March 13, 1989

Docket No. 50-389

DISTRIBUTION
See attached sheet

Mr. W. F. Conway
Senior Vice President-Nuclear
Nuclear Energy Department
Florida Power and Light Company
Post Office Box 14000
Juno Beach, Florida 33408-0420

Dear Mr. Conway:

SUBJECT: ST. LUCIE UNIT 2 - ISSUANCE OF AMENDMENT RE: BORIC ACID MAKEUP SYSTEM (TAC NO. 69325)

The Commission has issued the enclosed Amendment No. 40 to Facility Operating License No. NPF-16 for the St. Lucie Plant, Unit No. 2. This amendment consists of changes to the Technical Specifications in response to your application dated September 1, 1988.

This amendment changes the Technical Specifications (TS) associated with the boric acid makeup (BAMU) system. Specifically, the required boron concentration requirements are reduced, the borated water volume is increased, and the requirement to heat trace the BAMU system is deleted.

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

Enclosures:
1. Amendment No. 40 to NPF-16
2. Safety Evaluation

cc w/enclosures:
See next page

LA:PDII-2	PM:PDII-2	D:PDII-2	SRXB	SPLB
DMiller	JNorris:bd	HBerkow	WHodges	JCraig
02/15/89	02/ /89	02/22/89	02/17/89	02/27/89
ECEB	OGC			
CMcCracken				
02/21/89	03/07/89			

Mr. W. F. Conway
Florida Power & Light Company

St. Lucie Plant

cc:
Mr. Jack Shreve
Office of the Public Counsel
Room 4, Holland Building
Tallahassee, Florida 32304

Resident Inspector
c/o U.S. NRC
7585 S. Hwy A1A
Jensen Beach, Florida 34957

State Planning & Development
Clearinghouse
Office of Planning & Budget
Executive Office of the Governor
The Capitol Building
Tallahassee, Florida 32301

Harold F. Reis, Esq.
Newman & Holtzinger
1615 L Street, N.W.
Washington, DC 20036

John T. Butler, Esq.
Steel, Hector and Davis
4000 Southeast Financial Center
Miami, Florida 33131-2398

Administrator
Department of Environmental Regulation
Power Plant Siting Section
State of Florida
2600 Blair Stone Road
Tallahassee, Florida 32301

Mr. Weldon B. Lewis, County
Administrator
St. Lucie County
2300 Virginia Avenue, Room 104
Fort Pierce, Florida 33450

Mr. Charles B. Brinkman, Manager
Washington Nuclear Operations
Combustion Engineering, Inc.
12300 Twinbrook Parkway, Suite 3300
Rockville, Maryland 20852

Jacob Daniel Nash
Office of Radiation Control
Department of Health and
Rehabilitative Services
1317 Winewood Blvd.
Tallahassee, Florida 32399-0700

Regional Administrator, Region II
U.S. Nuclear Regulatory Commission
101 Marietta Street N.W., Suite 2900
Atlanta, Georgia 30323

Campbell Rich
4626 S.E. Pilot Avenue
Stuart, Florida 34997

DATED: March 13, 1989

AMENDMENT NO. 40 TO FACILITY OPERATING LICENSE NO. NPF-16 - ST. LUCIE, UNIT 2

Docket File
NRC & Local PDRs
PDII-2 Reading
G. Lainas, 14/E/4
E. Adensam, 14/H/3
H. Berkow
D. Miller
J. Norris
OGC-WF
D. Hagan, 3302 MNBB
E. Jordan, 3302 MNBB
B. Grimes, 9/A/2
T. Meek (4), P1-137
Wanda Jones, P-130A
E. Butcher, 11/F/23
ACRS (10)
GPA/PA
ARM/LFMB
B. Wilson, R-II
S. Sun

cc: Plant Service list

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. 40
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 September 1, 1988, 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. 40 , 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 the date of its issuance.

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: March 13, 1989

ATTACHMENT TO LICENSE AMENDMENT NO. 40

TO FACILITY OPERATING LICENSE NO. NPF-16

DOCKET NO. 50-389

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

Remove Pages	Insert Pages
3/4 1-7	3/4 1-7
3/4 1-8	3/4 1-8
--	3/4 1-8a
3/4 1-12	3/4 1-12
3/4 1-13	3/4 1-13
3/4 1-14	3/4 1-14
3/4 1-15	3/4 1-15
3/4 5-1	3/4 5-1
B3/4 1-2	B3/4 1-2
B3/4 1-3	B3/4 1-3
B3/4 5-3	B3/4 5-3
B3/4 6-3	B3/4 6-3

ATTACHMENT TO LICENSE AMENDMENT NO. 40

TO FACILITY OPERATING LICENSE NO. NPF-16

DOCKET NO. 50-389

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

Remove Pages	Insert Pages
3/4 1-7	3/4 1-7
3/4 1-8	3/4 1-8
--	3/4 1-8a
3/4 1-12	3/4 1-12
3/4 1-13	3/4 1-13
3/4 1-14	3/4 1-14
3/4 1-15	3/4 1-15
3/4 5-1	3/4 5-1
B3/4 1-2	B3/4 1-2
B3/4 1-3	B3/4 1-3
B3/4 5-3	B3/4 5-3
B3/4 6-3	B3/4 6-3

3/4.1.2 BORATION SYSTEMS

FLOW PATHS - SHUTDOWN

LIMITING CONDITION FOR OPERATION

3.1.2.1 As a minimum, one of the following boron injection flow paths shall be OPERABLE and capable of being powered from an OPERABLE emergency power source:

a. A flow path from the boric acid makeup tank via either a boric acid makeup pump or a gravity feed connection and any charging pump to the Reactor Coolant System if only the boric acid makeup tank in Specification 3.1.2.7a. is OPERABLE, or

b. The flow path from the refueling water tank via either a charging pump or a high pressure safety injection pump to the Reactor Coolant System if only the refueling water tank in Specification 3.1.2.7b. is OPERABLE.

APPLICABILITY: MODES 5 and 6.

ACTION:

With none of the above flow paths OPERABLE or capable of being powered from an OPERABLE emergency power source, suspend all operations involving CORE ALTERATIONS or positive reactivity changes.

SURVEILLANCE REQUIREMENTS

4.1.2.1 At least one of the above required flow paths shall be demonstrated OPERABLE:

a. At least once per 31 days by verifying that each valve (manual, power-operated, or automatic) in the flow path that is not locked, sealed, or otherwise secured in position, is in its correct position.

b. At least once per 24 hours when the Reactor Auxiliary Building air temperature is less than 55°F by verifying that the Boric Acid Makeup Tank solution temperature is greater than 55°F (when the flow path from the Boric Acid Makeup Tank is used).

