

October 7, 1994

Mr. J. H. Goldberg
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SUBJECT: ST. LUCIE UNIT 1 - ISSUANCE OF AMENDMENT RE: BORIC ACID MAKEUP TANK
MINIMUM INVENTORY REQUIREMENTS (TAC NO. M88976)

Dear Mr. Goldberg:

The Commission has issued the enclosed Amendment No. 129 to Facility Operating License Nos. DPR-67 for the St. Lucie Plant, Unit No. 1. This amendment consists of changes to the Technical Specifications in response to your application dated February 22, 1994.

This amendment modifies the minimum stored borated water inventory requirements for Operational Modes 1 through 4 by revising Figure 3.1-1 and Limiting Condition for Operation 3.1.2.8 of the unit Technical Specifications (TS). The associated bases for TS 3/4.1.2 are also revised to reflect the bounding borated water makeup volumes, as a function of boric acid concentration, which define the proposed inventory requirements.

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

Docket No. 50-335

Enclosures:

- 1. Amendment No. 129 to DPR-67
- 2. Safety Evaluation

cc w/enclosures:
See next page

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DATE	09/14/94		09/14/94		09/15/94	09/14/94	09/14/94

*No legal objection

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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. 129
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 February 22, 1994, 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.

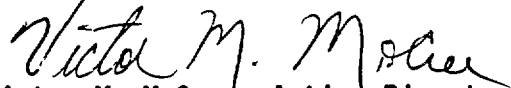
2. Accordingly, Facility Operating License No. DPR-67 is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and by amending paragraph 2.C.(2) to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 129, 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



Victor M. McCree, Acting 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: October 7, 1994

