCK 05000335
P PDR

Docket Nos. 50-335, 50-389

Enclosures: 1. Amendment No. 157 to DPR-67
2. Amendment No. 96 to NPF-16
3. Safety Evaluation

cc w/enclosures: See next page

Distribution
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President - Nuclear Division
Florida Power and Light Company
P.O. Box 14000
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October 16, 1 3

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

October 16, 1998

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

SUBJECT: ST. LUCIE PLANT UNITS 1 AND 2 - ISSUANCE OF AMENDMENTS REGARDING SAFETY INJECTION TANKS - ALLOWED OUTAGE TIME (TAC NOS. M93379 AND M93380)

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Sincerely,

WmCGl

William C. Gleaves, Project Manager
Project Directorate II-3
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Docket Nos. 50-335, 50-389

Enclosures: 1. Amendment No. 157 to DPR-67
2. Amendment No. 96 to NPF-16
3. Safety Evaluation

cc w/enclosures: See next page

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

ST. LUCIE PLANT

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

FLORIDA POWER & LIGHT COMPANY

DOCKET NO. 50-335

ST. LUCIE PLANT UNIT NO. 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 157
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 June 21, 1995, 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) <u>Technical Specifications</u>

   The Technical Specifications contained in Appendices A and B, as revised through Amendment No. **157** , 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

Frederick J. Hebdon

Frederick J. Hebdon, Director
Project Directorate II-3
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Technical
Specifications

Date of Issuance: October 16, 1998

ATTACHMENT TO LICENSE AMENDMENT NO. 157

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 area of change. The corresponding overleaf pages are also provided to maintain document completeness.

Remove Page	Insert Page
3/4 5-1	3/4 5-1
3/4 5-2	3/4 5-2
B 3/4 5-1	B 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:

a. The isolation valve open,

b. Between 1090 and 1170 cubic feet of borated water,

c. A minimum boron concentration of 1720 PPM, and

d. A nitrogen cover-pressure of between 200 and 250 psig.

APPLICABILITY: MODES 1, 2 and 3.*

ACTION:

a. 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.

b. 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 Each safety injection tank shall be demonstrated OPERABLE:

a. At least once per 12 hours by:

1. Verifying that the borated water volume and nitrogen cover-pressure in the tanks are within their limits, and

2. Verifying that each safety injection tank isolation valve is open.

---

* With pressurizer pressure $\geq$ 1750 psia.

SURVEILLANCE REQUIREMENTS (Continued)

b. At least once per 31 days and once within 6 hours after each solution volume increase of $\geq 1\%$ of tank volume by verifying the boron concentration of the safety injection tank solution. This latter surveillance is not required when the volume increase makeup source is the RWT and the RWT has not been diluted since verifying that the RWT boron concentration is equal to or greater than the safety injection tank boron concentration limit.

c. At least once per 31 days when the RCS pressure is above 1750 psia, by verifying that power to the isolation valve operator is removed by maintaining the breaker open under administrative control.

d. At least once per 18 months by verifying that each safety injection tank isolation valve opens automatically under each of the following conditions:

   1. When the RCS pressure exceeds 350 psia, and

   2. Upon receipt of a safety injection test signal.

BASES

3/4.5.1 SAFETY INJECTION TANKS

The OPERABILITY of each of the RCS safety injection tanks ensures that a sufficient volume of borated water will be immediately forced into the reactor core through each of the cold legs in the event the RCS pressure falls below the pressure of the safety injection tanks. This initial surge of water into the core provides the initial cooling mechanism during large RCS pipe ruptures.

The limits on safety injection tank volume, boron concentration and pressure ensure that the assumptions used for safety injection tank injection in the accident analysis are met.

The limit of 72 hours for operation with an SIT that is inoperable due to boron concentration not within limits, or due to the inability to verify liquid volume or cover-pressure, considers that the volume of the SIT is still available for injection in the event of a LOCA. If one SIT is inoperable for other reasons, the SIT may be unable to perform its safety function and, based on probability risk assessment, operation in this condition is limited to 24 hours.