FLOW PATHS - OPERATING

LIMITING CONDITION FOR OPERATION

3.1.2.2 At least two of the following three boron injection flow paths shall be OPERABLE:

a. One flow path from the boric acid makeup tank(s) with the tank meeting Specification 3.1.2.8 part a) or b), via a boric acid makeup pump through a charging pump to the Reactor Coolant System.

b. One flow path from the boric acid makeup tank(s) with the tank meeting Specification 3.1.2.8 part a) or b), via a gravity feed valve through a charging pump to the Reactor Coolant System.

c. The flow path from the refueling water storage tank via a charging pump to the Reactor Coolant System.

OR

At least two of the following three boron injection flow paths shall be OPERABLE:

a. One flow path from each boric acid makeup tank with the combined tank contents meeting Specification 3.1.2.8 c), via both boric acid makeup pumps through a charging pump to the Reactor Coolant System.

b. One flow path from each boric acid makeup tank with the combined tank contents meeting Specification 3.1.2.8 c), via both gravity feed valves through a charging pump to the Reactor Coolant System.

c. The flow path from the refueling water storage tank, via a charging pump to the Reactor Coolant System.

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTION:

With only one of the above required boron injection flow paths to the Reactor Coolant System OPERABLE, restore at least two boron injection flow paths to the Reactor Coolant System to OPERABLE status within 72 hours or be in at least HOT STANDBY and borated to a SHUTDOWN MARGIN equivalent to at least 3000 pcm at 200°F within the next 6 hours; restore at least two flow paths to OPERABLE status within the next 7 days or be in COLD SHUTDOWN within the next 30 hours.

FLOW PATHS - OPERATING

SURVEILLANCE REQUIREMENTS

4.1.2.2 At least two of the above required flow paths shall be demonstrated OPERABLE:

a. At least once per 24 hours, when the Reactor Auxiliary Building air temperature is below 55°F, by verifying that the solution temperature of the Boric Acid Makeup Tanks is above 55°F.

b. At least once per 31 days by verifying that each valve (manual, power-operated or automatic) in the flow path that is not locked, sealed, or otherwise secured in position, is in its correct position.

c. At least once per 18 months during shutdown by verifying that each automatic valve in the flow path actuates to its correct position on an SIAS test signal.

d. At least once per 18 months by verifying that the flow path required by Specification 3.1.2.2a and 3.1.2.2b delivers at least 40 gpm to the Reactor Coolant System.

BORIC ACID MAKEUP PUMPS - SHUTDOWN

LIMITING CONDITION FOR OPERATION

3.1.2.5 At least one boric acid makeup pump shall be OPERABLE and capable of being powered from an OPERABLE emergency bus if only the flow path through the boric acid pump in Specification 3.1.2.1a. is OPERABLE.

APPLICABILITY: MODES 5 and 6.

ACTION:

With no boric acid makeup pump OPERABLE as required to complete the flow path of Specification 3.1.2.1a., suspend all operations involving CORE ALTERATIONS or positive reactivity changes.

SURVEILLANCE REQUIREMENTS

4.1.2.5 The above required boric acid makeup pump shall be demonstrated OPERABLE by verifying, that on recirculation flow, the pump develops a discharge pressure of greater than or equal to 90 psig when tested pursuant to Specification 4.0.5.

BORIC ACID MAKEUP PUMPS - OPERATING

LIMITING CONDITION FOR OPERATION

3.1.2.6 At least the boric acid makeup pump(s) in the boron injection flow path(s) required OPERABLE pursuant to Specification 3.1.2.2 shall be OPERABLE and capable of being powered from an OPERABLE emergency bus if the flow path through the boric acid pump(s) in Specification 3.1.2.2 is OPERABLE.

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTION:

With one boric acid makeup pump required for the boron injection flow path(s) pursuant to Specification 3.1.2.2 inoperable, restore the boric acid makeup pump to OPERABLE status within 72 hours or be in at least HOT STANDBY within the next 6 hours and borated to a SHUTDOWN MARGIN equivalent to at least 3000 pcm at 200°F; restore the above required boric acid makeup pump(s) to OPERABLE status within the next 7 days or be in COLD SHUTDOWN within the next 30 hours.

SURVEILLANCE REQUIREMENTS

4.1.2.6 The above required boric acid makeup pump(s) shall be demonstrated OPERABLE by verifying, that on recirculation flow, the pump(s) develop a discharge pressure of greater than or equal to 90 psig when tested pursuant to Specification 4.0.5.

BORATED WATER SOURCES - SHUTDOWN

LIMITING CONDITION FOR OPERATION

3.1.2.7 As a minimum, one of the following borated water sources shall be OPERABLE:

a. One boric acid makeup tank with a minimum borated water volume of 3550 gallons of 2.5 to 3.5 weight percent boric acid (4371 to 6119 ppm boron).

b. The refueling water tank with:

   1. A minimum contained borated water volume of 125,000 gallons,

   2. A minimum boron concentration of 1720 ppm, and

   3. A solution temperature between 40°F and 120°F.

APPLICABILITY: MODES 5 and 6.

ACTION:

With no borated water sources OPERABLE, suspend all operations involving CORE ALTERATIONS or positive reactivity changes.

SURVEILLANCE REQUIREMENTS

4.1.2.7 The above required borated water source shall be demonstrated OPERABLE:

a. At least once per 7 days by:

   1. Verifying the boron concentration of the water,

   2. Verifying the contained borated water volume of the tank, and

b. At least once per 24 hours by verifying the RWT temperature when it is the source of borated water and the outside air temperature is outside the range of 40°F and 120°F.

c. At least once per 24 hours when the Reactor Auxiliary Building air temperature is less than 55°F, by verifying that the boric acid makeup tank solution temperature is greater than 55°F when that boric acid makeup tank is required to be OPERABLE.