ATTACHMENT TO LICENSE AMENDMENT NO. 129

TO FACILITY OPERATING LICENSE NO. DPR-67

DOCKET NO. 50-335

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

Remove Pages

3/4 1-17

3/4 1-18

B 3/4 1-2

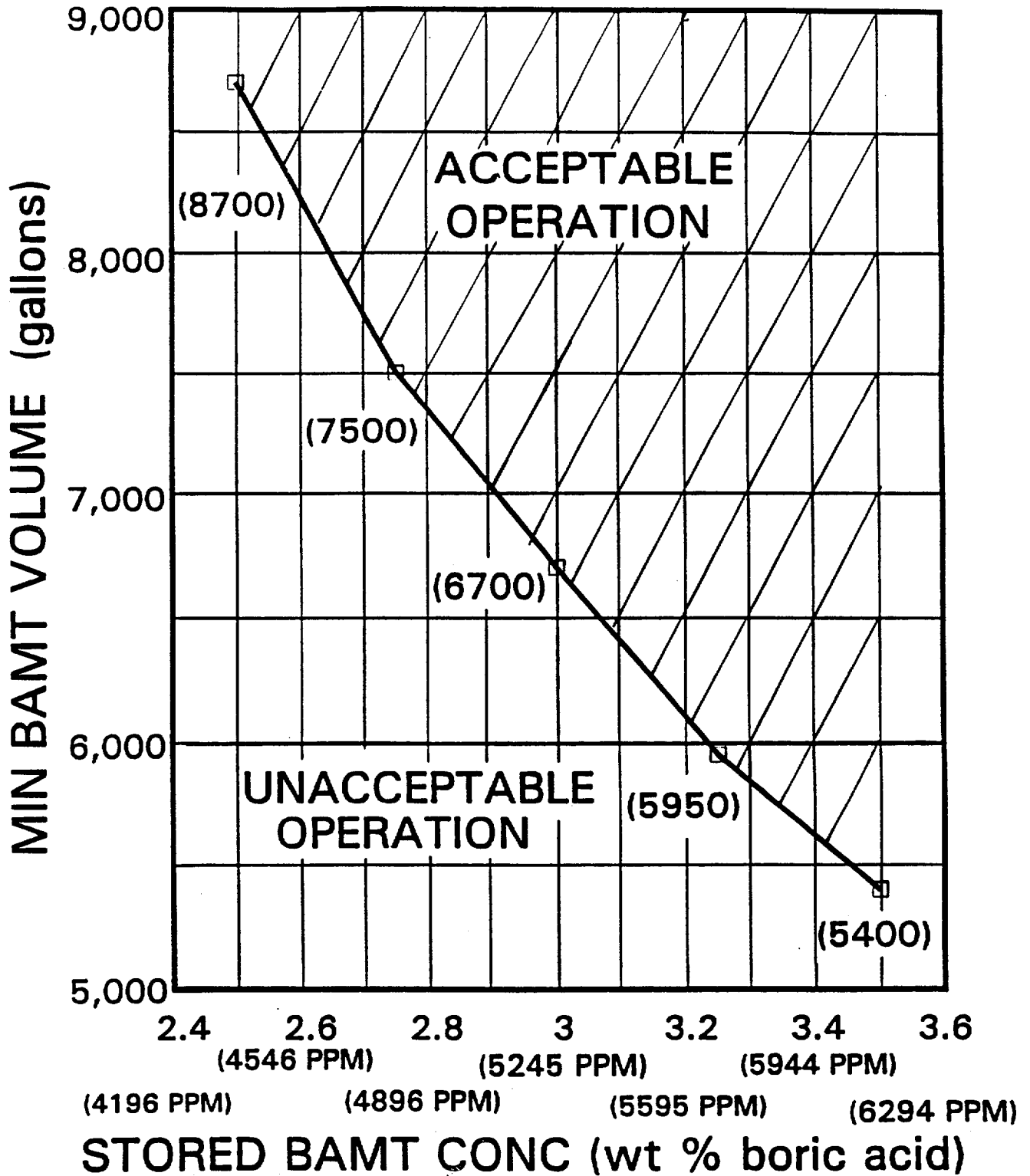
Insert Pages

3/4 1-17

3/4 1-18

B 3/4 1-2

**FIGURE 3.1-1 ST. LUCIE 1 MIN BAMT VOLUME
VS STORED BAMT CONCENTRATION**



REACTIVITY CONTROL SYSTEMS

BORATED WATER SOURCES - OPERATING

LIMITING CONDITION FOR OPERATION

3.1.2.8 At least two of the following four borated water sources shall be OPERABLE:

- a. Boric Acid Makeup Tank 1A in accordance with Figure 3.1-1.
- b. Boric Acid Makeup Tank 1B in accordance with Figure 3.1-1.
- c. Boric Acid Makeup Tanks 1A and 1B with a minimum combined contained borated water volume in accordance with Figure 3.1-1.
- d. The refueling water tank with:
 1. A minimum contained volume of 401,800 gallons of water,
 2. A minimum boron concentration of 1720 ppm,
 3. A maximum solution temperature of 100°F,
 4. A minimum solution temperature of 55°F when in MODES 1 and 2, and
 5. A minimum solution temperature of 40°F when in MODES 3 and 4.

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTION:

With only one borated water source OPERABLE, restore at least two borated water sources to OPERABLE status within 72 hours or make the reactor subcritical within the next 2 hours and borate to a SHUTDOWN MARGIN equivalent to at least 2000 pcm at 200°F; restore at least two borated water sources to OPERABLE status within the next 7 days or be in COLD SHUTDOWN within the next 30 hours.

SURVEILLANCE REQUIREMENTS

4.1.2.8 At least two borated water sources shall be demonstrated OPERABLE:

- a. At least once per 7 days by:
 1. Verifying the boron concentration in each water source,

3/4.1 REACTIVITY CONTROL SYSTEMS

BASES

3/4.1.1 BORATION CONTROL

3/4.1.1.1 and 3/4.1.1.2 SHUTDOWN MARGIN

A sufficient SHUTDOWN MARGIN ensures that 1) the reactor can be made subcritical from all operating conditions, 2) the reactivity transients associated with postulated accident conditions are controllable within acceptable limits, and 3) the reactor will be maintained sufficiently subcritical to preclude inadvertent criticality in the shutdown condition.

SHUTDOWN MARGIN requirements vary throughout core life as a function of fuel depletion, RCS boron concentration, and RCS T_{avg} . The most restrictive condition occurs at EOL, with T_{avg} at no load operating temperature, and is associated with a postulated steam line break accident and resulting uncontrolled RCS cooldown. In the analysis of this accident, a minimum SHUTDOWN MARGIN of 3600 pcm is required to control the reactivity transient. Accordingly, the SHUTDOWN MARGIN required by Specification 3.1.1.1 is based upon this limiting condition and is consistent with FSAR accident analysis assumptions. For earlier periods during the fuel cycle, this value is conservative. With $T_{avg} < 200^{\circ}\text{F}$, the reactivity transient resulting from a boron dilution event with a partially drained Reactor Coolant System requires a 2000 pcm SHUTDOWN MARGIN and restrictions on charging pump operation to provide adequate protection. A 2000 pcm SHUTDOWN MARGIN is 1000 pcm conservative for Mode 5 operation with total RCS volume present, however LCO 3.1.1.2 is written conservatively for simplicity.

3/4.1.1.3 BORON DILUTION AND ADDITION

A minimum flow rate of at least 3000 GPM provides adequate mixing, prevents stratification and ensures that reactivity changes will be gradual during boron concentration changes in the Reactor Coolant System. A flow rate of at least 3000 GPM will circulate an equivalent Reactor Coolant System volume of 11,400 cubic feet in approximately 26 minutes. The reactivity change rate associated with boron concentration changes will be within the capability for operator recognition and control.