3/4.5.2 and 3/4.5.3 ECCS SUBSYSTEMS

The OPERABILITY of two separate and independent ECCS subsystems ensures that sufficient emergency core cooling capability will be available in the event of a LOCA assuming the loss of one subsystem through any single failure consideration. Either subsystem operating in conjunction with the safety injection tanks is capable of supplying sufficient core cooling to limit the peak cladding temperatures within acceptable limits for all postulated break sizes ranging from the double ended break of the largest RCS cold leg pipe downward. In addition, each ECCS subsystem provides long term core cooling capability in the recirculation mode during the accident recovery period.

The Surveillance Requirements provided to ensure OPERABILITY of each component ensure that at a minimum, the assumptions used in the accident analyses are met and that subsystem OPERABILITY is maintained.

The limitations on HPSI pump operability when the RCS temperature is ≤ 270°F and ≤ 236°F, and the associated Surveillance Requirements provide additional administrative assurance that the pressure/temperature limits (Figures 3.4-2a and 3.4-2b) will not be exceeded during a mass addition transient mitigated by a single PORV. A limit on the maximum number of operable HPSI pumps is not necessary when the pressurizer manway cover or the reactor vessel head is removed.

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 FACILITY OPERATING LICENSE

Amendment No. 96
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 June 21, 1995, 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. **96** , 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

Frederick J. Hebdon

Frederick J. Hebdon, Director
Project Directorate II-3
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Technical
Specifications

Date of Issuance: **October 16, 1998**

ATTACHMENT TO LICENSE AMENDMENT NO. 96

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. The corresponding overleaf pages are also provided to maintain document completeness.

Remove Page	Insert Page
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3/4 5-2	3/4 5-2
B 3/4 5-1	B 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:

a. The isolation valve open,

b. A contained borated water volume of between 1420 and 1556 cubic feet,

c. A boron concentration of between 1720 and 2100 ppm of boron, and

d. A nitrogen cover-pressure of between 500 and 650 psig.

APPLICABILITY: MODES 1, 2, 3*, and 4*.

ACTION:

a. 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.

b. 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:

a. At least once per 12 hours by:

1. Verifying that the contained borated water volume and nitrogen cover-pressure in the tanks are within their limits, and

2. 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. In MODE 4 with pressurizer pressure less than 276 psia, the safety injection tanks may be isolated.

SURVEILLANCE REQUIREMENTS (Continued)

b. At least once per 31 days and once within 6 hours after each solution volume increase of greater than or equal to 1% of tank volume by verifying the boron concentration of the safety injection tank solution. This latter surveillance is not required when the volume increase makeup source is the RWT and the RWT has not been diluted since verifying that the RWT boron concentration is equal to or greater than the safety injection tank boron concentration limit.

c. At least once per 31 days when the RCS pressure is above 700 psia, by verifying that power to the isolation valve operator is disconnected by maintaining the breaker open by administrative controls.

d. At least once per 18 months by verifying that each safety injection tank isolation valve opens automatically under each of the following conditions:

1. When an actual or simulated RCS pressure signal exceeds 515 psia, and

2. Upon receipt of a safety injection test signal.

BASES

3/4.5.1 SAFETY INJECTION TANKS

The OPERABILITY of each of the Reactor Coolant System (RCS) safety injection tanks ensures that a sufficient volume of borated water will be immediately forced into the reactor core through each of the cold legs in the event the RCS pressure falls below the pressure of the safety injection tanks. This initial surge of water into the core provides the initial cooling mechanism during large RCS pipe ruptures.

The limits on safety injection tank volume, boron concentration, and pressure ensure that the assumptions used for safety injection tank injection in the safety analysis are met.