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 2A in accordance with Figure 3.1-1.

b. Boric Acid Makeup Tank 2B in accordance with Figure 3.1-1.

c. Boric Acid Makeup Tanks 2A and 2B 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 borated water volume of 417,100 gallons,

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

   3. A solution temperature of between 55°F and 100°F.

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTION:

a. With the above required boric acid makeup tank(s) inoperable, restore the tank(s) to OPERABLE status within 72 hours or be in at least HOT STANDBY within the next 6 hours and borated to a SHUTDOWN MARGIN equivalent to at least 3000 pcm at 200°F; restore the above required boric acid makeup tank(s) to OPERABLE status within the next 7 days or be in COLD SHUTDOWN within the next 30 hours.

b. With the refueling water tank inoperable, restore the tank to OPERABLE status within 1 hour or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

SURVEILLANCE REQUIREMENTS

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

a. At least once per 7 days by:

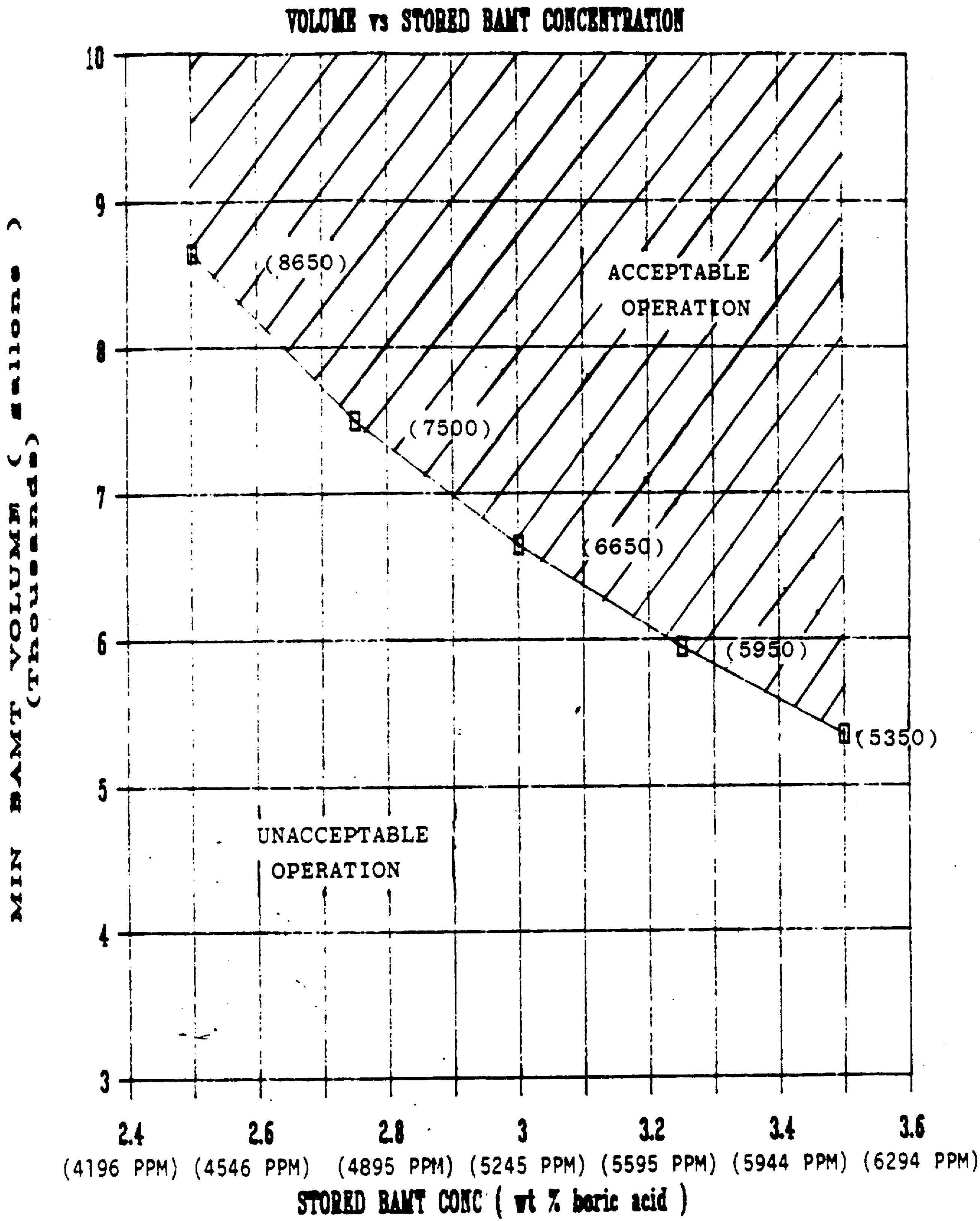
   1. Verifying the boron concentration in the water and

   2. Verifying the contained borated water volume of the water source.

b. At least once per 24 hours by verifying the RWT temperature when the outside air temperature is outside the range of 55°F and 100°F.

c. At least once per 24 hours when the Reactor Auxiliary Building air temperature is less than 55°F, by verifying that the boric acid makeup tank solution is greater than 55°F.

FIGURE 3.1-1 ST. LUCIE 2 MIN BAMT



BORON DILUTION

LIMITING CONDITION FOR OPERATION

3.1.2.9 Boron concentration shall be verified consistent with SHUTDOWN MARGIN requirements of Specifications 3.1.1.1, 3.1.1.2, and 3.9.1.

APPLICABILITY:

a. MODES 3, 4, and 5 with RCS level above the hot leg centerline by use of boronometer or sampling per Table 3.1-1, and

b. MODE 5 with RCS level below the hot leg centerline; and MODE 6 by sampling per Table 3.1-1.

ACTION:

a. With the boron concentration not consistent with required SHUTDOWN MARGIN, initiate emergency boration.

b. If unable to determine the RCS boron concentration by the means specified above, immediately suspend all operations involving CORE ALTERATIONS or positive reactivity changes until one of the means of determining the RCS boron concentration as specified above is restored to OPERABLE status.

c. The provisions of Specification 3.0.3 are not applicable.

SURVEILLANCE REQUIREMENTS

4.1.2.9

a. When in MODES 3, 4, 5, and 6, the boron concentration shall be determined consistent with SHUTDOWN MARGIN requirements once per 8 hours.

b. The boronometer, when used to monitor boron concentration, shall be demonstrated OPERABLE by performance of:

   1. a CHANNEL CHECK once per 12 hours, and

   2. a CHANNEL CALIBRATION once per 18 months.

c. Whenever performing an RCS heatup or cooldown, determine the boron concentration at least once every 50°F change in temperature.

3/4.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

3/4.5.1 SAFETY INJECTION TANKS

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 570 and 650 psig.

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

ACTION:

a. With one safety injection tank inoperable, except as a result of a closed isolation valve, restore the inoperable tank to OPERABLE status within 1 hour or be in at least HOT STANDBY within the next 6 hours and in HOT SHUTDOWN within the following 6 hours.

b. With one safety injection tank inoperable due to the isolation valve being closed, either immediately open the isolation valve or be in at least HOT STANDBY within 1 hour and be in HOT SHUTDOWN within the next 12 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 (by the absence of alarms) the contained borated water volume and nitrogen cover-pressure in the tanks, 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 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.