3/4.1.1.4 MODERATOR TEMPERATURE COEFFICIENT (MTC)

The limiting values assumed for the MTC used in the accident and transient analyses were +7 pcm/ $^{\circ}\text{F}$ for THERMAL POWER levels < 70% of RATED THERMAL POWER, +2 pcm/ $^{\circ}\text{F}$ for THERMAL POWER levels > 70% of RATED THERMAL and -28 pcm/ $^{\circ}\text{F}$ at RATED THERMAL POWER. Therefore, these limiting values are included in this specification. Determination of MTC at the specified conditions ensures that the maximum positive and/or negative values of the MTC will not exceed the limiting values.

REACTIVITY CONTROL SYSTEMS

BASES

3/4.1.1.5 MINIMUM TEMPERATURE FOR CRITICALITY

The MTC is expected to be slightly negative at operating conditions. However, at the beginning of the fuel cycle, the MTC may be slightly positive at operating conditions and since it will become more positive at lower temperatures, this specification is provided to restrict reactor operation when T_{avg} is significantly below the normal operating temperature.

3/4.1.2 BORATION SYSTEMS

The boron injection system ensures that negative reactivity control is available during each mode of facility operation. The components required to perform this function include 1) borated water sources, 2) charging pumps, 3) separate flow paths, 4) boric acid pumps, and 5) an emergency power supply from OPERABLE diesel generators.

With the RCS average temperature above 200°F, a minimum of two separate and redundant boron injection systems are provided to ensure single functional capability in the event an assumed failure renders one of the systems inoperable. Allowable out-of-service periods ensure that minor component repair or corrective action may be completed without undue risk to overall facility safety from injection system failures during the repair period.

The boration capability of either system is sufficient to provide a SHUTDOWN MARGIN from all operating conditions of 2000 pcm after xenon decay and cooldown to 200°F. The maximum boration capability requirement occurs at EOL from full power equilibrium xenon conditions. This requirement can be met for a range of boric acid concentrations in the Boric Acid Makeup Tanks (BAMTs) and Refueling Water Tank (RWT). This range is bounded by 5400 gallons of 3.5 weight percent (6119 ppm boron) boric acid from the BAMTs and 17,000 gallons of 1720 ppm borated water from the RWT to 8700 gallons of 2.5 weight percent (4371 ppm boron) boric acid from the BAMTs and 13,000 gallons of 1720 ppm borated water from the RWT. A minimum of 45,000 gallons of 1720 ppm boron is required from the RWT if it is to be used to borate the RCS alone.

The requirements for a minimum contained volume of 401,800 gallons of borated water in the refueling water tank ensures the capability for borating the RCS to the desired level. The specified quantity of borated water is consistent with the ECCS requirements of Specification 3.5.4. Therefore, the larger volume of borated water is specified here too.

With the RCS temperature below 200°F, one injection system is acceptable without single failure consideration on the basis of the stable reactivity condition of the reactor and the additional restrictions prohibiting CORE ALTERATIONS and positive reactivity change in the event the single injection system becomes inoperable.



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 129

TO FACILITY OPERATING LICENSE NO. DPR-67

FLORIDA POWER AND LIGHT COMPANY, ET AL.

ST. LUCIE PLANT, UNIT NO. 1

DOCKET NO. 50-335

1.0 INTRODUCTION

By letter dated February 22, 1994, Florida Power and Light (FPL) (the licensee) proposed changes to the Technical Specifications (TS) for the St. Lucie Unit 1 facility. Specifically, the proposed changes were a modification of (1) Figure 3.1-1, (2) the Limiting Condition for Operation (LCO) 3.1.2.8 and (3) the associated bases for TS 3/4.1.2. These changes are related to reducing the minimum stored borated water inventory requirements. It is the licensee's contention that the proposed amendment will significantly improve operational flexibility with no risk to plant safety and that it will also provide consistency in operation between the Unit 1 and Unit 2 plants.

2.0 EVALUATION

In June 1988, the staff accepted FPL's proposal to lower the boric acid concentration at St. Lucie Unit 1 (Amendment 94 to Facility Operating License No. DPR-67). By making this change, the licensee was able to remove the heat tracing on the boric acid system.

The licensee later recognized that, although TS 3.1.2.8 requires at least two independent borated water sources during operation in Modes 1 through 4, the two sources do not have to be two boric acid makeup tanks (BAMTs). The sources can include one of the BAMT in conjunction with the refueling water tank (RWT) or both BAMTs. Figure 3-1.1, however, was developed for use when two BAMTs are in service. In this proposal, it is the licensee's intent to modify the TS to apply to an individual BAMT by (1) reducing the required quantity of stored borated water inventories and (2) expanding the scope of boric acid concentration for a single BAMT.