The safety injection tank power-operated isolation valves are considered to be "operating bypasses" in the context of IEEE Std. 279-1971, which requires that bypasses of a protective function be removed automatically whenever permissive conditions are not met. In addition, as these safety injection tank isolation valves fail to meet single failure criteria, removal of power to the valves is required.

The limit of 72 hours for operation with an SIT that is inoperable due to boron concentration not within limits, or due to the inability to verify liquid volume or cover-pressure, considers that the volume of the SIT is still available for injection in the event of a LOCA. If one SIT is inoperable for other reasons, the SIT may be unable to perform its safety function and, based on probability risk assessment, operation in this condition is limited to 24 hours.

3/4.5.2 and 3/4.5.3 ECCS SUBSYSTEMS

The OPERABILITY of two separate and independent ECCS subsystems ensures that sufficient emergency core cooling capability will be available in the event of a LOCA assuming the loss of one subsystem through any single failure consideration. Either subsystem operating in conjunction with the safety injection tanks is capable of supplying sufficient core cooling to limit the peak cladding temperatures within acceptable limits for all postulated break sizes ranging from the double-ended break of the largest RCS hot leg pipe downward. In addition, each ECCS subsystem provides long-term core cooling capability in the recirculation mode during the accident recovery period.

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 157 TO FACILITY OPERATING LICENSE NO. DPR-67

AND AMENDMENT NO. 96 TO FACILITY OPERATING LICENSE 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

By application dated June 21, 1995, for the safety injection tanks (SITs), with additional information submitted by the Florida Power and Light (FPL or licensee) through the Combustion Engineering Owners Group (CEOG), on June 14, 1996, FPL requested changes to the Technical Specifications (TS)(Appendix A to Facility Operating License Nos. DPR-67 and NPF-16) for the St. Lucie Plant, Unit 1 and Unit 2.

The proposed changes would modify the TS to extend up to 24 hours the allowed outage times (AOTs) to restore a single inoperable safety injection tank (SIT) (for reasons other than those described below) to OPERABLE status. In addition, for a single SIT inoperable specifically due to boron concentration not within the prescribed limits, or due to inability to verify the required SIT water volume or nitrogen cover pressure, the AOT to restore the SIT to OPERABLE status will be extended from one hour to 72 hours. For both of these conditions, if an inoperable SIT is not restored to OPERABLE status within the AOT, the TS will require transition to HOT STANDBY within the next 6 hours and to HOT SHUTDOWN within the following 6 hours. Several related changes to Surveillance Requirements (SRs) in TS 3.5.1 were also proposed by the licensee along with some minor editorial changes.

2.0 BACKGROUND

Since the mid-1980s, the U.S. Nuclear Regulatory Commission (NRC) has been reviewing and granting improvements to TS that are based, at least in part, on probabilistic risk assessment (PRA) insights. In its final policy statement on TS improvements of July 22, 1993, the NRC stated that it:

> "expects that licensees, in preparing their Technical Specification related submittals, will utilize any plant-specific PSA [probabilistic safety assessment][1] or risk survey and any available literature on risk insights and PSAs...Similarly, the NRC staff will also employ risk insights and PSAs in evaluating Technical

[1]PSA and PRA are used interchangeably herein.

Specifications related submittals. Further, as a part of the Commission's ongoing program of improving Technical Specifications, it will continue to consider methods to make better use of risk and reliability information for defining future generic Technical Specification requirements."

The NRC reiterated this point when it issued the revision to 10 CFR 50.36, "Technical Specifications," in July 1995 (60 FR 36953). In August 1995, the NRC adopted a final policy statement on the use of PRA methods in nuclear regulatory activities that encouraged greater use of PRA to improve safety decision making and regulatory efficiency (60 FR 42622). The PRA policy statement included the following points:

1. The use of PRA technology should be increased in all regulatory matters to the extent supported by the state of the art in PRA methods and data and in a manner that complements the NRC's deterministic approach and supports the NRC's traditional defense-in-depth philosophy.