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.

4.5.1.2 Each safety injection tank water level and pressure channel shall be demonstrated OPERABLE:

a. At least once per 31 days by the performance of a CHANNEL FUNCTIONAL TEST.

b. At least once per 18 months by the performance of a CHANNEL CALIBRATION.

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 5000 pcm is required to control the reactivity transient. Accordingly, the SHUTDOWN MARGIN requirement is based upon this limiting condition and is consistent with FSAR safety analysis assumptions. At earlier times in core life, the minimum SHUTDOWN MARGIN required for the most restrictive conditions is less than 5000 pcm. With T_{avg} less than or equal to 200°F, the reactivity transients resulting from any postulated accident are minimal and a 3000 pcm SHUTDOWN MARGIN provides adequate protection.

3/4.1.1.3 BORON DILUTION

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 reductions in the Reactor Coolant System. A flow rate of at least 3000 gpm will circulate an equivalent Reactor Coolant System volume of 10,931 cubic feet in approximately 26 minutes. The reactivity change rate associated with boron concentration reductions will therefore be within the capability of operator recognition and control.

3/4.1.1.4 MODERATOR TEMPERATURE COEFFICIENT

The limitations on moderator temperature coefficient (MTC) are provided to ensure that the assumptions used in the accident and transient analysis remain valid through each fuel cycle. The surveillance requirements for measurement of the MTC during each fuel cycle are adequate to confirm the MTC value since this coefficient changes slowly due principally to the reduction in RCS boron concentration associated with fuel burnup. The confirmation that the measured MTC value is within its limit provides assurances that the coefficient will be maintained within acceptable values throughout each fuel cycle.

3/4.1.1.5 MINIMUM TEMPERATURE FOR CRITICALITY

This specification ensures that the reactor will not be made critical with the Reactor Coolant System average temperature less than 515°F. This limitation is required to ensure (1) the moderator temperature coefficient is within its analyzed temperature range, (2) the protective instrumentation is within its normal operating range, (3) the pressurizer is capable of being in an OPERABLE status with a steam bubble, and (4) the reactor pressure vessel is above its minimum RT_{NDT} 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 makeup 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 expected operating conditions of 3000 pcm after xenon decay and cooldown to 200°F. The maximum expected 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 Tank (BAMT) and Refueling Water Tank (RWT). This range is bounded by 5350 gallons of 3.5 weight percent (6119 ppm boron) from the BAMT and 16,000 gallons of 1720 ppm borated water from the RWT to 8650 gallons of 2.5 weight percent (4371 ppm boron) boric acid from BAMT and 12,000 gallons of 1720 ppm borated water from the RWT. A minimum of 35,000 gallons of 1720 ppm boron is required from the RWT if it is to be used to borate the RCS alone.

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 changes in the event the single injection system becomes inoperable.

The boron capability required below 200°F is based upon providing a 3000 pcm SHUTDOWN MARGIN after xenon decay and cooldown from 200°F to 140°F. This condition requires either 6750 gallons of 1720 ppm - 2100 ppm borated water from the refueling water tank or 3550 gallons of 2.5 to 3.5 weight percent boric acid solution from the boric acid makeup tanks.

The contained water volume limits includes allowance for water not available because of discharge line location and other physical characteristics.

The OPERABILITY of one boron injection system during REFUELING ensures that this system is available for reactivity control while in MODE 6.

The limits on contained water volume and boron concentration of the RWT also ensure a pH value of between 7.0 and 8.0 for the solution recirculated within containment after a LOCA. This pH band minimizes the evolution of iodine and minimizes the effect of chloride and caustic stress corrosion on mechanical systems and components.

3/4.1.2.9 BORON DILUTION

The simultaneous use of the boronometer and RCS sampling at intervals dependent upon the MODE and the number of OPERABLE charging pumps to monitor the RCS boron concentration provides diverse and redundant indications of an inadvertent boron dilution. This will allow detection with sufficient time for termination of the boron dilution event before a complete loss of SHUTDOWN MARGIN occurs.

3/4.1.3 MOVABLE CONTROL ASSEMBLIES

The specifications of this section ensure that (1) acceptable power distribution limits are maintained, (2) the minimum SHUTDOWN MARGIN is maintained, and (3) the potential effects of CEA misalignments are limited to acceptable levels.

The ACTION statements which permit limited variations from the basic requirements are accompanied by additional restrictions which ensure that the original design criteria are met.

The ACTION statements applicable to a stuck or untrippable CEA, to two or more inoperable CEAs and to a large misalignment (greater than or equal to 15 inches) of two or more CEAs, require a prompt shutdown of the reactor since either of these conditions may be indicative of a possible loss of mechanical functional capability of the CEAs and in the event of a stuck or untrippable CEA, the loss of SHUTDOWN MARGIN.

For small misalignments (less than 15 inches) of the CEAs, there is (1) a small effect on the time-dependent long-term power distributions relative to those used in generating LCOs and LSSS setpoints, (2) a small effect on the available SHUTDOWN MARGIN, and (3) a small effect on the ejected CEA worth used in the safety analysis. Therefore, the ACTION statement associated with small misalignments of CEAs permits a 1-hour time interval during which attempts may be made to restore the CEA to within its alignment requirements. The 1-hour time limit is sufficient to (1) identify causes of a misaligned CEA, (2) take appropriate corrective action to realign the CEAs, and (3) minimize the effects of xenon redistribution.

MOVABLE CONTROL ASSEMBLIES (Continued)

Overpower margin is provided to protect the core in the event of a large misalignment ($\geq$ 15 inches) of a CEA. However, this misalignment would cause distortion of the core power distribution. This distribution may, in turn, have a significant effect on (1) the available SHUTDOWN MARGIN, (2) the time-dependent long-term power distributions relative to those used in generating LCOs and LSSS setpoints, and (3) the ejected CEA worth used in the safety analysis. Therefore, the ACTION statement associated with the large misalignment of a CEA requires a prompt realignment of the misaligned CEA.

The ACTION statements applicable to misaligned or inoperable CEAs include requirements to align the OPERABLE CEAs in a given group with the inoperable CEA. Conformance with these alignment requirements bring the core, within a short period of time, to a configuration consistent with that assumed in generating LCO and LSSS setpoints. However, extended operation with CEAs significantly inserted in the core may lead to perturbations in (1) local burnup, (2) peaking factors, and (3) available shutdown margin which are more adverse than the conditions assumed to exist in the safety analyses and LCO and LSSS setpoints determination. Therefore, time limits have been imposed on operation with inoperable CEAs to preclude such adverse conditions from developing.