The licensee's methodology and analytical results to support the proposed changes to Figure 3.1-1 and TS 3.1.2.8 are documented in the Combustion Engineering Report CEN-353(F), Revision 3 with Supplement 1. The definition of the boration requirements for the most limiting time in the core cycle and the cooldown and calculational methodology used in this analysis are the same as those used in the technical basis for the existing TS.

Required RCS Boron Concentration

The licensee determined the required boron concentration using previously approved methodology in CEN-353(F), updated core physics data, and future planned St. Lucie Unit 1 core reloads. To ensure the upper bound boron requirements were predicted for all operational modes, the licensee included analytical and measurement uncertainties. The licensee indicated that the analytical results show that the shutdown margin requirements are assured with a smaller reactor coolant system (RCS) boron concentration than was predicted by earlier analyses.

Available Borated Water Inventory (Figure 3.1-1)

The licensee stated that the proposed BAMT inventory reduction is made possible by increasing the make-up water provided by the RWT during plant cooldown. The boration requirements were determined by the licensee using conservative assumptions in order to maximize the boron demand. It was also assumed that the approved boric acid concentration of 2.5 - 3.5 percent by weight (wt%) in the BAMT remained the same. The licensee concluded that additional demand on the RWT inventory has no impact on the existing TS RWT minimum volumes and boron concentration.

In the currently documented volume reduction analysis, CEN-353(F), Revision 3, 1000 gallons of borated water was added to the calculated BAMT volume to provide additional volume for auxiliary spray while depressurizing the RCS. The additional volume is required because the analysis assumes that motor-operated valve V2504 fails to automatically open. In Supplement 1 to CEN-353(F), Revision 3, the volume reduction analysis for these proposed changes, the final volume is determined by (1) adding a 500-gallon allowance for conservatism and (2) removing the additional 1000-gallon allowance for auxiliary spray from the BAMTs. The licensee justifies this reduction by taking credit for manual handwheel operation of V2504. These BAMT volume adjustments are consistent with the volume adjustments made for St. Lucie, Unit 2.

TS 3.1.2.8.a and 3.1.2.8.b

In the case where one BAMT is used, the maximum useable capacity is 9450 gallons and TSs 3.1.2.8.a and b currently specify a minimum boric acid concentration of 3.2 wt% for an individual BAMT. Figure 3.1-1 is actually based on the use of two BAMTs. This results in limiting the range of permissible inventories for the selected tank to the narrow operating band delineated in Figure 3.1-1 of the current TSs.

By reducing the inventory to the single BAMT range of 5,400 - 8,700 gallons, the corresponding boric acid concentration is 3.5 - 2.5 wt%, respectively. Therefore the 3.2 wt% minimum for the boric acid concentration for an individual BAMT is not required.

Transient and Accident Analysis

Credit is not taken for boron addition to the RCS from the BAMTs for the purpose of reactivity control in the St. Lucie Unit 1 Final Safety Analysis Report, Chapter 15 accident analysis. Therefore, the licensee concluded that this request does not affect Chapter 15 analysis. Also, the action statements used to mitigate a loss of the safe shutdown margin are conservatively based on boration from the RWT. These TSs will not be affected by the proposed BAMT inventories.

3.0 TECHNICAL FINDING

The licensee has proposed to modify Figure 3.1-1 and TS 3.1.2.8 so that the requirements will be applicable to an individual BAMT. These changes are supported by the analytical results of CEN-353(F) Supplement 1 which includes previously approved methodologies, worst-case assumptions, and allowances for the uncertainties.

The licensee indicated that the revised BAMT and RWT inventories will continue to provide assurance that the safe shutdown margins specified in the TS can be met for the most limiting accident conditions during core fuel cycles. Based on these elements the staff finds the proposed BAMT inventory requirements acceptable.

4.0 REFERENCES

1. Letter from D.A. Sager, Florida Power and Light Company to US NRC, "Proposed License Amendment Boric Acid Makeup Tank Minimum Inventory Requirements", dated February 22, 1994.
2. Letter from E.G. Tourigny, US NRC to W.F. Conway, Florida Power and Light Company, "St Lucie Unit 1 - Issuance of Amendment RE: Boric Acid Makeup System (TAC No. 67051)", dated June 6, 1988.

5.0 ENVIRONMENTAL CONSIDERATION

These amendments involve a change to 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 these amendments involve no significant hazards consideration and there has been no public comment on such finding (59 FR 14888). 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: S. Brewer

Date: October 7, 1994