2. PRA and associated analyses (e.g., sensitivity studies, uncertainty analyses, and importance measures) should be used in regulatory matters, where practical within the bounds of the state of the art, to reduce unnecessary conservatism associated with current regulatory requirements.

3. PRA evaluations in support of regulatory decisions should be as realistic as practicable and appropriate supporting data should be publicly available for review.

In August 1995, the CEOG submitted several Joint Application Reports for the staff's review. One of the CEOG Joint Application Reports provided justifications for extension of the TS AOT for SITs.[2] The justification for this extension is based on a balance of probabilistic considerations, traditional engineering considerations, including defense-in-depth, and operating experience. Risk assessments for all of the Combustion Engineering (CE) plants are contained in the report. The staff first reviewed the Joint Application Report and then reviewed the licensee's plant-specific amendment request which incorporated the Joint Application Report by reference.

Arkansas Nuclear One, Unit 2 (ANO-2) had been the lead CE plant for the SIT TS changes. The staff performed an in-depth review of the ANO-2 PRA methodology relating to these changes, as the lead plant for all of the CEOG. Therefore, a portion of the review of the St. Lucie Unit 1 and Unit 2 amendment request was based on a comparison of the St. Lucie PRA results with those from ANO-2.

In addition, some of the proposed changes would revise TS 3.5.1, "Safety Injection Tanks (SITs)" to incorporate recommendations and suggestions from Generic Letter (GL) 93-05, "Line-Item Technical Specifications Improvements to Reduce Surveillance Requirements for Testing During Power Operations," while other changes would revise TS 3.5.1 to be consistent with NUREG-1432, "Standard Technical Specifications, Combustion Engineering Plants," Revision 1.

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[2]CE NPSD-994, "Joint Application Report for Safety Injection Tank AOT/STI Extension," May 1995.

3.0 PROPOSED CHANGES

The licensee proposed several changes to TS 3.5.1, namely:

a. When a single SIT is inoperable due to boron concentration not within prescribed limits or due to the inability to verify SIT water volume or nitrogen cover-pressure, the AOT to restore the SIT to OPERABLE status would be extended form 1 hour to 72 hours.

b. When a single SIT is inoperable for reasons other than stated in "a" above, the AOT to restore the SIT to OPERABLE status would be extend to 24 hours. The current AOT is "immediately" if the inoperability is due to a closed isolation valve and 1 hour if the inoperability is due to any other reason.

c. If an inoperable SIT is not restored to OPERABLE status within the AOT, the proposed TS would require transition to HOT STANDBY within the next 6 hours and to HOT SHUTDOWN within the following six hours. This is consistent with Action a for the current Unit 2 TS but is a change in the times to reach HOT STANDBY and HOT SHUTDOWN from Unit 1 and Unit 2 Action b.

d. Minor administrative changes to SR 4.5.1.a.1, SR 4.5.1.b, and SR 4.5.1.d (Unit 1 only) to clarify the intent of the required surveillances.

e. A revision to SR 4.5.1.1.a.1 (Unit 2 only) to delete the reference to verify operability "by the absence of alarms" and to clarify the intent of the required surveillance.

f. Deletion of SR 4.5.1.2 (Unit 2 only) which requires that each SIT water level and pressure channel be demonstrated to be OPERABLE.

4.0 EVALUATION

The staff evaluated the licensee's proposed amendment to the TS using a combination of traditional engineering analysis, PRA methods, and a review of operating experience. The staff's traditional analysis evaluated the capabilities of the plant to mitigate design basis events with one SIT inoperable. The staff then used insights derived from the use of PRA methods to determine the risk significance of the proposed changes. The results of these evaluations were used in combination by the staff to determine the safety impact of extending the AOTs for one inoperable SIT.