The requirement to reduce power in certain time limits depending upon the previous F_r^T is to eliminate a potential nonconservatism for situations when a CEA has been declared inoperable. A worst-case analysis has shown that a DNBR SAFDL violation may occur during the second hour after the CEA misalignment if this requirement is not met. This potential DNBR SAFDL violation is eliminated by limiting the time operation is permitted at full power before power reductions are required. These reductions will be necessary once the deviated CEA has been declared inoperable. This time allowed for continued operation at a reduced power level can be permitted for the following reasons:

1. The margin calculations which support the Technical Specifications are based on a steady-state radial peak of $F_r^T = 1.70$.
2. When the actual $F_r^T < 1.70$, significant additional margin exists.
3. This additional margin can be credited to offset the increase in F_r^T with time that can occur following a CEA misalignment.
4. This increase in F_r^T is caused by xenon redistribution.
5. The present analysis can support allowing a misalignment to exist for up to 63 minutes without correction, if the initial $F_r^T \leq 1.54$.

CONTAINMENT SPRAY SYSTEM (Continued)

The Containment Spray System and the Containment Cooling System provide post-accident cooling of the containment atmosphere. However, the Containment Spray System also provides a mechanism for removing iodine from the containment atmosphere and therefore the time requirements for restoring an inoperable spray system to OPERABLE status have been maintained consistent with that assigned other inoperable ESF equipment.

3/4.6.2.2 IODINE REMOVAL SYSTEM

The OPERABILITY of the Iodine Removal System ensures that sufficient N_2H_4 is added to the containment spray in the event of a LOCA. The limits on N_2H_4 volume and concentration ensure a minimum of 50 ppm of N_2H_4 concentration available in the spray for a minimum of 6.5 hours per pump for a total of 13 hours to provide assumed iodine decontamination factors on the containment atmosphere during spray function and ensure a pH value of between 7.0 and 8.0 for the solution recirculated within containment after a LOCA. This pH band minimizes the evolution of iodine and minimizes the effect of chloride and caustic stress corrosion on mechanical systems and components. The contained water volume limit includes an allowance for water not usable because of tank discharge line location or other physical characteristics. These assumptions are consistent with the iodine removal efficiency assumed in the safety analyses.

3/4.6.2.3 CONTAINMENT COOLING SYSTEM

The OPERABILITY of the Containment Cooling System ensures that (1) the containment air temperature will be maintained within limits during normal operation, and (2) adequate heat removal capacity is available when operated in conjunction with the Containment Spray Systems during post-LOCA conditions.

The Containment Cooling System and the Containment Spray System provide post-accident cooling of the containment atmosphere. As a result of this cooling capability, the allowable out-of-service time requirements for the Containment Cooling System have been appropriately adjusted. The allowable out-of-service time requirements for the Containment Spray System and Containment Cooling System have been maintained consistent with that assigned other inoperable ESF equipment since the Containment Spray System and Containment Cooling System also provide a mechanism for removing iodine from the containment atmosphere.

3/4.6.3 CONTAINMENT ISOLATION VALVES

The OPERABILITY of the containment isolation valves ensures that the containment atmosphere will be isolated from the outside environment in the event of a release of radioactive material to the containment atmosphere or pressurization of the containment and is consistent with the requirements of GDC 54 through GDC 57 of Appendix A to 10 CFR Part 50. Containment isolation within the time limits specified for those isolation valves designed to close automatically ensures that the release of radioactive material to the environment will be consistent with the assumptions used in the analyses for a LOCA.

3/4.6.4 COMBUSTIBLE GAS CONTROL

The OPERABILITY of the equipment and systems required for the detection and control of hydrogen gas ensures that this equipment will be available to maintain the hydrogen concentration within containment below its flammable limit during post-LOCA conditions. Either recombiner unit is capable of controlling the expected hydrogen generation associated with 1) zirconium-water reactions, 2) radiolytic decomposition of water and 3) corrosion of metals within containment. These hydrogen control systems are consistent with the recommendations of Regulatory Guide 1.7, "Control of Combustible Gas Concentrations in Containment Following a LOCA", March 1971.

The containment fan coolers and containment spray ensure adequate mixing of the containment atmosphere following a LOCA. This mixing action will prevent localized accumulations of hydrogen from exceeding the flammable limit.

3/4.6.5 VACUUM RELIEF VALVES

The OPERABILITY of the primary containment to atmosphere vacuum relief valves ensures that the containment internal pressure differential does not become more negative than 0.615 psi. This condition is necessary to prevent exceeding the containment design limit for internal pressure differential of 0.7 psi.

EMERGENCY CORE COOLING SYSTEMS

BASES

REFUELING WATER TANK (Continued)

The contained water volume limit includes an allowance for water not usable because of tank discharge line location or other physical characteristics.

The limits on contained water volume and boron concentration of the RWT also ensure a pH value of between 7.0 and 8.0 for the solution recirculated within containment after a LOCA. This pH band minimizes the evolution of iodine and minimizes the effect of chloride and caustic stress corrosion on mechanical systems and components.

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 40

TO FACILITY OPERATING LICENSE NO. NPF-16

FLORIDA POWER & LIGHT COMPANY, ET AL.

ST. LUCIE PLANT, UNIT NO. 2

DOCKET NO. 50-389

1.0 INTRODUCTION

By letter dated September 1, 1988, the Florida Power and Light Company (FP&L, the licensee) requested Technical Specifications changes for the St. Lucie Plant, Unit No. 2. The proposed changes would revise the requirements of the boric acid makeup system such that the boric acid concentration would be lowered, the water volume would be increased, and heat tracing of the circuits would no longer be required. In addition, the licensee reevaluated the post-LOCA containment sump chemistry to determine the effect of boric acid concentration reduction. The licensee also submitted Combustion Engineering report number CEN-365(L) entitled "Boric Acid Concentration Reduction Effort, Technical Bases and Operational Analysis," to serve as the technical basis for the proposed changes.

2.0 DISCUSSION

The proposed changes would modify the requirements for the boric acid makeup (BAMU) system, which is used to provide an adequate volume of borated water in the reactor coolant system (RCS) to assure that the shutdown margin is met in all modes of reactor operation. The boron contained in the BAMU system is not taken credit for in reactivity control during transients and accidents. Thus, the plant's accident analysis basis is not changed as a result of the proposed changes to the requirements of the BAMU system.