4.1 Justification for Proposed Changes

4.1.a Justification for Proposed Change to SIT AOT from 1 to 72 Hours when SIT is Inoperable Due to Inability to Verify Water Volume or Nitrogen Cover-Pressure, for Proposed Change to SR 4.5.1.a.1, and for Proposed Unit 2 Change to Delete SR 4.5.1.2

The NRC issued GL 93-05 on September 27, 1993, and recommended that licensees add a condition to the SIT TS for the case where one SIT is inoperable due to the inoperability of water level and pressure channels in which the AOT to restore the SIT to OPERABLE status would be 72 hours. GL 93-05 stated that the NRC staff and industry efforts to develop new Standard TS (STS) recognized that SIT instrumentation operability was not directly related to the capability of the SITs to perform their safety function. Therefore, surveillance requirements for SIT pressure and level instrumentation were relocated from the new STS and the only surveillance that was retained was that surveillance required to confirm that the parameters defining SIT operability are within their specified limits. At the time of the development of the STS, the staff did not include a separate condition in the SIT TS for a SIT inoperable due to the inability to verify level or pressure, as was recommended in GL 93-05. However, the staff believes this is appropriate based on the analysis done during the development of NUREG-1366, "Improvements to Technical Specifications Surveillance Requirements," which formed the basis for the issuance of GL 93-05.

The current St. Lucie Unit 1 and Unit 2 TS do not differentiate between a SIT that is inoperable due to tank inventory or nitrogen gas pressure discrepancies and a SIT whose inventory or gas pressure cannot be verified due solely to malfunctioning water level instrumentation or pressure instrumentation. Because these instruments provide no safety actuation, it is reasonable to extend the AOT to 72 hours under these conditions since the SIT is available to perform its safety function during this time, consistent with the staff's recommendations in GL 93-05.

4.1.b <u>Justification for Proposed Change to SIT AOT from 1 to 72 Hours when SIT is Inoperable Due to Boron Concentration Being Outside Limits</u>

An extension of the AOT from 1 hour to 72 hours to restore boron concentration to within limits is consistent with NUREG-1432, "Standard Technical Specifications, Combustion Engineering Plants," Revision 1. The basis for this AOT includes recognition that, although ability to maintain subcriticality or minimum boron precipitation time may be reduced in this condition, the reduced concentration effects on core subcriticality during reflood are minor. In addition, the volume of the SIT is still available for injection. Since the boron requirements are based on the average boron concentration of the total volume of three SITs, the consequences are less severe than they would be if a SIT were not available for injection. Therefore, 72 hours is a reasonable AOT for returning the boron concentration to within limits.

4.1.c <u>Justification for Proposed Change to SIT AOT to 24 Hours when SIT is Inoperable for Other Reasons</u>

Industry operating experience has demonstrated that many of the causes of SIT inoperability have been diagnosed and corrected within a relatively short period, but one that is often longer than the existing 1-hour AOT. In several cases, the diagnosis of an inoperable SIT has resulted in plant shutdowns.

If a single SIT were to be diagnosed as inoperable for reasons other than a closed isolation valve which requires immediate, TS 3.5.1, Action a, would require restoration in 1 hour. If the action were not completed, the plant would have to be shut down. The extension of the existing SIT AOT to 24 hours should provide the licensee with sufficient time in which to diagnose and possibly repair minor SIT system malfunctions at power, thereby averting an unplanned plant shutdown. Since risk analyses demonstrate that the increased risk of operating with a single SIT out of service is negligible, increasing the AOT can be beneficial by possibly avoiding unplanned shutdowns associated with an inoperable SIT. Unnecessary plant shutdowns associated with the outage of non-risk-significant equipment are undesirable because mode changes have the potential to increase the risk above that of steady state operation. The proposed times to reach HOT STANDBY and HOT SHUTDOWN when the SIT cannot be restored within the AOT are consistent with the licensee's current TS 3.0.3 and with the STS (NUREG-1432).

4.1.d <u>Justification for Proposed Changes to SR 4.5.1.b, SR 4.5.1.d (Unit 1 only) and SR 4.5.1.1.a.1 (Unit 2 only)</u>

The proposed change to SR 4.5.1.b.1 is administrative in nature and removes an element of ambiguity from the stated SR that could, if misinterpreted, result in not performing a required 31 day surveillance.

The proposed change to SR 4.5.1.d (Unit 1 only) is editorial. The words being deleted have no meaning in this context.

The proposed change to SR 4.5.1.1.a.1 (Unit 2 only) removes the reference to verify operability of the SITs "by the absence of alarms". This change is consistent with the proposed change to remove SR 4.5.1.2 on the SIT pressure and level instrumentation.

4.2 <u>Traditional Engineering Evaluation</u>

The performance of all of the emergency core cooling system (ECCS), including SITs, is calculated in accordance with 10 CFR Part 50, Appendix K, such that the ECCS ensures that the acceptance criteria of 10 CFR 50.46 are satisfied. These criteria were established in order to define deterministic acceptance criteria that could be used to judge the acceptability of a given ECCS design. The methodology defined in Appendix K conservatively represents loss of coolant accident (LOCA) thermohydraulic and hydrodynamic phenomenology to calculate fuel peak clad temperature. As a result, the methodology may well overstate the minimum equipment requirements for adequate response to an event.

The SITs are passive pressure vessels partially filled with borated water and pressurized with a cover gas (nitrogen) to facilitate injection into the reactor vessel during the blowdown phase of a large break LOCA. This action provides inventory to assist in accomplishing the refill stage following blowdown.

Each SIT is piped into an associated reactor coolant system (RCS) cold leg by an ECCS line also utilized by high-pressure safety injection and low-pressure safety injection (LPSI). Each SIT is isolated from the RCS during full pressure operations by two series check valves. Each SIT also has a normally deenergized open motor-operated isolation valve utilized to isolate the SIT from the RCS during normal cooldown and depressurization evolutions. Each of these valves receive a safety injection actuation signal to open. The SIT gas pressure and volume, water volume, and outlet pipe size are designed to allow three of the four SITs to inject the inventory necessary to keep clad temperature and zirconium-water reaction within design assumptions following a design basis LOCA. The design assumes the loss of inventory from one SIT through the LOCA break.

Limiting condition for operation (LCO) 3.5.1 requires that all SITs be OPERABLE whenever the plant is in Modes 1, 2, or 3, with pressurizer pressure greater than or equal to 1750 psia. The LCO is based on the assumption that when the plant is in any of these modes of operation, the SITs must have the same functionality that would be required for a LOCA at full rated thermal power. When the plant is in any of the applicable modes, a SIT is considered OPERABLE when the following conditions exist:

- The associated isolation valve is fully open.
- Electric power has been interrupted to the motor for the associated isolation valve.
- Water inventory in the tank is within the assumed band.
- The boric acid concentration of the water inventory of the tank is within the assumed band.
- The nitrogen cover pressure within the tank is within the assumed band.

In the past, a justification for the short AOT for one inoperable SIT has been that the perceived severity of the consequences of not having all SITs available to provide passive injection during a design basis LOCA warranted the severity of the requirement to return the SIT to OPERABLE status within 1 hour or shut down the unit. However, the current SIT AOT was based solely on engineering judgment and did not take into consideration a quantitative assessment of risk.

The SIT operational parameters are set by the design basis licensing large break LOCA analysis. Since the SIT is a passive device and provides a limited function, operability has been restricted to mean that the equipment's initial conditions are within a band supported by 10 CFR Part 50, Appendix K, design basis analysis. Analytical models of Appendix K to 10 CFR Part 50 are devised so as to overestimate the amount of liquid lost from the break and to underestimate the residual inventory in the reactor vessel lower plenum. Consequently, inventory discharge requirements are conservatively set at a high level. Extending the AOT from 1 to 24 hours for one SIT that is inoperable for reasons other than boron concentration being outside of limits or the inability to verify level or pressure will allow time for the licensee to correct minor problems with a SIT. Considering the short time frame that a SIT is allowed to be out of service, the low likelihood of a large break LOCA during this short time frame, and the potential risk associated with plant shutdowns, extending the SIT AOT will allow defense in depth to be maintained while not significantly affecting overall safety margins assumed in the design basis analysis.