Presently, the minimum required boric acid concentration in water is 8 percent. This requires the minimum water temperature to be approximately 105°F. In practice, the boric acid concentration has operational range, i.e., 8 to 12 weight percent in this case. Twelve weight percent boric acid concentration requires a water temperature of approximately 135°F. If the minimum water temperature is not maintained for a given boric acid concentration, the boron in the boric acid will precipitate out of solution and solidify at the bottom of tanks and piping. If the boron starts to precipitate, the BAMU system cannot be called upon to meet shutdown margin requirements. Thus, the water temperature in the BAMU system is continually being maintained by electrical means called heat tracing. The boric acid concentration can be lowered to an extent that heat tracing is not necessary, but other compensatory measures would also have to be taken.

The licensee proposed to delete the heat tracing requirement for the BAMU system. In order to do so, the licensee proposed to decrease the required boric acid concentration and increase the required borated water volume to offset the reduced concentration. The range of boric acid concentration is proposed to be reduced from 8.0 to 12.0 weight percent to 2.5 to 3.5 weight percent. This reduction in boric acid concentration will prevent boron precipitation at ambient temperatures in the auxiliary building after the heat tracing is removed. For example, the minimum water temperature necessary to keep the boron in solution is only 50°F. The range of borated water volume in a boric acid makeup tank is proposed to be changed from the approximate range of 6140 - 6520 gallons to the range of 5350 - 8650 gallons for Modes 1 through 4, and at least 3550 gallons (assumes 2.5 weight percent concentration) for Modes 5 and 6. The following Technical Specifications would be changed to effect the above described changes: TS 3/4.1.2.1, Boration Systems - Flow Paths - Shutdown; TS 3/4.1.2.2, Boration System - Flow Paths - Operation; TS 3.4.1.2.7, Borated Water Sources - Shutdown; and TS 3/4 1.2.8, Borated Water Sources - Operating.

3.0 EVALUATION

The proposed changes to the requirements for the BAMU system, the associated Technical Specifications changes, and the calculated results associated with the Combustion Engineering report are evaluated below.

3.1 Borated Capacity

The methodology and analytical results to support the request for the Technical Specifications changes are documented in Combustion Engineering report number CEN-365(L), and include two distinct series of calculations for the required and available boron concentration in the RCS to maintain a safe shutdown margin. Both are employed at each time of interest in the plant cooldown conditions.

3.1.1 Evaluation of Analysis for Required Boron Concentration

According to the licensee, the analysis for the required boron concentration is based on the shutdown requirements of Branch Technical Position 5.1, entitled "Design Requirements for the Residual Heat Removal System" (SRP Section 5.4.7). Specifically, the shutdown margin requirements are consistent with those specified in Technical Specifications 3.1.1.1 and 3.1.1.2 for operating Modes 1 through 4, and 5 through 6, respectively. Reasonable core physics parameters were used to calculate the boron concentration required to be present in the RCS for the shutdown margins required by the Technical Specifications.

In the analysis, the analytical and measurement uncertainties were included to ensure that the upper bound boron requirements were predicted. The uncertainties include -13% in scram worth, ±10% in moderator temperature feedback, ±15% in Doppler reactivity feedback, and the time constant of 26 hours for xenon decay to maximize the xenon poison effect.

The staff has reviewed the licensee's analysis for required boron concentration and finds the analysis acceptable.

3.1.2 Evaluation of Analysis for Available Boron Concentration

The licensee specified that the calculational method to determine the available boron concentration is based on a steady-state mass balance for boron in the entire RCS. It is assumed that the borated water added to the RCS is equal to the fluid volume contraction due to the cooldown while the pressurizer water level is maintained constant. In the analysis (CEN-365(L)), various core conditions were considered to minimize the available boron reactivity effect. The limiting core conditions identified and used in the analysis were (1) end-of-cycle conditions with initial RCS concentrations at zero ppm boron, (2) the core with the most reactive control rod fully stuck out, (3) plant power at 100% with 100% equilibrium xenon prior to initiation of plant shutdown, (4) a slow plant cooldown rate of 12.5°F/hr., (5) end-of-cycle moderator cooldown effects, and (6) end-of-cycle boron reactivity worths.

These assumptions are conservative with respect to minimizing the boron reactivity effects since assumptions (1) and (2) minimize the existing boron within the core and available scram worth, assumptions (3) and (4) maximize the xenon poison effect, and assumption (5) maximizes the boration requirements due to moderator cooldown effects.

End-of-cycle (EOC) inverse boron worth (IBW) data were used in combination with EOC reactivity insertion rates normalized to the most negative Technical Specification Moderator Temperature Coefficient (MTC) limit, since it was known that this yields results that are more limiting than the combination of actual MTC and actual IBW valves at all periods through the fuel cycle prior to EOC.

The use of a cooldown rate of 12.5°F/hr. is consistent with the plant test procedures for the boron mixing test performed during a natural circulation test at another Combustion Engineering plant. Included in CEN-365(L) is an analysis that demonstrates that the boration requirements for the fastest cooldown rate of 100°F/hr., as allowed by the Technical Specifications, is bounded by the case when the cooldown rate was limited to 12.5°F/hr.

The report (CEN-365(L)) uses a conservative method to calculate the required boron concentration necessary to maintain the shutdown margin required by Technical Specifications 3.1.1.1 and 3.1.1.2 during a safe shutdown scenario. A conservative RCS makeup scenario was used to demonstrate that the proposed boron concentration and volume requirements for the BAMU tanks will maintain the safe shutdown margins required by the Technical Specifications.

The staff agrees with the above licensee analysis, showing that the available boron meets the required boron concentration requirements, and finds it acceptable.

3.2 Transient and Accidents

The licensee addressed off-normal operations as follows. As stated in Section 2.6 of CEN-365(L), credit is not taken for boron addition to the RCS from the boric acid makeup tanks for the purpose of reactivity control in the accidents analyzed in Chapter 15 of the plant's Final Safety Analysis Report. The response of an operator, therefore, to such events as steam line break, overcooling, boron dilution, etc., will not be affected by a reduction in boric acid makeup tank (BAMT) concentration. In particular, the action statements associated with Technical Specification 3.1.1.2 require that boration be commenced at greater than 40 gallons per minute using a solution of at least 1720 ppm boron in the event that shutdown margin is lost. Such statements are conservatively based upon the refueling water tank concentration and are therefore independent of the amount of boron in the BAMTs. It should be noted that even after reducing the boron concentration in the BAMTs, the minimum boron concentration in these tanks is higher than 1720 ppm.