4.3 Evaluation of the PRA Used to Support the Proposed TS Change to SIT AOT to 24 Hours

The staff used a three-tiered approach to evaluate the risk associated with the proposed TS changes. The first tier evaluated the PRA model and the impact of the AOT extensions for the SITs on plant operational risk. The second tier addressed the need to preclude potentially high risk configurations, should additional equipment outages occur during the time when one SIT is out of service. Because the SIT sequence modeling is relatively independent of that for other systems, the staff concludes that application of Tier 3 to the proposed SIT AOT is not necessary. Each tier and the associated findings are discussed below.

4.3.a Cross Comparison Approach

After completing a detailed evaluation for the tentative approval of SIT TS AOT extension for Arkansas Nuclear One, Unit 2 (ANO-2), the original CEOG lead plant for the risk-informed TS pilot project, the staff used a cross comparison approach to consider the viability of similar AOT relaxations for other participating CEOG plants, including St. Lucie. The pilot technical evaluation report[3] used in support of the staff's draft safety evaluation for ANO-2[4] focused on:

- the process adopted by the CEOG to assess single AOT risk,
- the identification of ANO-2 accident sequences in which credit was taken for SITs and LPSI,
- independent verification of the single AOT risk [essentially equivalent to incremental conditional core damage probability (ICCDP)[5]], and
- determination of the significance of single AOT risk relative to an acceptance guideline value.

The objective of this cross comparison evaluation is to use insights derived from the ANO-2 technical evaluation to examine the validity of the conclusions drawn in the joint submittals. Because a common methodology was employed by the CEOG to quantify AOT risk and because CE plants generally have similar design characteristics, the staff concludes that the findings of the lead pilot plant evaluation will be generally applicable to other CE plants. The staff confirmed that differences in the underlying PRA models are chiefly attributed to:

- minor design differences,
- operational differences,
- success criteria assumptions, and
- common cause failure β-factor assumptions.

The cross comparison draws on information contained in the CEOG Joint Application Reports, the licensees' responses to the staff's requests for additional information, the licensees' individual plant examinations (IPEs) performed in response to Generic Letter 88-20, "Individual Plant Examination for Severe Accident Vulnerabilities," and the corresponding IPE evaluations performed by the staff.

4.3.b Impact of SITs on Tier 1, 2, and 3 Requirements (Risk Measures)

The following factors are chiefly responsible for the differences in SIT AOT risks among the CE plants:

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[3]SCIE-NRC-318-97, "Technical Evaluation of Combustion Engineering Owners Group (CEOG) Joint Application for Safety Injection Tanks and Low Pressure Safety Injection System Allowed Outage Time (AOT) Extension," July 21, 1997.

[4]SECY-97-095, "Probabilistic Risk Assessment Implementation Plan Pilot Application for Risk-Informed Technical Specifications," April 30, 1997.

[5]ICCDP = [(conditional core damage frequency (CDF) with the subject equipment out of service) - (baseline CDF with nominal expected equipment unavailabilities)] X (duration of single AOT under consideration).

- modeling for success criteria for SITs,
- initiating event frequency assumed for the initiators challenging the SITs, and
- credit for SITs in mitigating medium LOCAs.

The SIT single AOT risks for St. Lucie Units 1 and 2 are 5.44E-07 (Unit 1) and 5.38E-07 (Unit 2) and are slightly in excess of the acceptance guideline value of 5.0E-07published in Regulatory Guide (RG) 1.177, "An Approach for Plant-Specific Risk-Informed Decisionmaking: Technical Specifications," (63 FR 48771, September 11, 1998), due largely to the use of conservative 3-out-of-4 success criteria (ANO-2 used 2-out-of-4). In addition, the changes in the St. Lucie updated baseline CDFs (as reported in the CEOG Joint Application Report) due to the SIT AOT change is about 12% (Unit 1) and 10.6% (Unit 2), i.e., from 2.14E-05 to 2.4E-05 (Unit 1) per year to 2.35E-05 to 2.6E-05 (Unit 2) per year. The changes in CDFs of 0.21E-05 (Unit 1) and 0.20E-05 (Unit 2) are within the acceptance guidelines published in RG 1.174, "An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis" (63 FR 44659, August 20, 1998).

In the context of integrated decisionmaking, the acceptance guidelines should not be interpreted as being overly prescriptive. They are intended to provide an indication, in numerical terms, of what is considered acceptable. As such, the numerical acceptance guideline is an approximate value that provides an indication of the changes that are generally acceptable. Furthermore, the state of knowledge, or epistemic uncertainties associated with PRA calculations preclude a definitive decision with respect to the acceptance of the proposed change based purely on the numerical results. The intent in making the comparison of the PRA results with the acceptance guidelines is to demonstrate with reasonable assurance that the increase in risk is small and consistent with the intent of the Commission's Safety Goal Policy Statement. Given the licensee's use of conservative 3-out-of-4 success criteria, the staff concludes that the proposed changes to the St. Lucie Unit 1 and Unit 2 SIT TS meet this principle.

The Tier 2 evaluation did not identify the need for any additional constraints or compensatory actions that, if implemented, would avoid or reduce the probability of a risk-significant configuration. Because the SIT sequence modeling is relatively independent of that for other systems, the staff concludes that application of Tier 3 to the proposed SIT AOT is not necessary.

4.4 Monitoring

The licensee has stated through endorsement of the CEOG Joint Application Reports that the maintenance rule (10 CFR 50.65) will be the vehicle that controls the actual equipment maintenance cycle by defining unavailability performance criteria for the SITs. The AOT extensions will allow efficient scheduling of maintenance within the boundaries established by implementing the maintenance rule. The effect of the AOT extensions should be considered if any adverse trends in meeting established performance criteria are identified for the SITs. The maintenance rule will thereby be the vehicle that monitors the effectiveness of the AOT extensions. Application of these implementation and monitoring strategies will help to ensure that extension of TS AOTs for SITs does not degrade operational safety over time and that the risk incurred when a SIT is taken out of service is minimized.

5.0 STAFF CONCLUSION

The staff has evaluated the licensee's proposed changes for compliance with regulatory requirements as documented in this evaluation and has determined that they are acceptable. This determination is based on the following:

1. The need to maintain reliable safety systems.

2. Consideration of the design basis requirements for the SITs.

3. Staff recommendations contained in GL 93-05 and NUREG-1432, Revision 1, regarding SIT TS requirements.

4. Interface considerations that ensure the risk incurred when a SIT is taken out of service is minimum.

5. Performance monitoring through the maintenance rule to ensure that extension of TS AOTs for SITs does not degrade operational safety over time.

The staff therefore finds that the AOT for one SIT that is inoperable for the inability to verify level or pressure or for boron concentration outside limits may be extended to 72 hours, the AOT for one SIT that is inoperable for other reasons may be extended to 24 hours, with a negligible impact on risk. The staff also finds that the proposed related changes to SRs for TS 3.5.1 are acceptable.

6.0 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, U.S. NRC, the State of Florida does not desire notification of issuance of license amendments.

7.0 ENVIRONMENTAL CONSIDERATION

The amendments change a requirement with respect to the 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 (60 FR 49936). Accordingly, the amendments meet the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). The amendments also involve changes in record keeping, reporting, or administrative procedures or requirements. Accordingly, with respect to these items, the amendments meet the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(10). Pursuant to 10 CFR 51.22(b) no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendments.

8.0 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.

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