Similar to the Technical Specifications action steps in the event of a loss of shutdown margin, the operator guidance in Combustion Engineering's Emergency Procedure Guidelines (EPBs), CEN-152, Rev. 2, are also independent of specific boron concentration within the boric acid makeup tanks. Specifically, the acceptance criteria developed for the reactivity control section of the Functional Recovery Guidelines of CEN-152 are based upon a boron addition rate from the chemical and volume control system of 40 gallons per minute without reference to a particular boration concentration. Therefore, the reduction in boron concentration within the BAMTs has no impact on, and does not change, the guidance contained in the EPGs.

The staff agrees with the above licensee analysis and finds it acceptable.

3.3 Evaluation of the Impact on Containment Sump pH and Affected Equipment

The licensee reevaluated the post LOCA long-term containment sump inventory calculation to reflect the new operating parameters as a result of the reduction in boric acid concentration in the BAMTs.

Two scenarios were considered. The first would result in a maximum post-LOCA containment sump boric acid concentration and the second would result in a minimum boric acid concentration. Both scenarios were also analyzed for a loss of offsite power where only one emergency train was available during the LOCA (assume one emergency diesel generator fails to start). With this information, the licensee was able to calculate the pH value for each case.

The results of the calculation established that the post-LOCA long-term containment sump and spray chemistry shall have new bounding values for boric acid concentration and pH:

	Maximum	Minimum
Boric Acid Concentration	2225 ppm boron	0 ppm boron
pH	8.00	7.00

The licensee performed an analysis to determine if the new boric acid concentration and pH ranges affected equipment Environmental Qualification during a LOCA. The result of the analysis showed that the equipment in the containment is qualified for the new bounding valves of the boric acid concentrations and pH values.

The licensee also performed an evaluation to determine the effect of the new pH range on mechanical systems and components due to corrosion. By maintaining the pH of the long-term containment sump and spray system at between 7.0 and 8.0, the evolution of iodine and the effect of chloride and caustic stress are minimized.

3.4 Technical Specification Changes

The Technical Specifications changes and the reasons for their acceptability are provided below.

Technical Specification 3/4.1.2.1 Boration Systems Flow Paths - Shutdown

The proposed changes to the Technical Specifications eliminate the requirements for heat tracing of the BAMU system. The design purpose of heat tracing of the BAMU system is to maintain the temperature of fluid in the BAMU tanks and the boration flowpaths high enough to prevent the boric acid from precipitating. The proposed changes to TS 3/4.1.2.7 and TS 3/4.1.2.8 (explained later) reduce the concentration in the BAMU tanks to a maximum concentration of 3.5 weight percent boric acid, which will not precipitate at a borated water temperature higher than 55°F. Chemical analyses have shown that a 3.5 weight percent solution of boric acid will remain dissolved (i.e., will not precipitate or "plate out") at solution temperatures above 50°F. The proposed changes also include a surveillance requirement to ensure that the borated water source is operable by verifying that the temperature in the BAMU is above 55°F whenever the auxiliary building temperature is below 55°F. The 55°F requirement provides a 5°F margin, since the boron will remain in solution down to 50°F. Consistent with the new surveillance requirement above, the old surveillance requirement to verify the flow path temperature above the temperature limit line on Figure 3.1-1 has been deleted.

The licensee specified that the auxiliary building temperature will be monitored at the Boric Acid Makeup Station. Therefore, the Technical Specification changes are acceptable.

Technical Specification 3/4.1.2.2 Flow Paths - Operating

Currently, the Technical Specifications require two out of the following three flow paths for boron injection into the RCS: (1) a BAMU tank gravity feed path and associated heat tracing, (2) a BAMU tank path via a boric acid makeup pump and associated heat tracing, or (3) flow path from the refueling water tank.

The proposed change requires a flow path from any credited source of water (refueling water storage tank and/or BAMU tank (or tanks)) to be operable. These changes are consistent with the assumptions used in CEN-365(L).

The proposed changes to the Technical Specifications eliminate the requirement for heat tracing of the BAMU system. As in Technical Specification 3/4.1.2.1, deletion of the requirement to heat trace the BAMU system is consistent with the ability of the boric acid to remain in solution at temperatures above 50°F. The proposed changes include a surveillance requirement to assure that the borated water source is operable by verifying that the temperature in the BAMU is above 55°F whenever the auxiliary building temperature is below 55°F. As in Technical Specification 3/4.1.2.1, the old surveillance requirement for temperaure verification of the flow path from the BAMTs has been deleted. The Technical Specification changes are therefore acceptable.

Technical Specification 3/4.1.2.6 Boric Acid Makeup Pumps - Operating

Currently, this Technical Specification references Specification 3.1.2.2a, Flow Path - Operating. Due to the additional items which have been proposed to Specification 3.1.2.2 for the subject proposed amendment, reference to Specification 3.1.2.2a is no longer applicable. Therefore, reference to Specification 3.1.2.2a has been changed to reference Specification 3.1.2.2.

Technical Specification 3/4.1.2.7 Borated Water Sources - Shutdown

The existing Technical Specification requires that one of the two BAMU tanks and its associated heat tracing be operable with the tank containing 8 weight percent boron and a minimum content of 4,150 gallons. The proposed changes will delete the heat tracing operability requirement, lower the boric acid concentration to a range of 2.5 to 3.5 weight percent, change the minimum BAMT content to 3,550 gallons (assumes a minimum of 2.5 weight percent boric acid concentration), and modify the surveillance requirement to verify that the BAMU tank temperature is above 55°F whenever the auxiliary building temperature is below 55°F. As in Technical Specification 3/4.1.2.1, the old surveillance requirement to verify the temperature of the flow path from the boric acid makeup tanks has been deleted. These changes are consistent with the analysis presented in CEN-365(L), which demonstrates adequate boration capability at the lower boric acid concentrations and the ability for boric acid to remain in solution at these concentrations at temperatures above 50°F. Therefore, the Technical Specification changes are acceptable.

Figure 3.1-1 (for Operating Modes 1 through 4)

The existing figure specifies the minimum required BAMU water volume and temperature as a function of stored boric acid concentration for the various plant operating modes. The existing figure is applicable to either of the two BAMU tanks, each having a maximum capacity of 9,975 gallons. The revised figure specifies the minimum required water volume (contained in one or both BAMU tanks) as a function of boric acid concentration in the BAMU tank. This curve was generated in report CEN-365(L) for a minimum refueling water tank boron concentration of 1720 ppm boron. This curve conservatively bounds BAMU tank minimum required water volumes for conditions when the refueling water tank boron concentration is greater than 1720 ppm (a Technical Specification requirement). The range of boron concentration in the BAMU tank has been reduced from 8.0 to 12.0 weight percent boric acid to 2.5 to 3.5 weight percent. The upper range of the required borated water volume has been increased from 6,520 gallons (8 weight percent) to 8,650 gallons (2.5 weight percent). The lower range of the required borated water volume has been decreased from 6,140 gallons (12 weight percent) to 5,350 gallons (3.5 weight percent). The revised Figure 3.1-1 is consistent with the analytical results of CEN-365(L) for plant conditions at Operating Modes 1 through 4 to maintain the required safe shutdown margin. The temperature versus BAMT concentration curve has been removed from the Technical Specifications since it is no longer required. The revised figure is acceptable.

Technical Specification 3.1.2.8 Borated Water - Operating

The current Technical Specification requires that at least one BAMU tank and its associated heat tracing be operable with the contents of boric acid in the tank to be consistent with the existing Figure 3.1-1.

The existing Figure 3.1-1 specifies the volume of boric acid of 6,520 gallons at a minimum concentration of 8.0 weight percent to be maintained in the BAMU tank. The proposed changes provide a new range of boric acid concentration of 2.5 to 3.5 weight percent for one or both of the BAMU tanks. The revised volumes of Figure 3.1-1 lower the minimum water volume to 5,350 gallons. Deletion of the requirement to heat trace the BAMU system is consistent with the ability to maintain 2.5 to 3.5 weight percent boric acid in solution at temperatures above 50°F. The revised surveillance requirements delete verifying the BAMU tank temperature unless the auxiliary building temperature is below 55°F. For conservatism, this verification of temperature is done more frequently (24 hours versus 7 days) and the old surveillance requirement has been deleted.

Since the borated water source can be made up of one BAMU tank (1A or 1B) per the proposed Technical Specifications, and considering that one tank has a maximum capacity of 9,975 gallons, a minimum concentration of boric acid needs to be specified. The minimum weight percent boric acid is specified as 3.2 weight percent under these conditions. The proposed Technical Specification changes are acceptable.

Technical Specification 3/4.5.1 Safety Injection Tanks

The existing Technical Specification requires each reactor coolant system Safety Injection Tank (SIT) to contain a borated water volume of 1,540 cubic feet maximum in Modes 3 and 4 when the pressurizer is less than 1750 psia. The maximum SIT volumes specified are not consistent with the maximum volume requirement (1556 cubic feet) for the SIT's in Modes 1, 2 and 3 when the pressurizer pressure is above 1750 psia. Technical Specification 3/4.5 has been revised to correct the inconsistency.

Bases - 3/4.1.2 Boration Systems

The Technical Specifications define the required components for the boron injection system, which ensures that negative reactivity is available during each mode of operation, and define the boric acid concentration and volume requirements for the BAMU tank and refueling water tank (RWT).

Since heat tracing will no longer be required, the deletion of the heat tracing system, as part of the boron injection system components, has been deleted from the bases statements. This change is acceptable.

The permissible range of boric acid concentration and associated water volumes needs to be changed in the bases statements. The bases statement for Modes 1 through 4 now reads, "This range is bounded by 5,350 gallons of 3.5 weight percent (6119 ppm boron) from the BAMT and 16,000 gallons of 1720 ppm borated water from the RWT to 8,650 gallons of 2.5 weight percent (4371 ppm boron) boric acid from BAMT and 12,000 gallons of 1720 ppm borated water from the RWT." The Combustion Engineering report, Table 2-34, page 2-67, specified 4,842.2 gallons of 3.5 weight percent boric acid and 8,118.1 gallons of 2.5 weight percent boric acid for Modes 1 through 4.

The relationship between these values and the Technical Specification values is explained on page 2-21 of the Combustion Engineering report. Each value was rounded up to the nearest 50 gallons and 500 gallons was added to provide conservatism. For example, 8,118.1 gallons was rounded to 8,150 gallons, and adding an additional 500 gallons yields 8,650 gallons. Therefore, the proposed changes are acceptable.

The bases statement for Modes 5 and 6 specifies 3,500 gallons of 2.5 to 3.5 weight percent boric acid solution. The 3,550 gallon calculation in the Combustion Engineering report assumed 2.5 weight percent boric acid solution.

Thus, any concentration greater than 2.5 weight percent, up to and including 3.5 weight percent, is conservative. In addition, the 3,550 gallon value is made up of the following components. The Combustion Engineering report on page 2-11 specifies that 3,049.0 gallons of 2.5 weight percent boric acid solution is the required value per analysis. An additional 500 gallons was added to this figure for conservatism. Finally, the 3,549.0 gallon number was rounded up to the nearest 50 gallon value of 3,550 gallons. Therefore, the proposed changes are acceptable.

<u>Bases - 3/4.5 Emergency Core Cooling System</u> - <u>3/4.5.4 Refueling Water Tank</u>

The pH values for the solution recirculated within the containment after a LOCA were incorrectly specified as between 7.0 and 11.0. The correct pH is between 7.0 and 8.0. The bases have been revised to delineate the correct pH range.

<u>Bases - 3/4.6 Containment Systems</u> - <u>3/4 6.2.2 Iodine Removal System</u>

The pH values for the solution recirculated within the containment after a LOCA were incorrectly specified as between 7.0 and 11.0. The correct pH is between 7.0 and 8.0. The bases have been revised to delineate the correct pH range.

3.5 SUMMARY

The staff has reviewed the proposed changes to the St. Lucie Plant, Unit No. 2 Technical Specifications involving reduction in boric acid concentration and volume requirements for the BAMU system, and deletion of the requirement for heat tracing in the BAMU system. The staff concludes that the proposed changes are acceptable since the changes of boric acid requirements for the BAMU system do not reduce shutdown margin below the required values specified in Technical Specifications 3.1.1.1 and 3.1.1.2. Because the concentration of boric acid in the BAMU system has been reduced to a value which will not cause precipitation at ambient temperatures for the BAMU system, heat tracing in the BAMU system is not required. The proposed Technical Specifications are acceptable since they are consistent with the proposed changes to requirements for the BAMU system and are supported by the analytical results.

ENVIRONMENTAL CONSIDERATION

This amendment involves a change in the installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 or a change to a surveillance requirement. The staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously published a proposed finding that the amendment involves no significant hazards consideration and there has been no public comment on such finding. Accordingly, the amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR §51.22(c)(9). Pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendment.

CONCLUSION

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

Date: March 13, 1989

Principal Contributors:

J. Norris
S. Sun