July 16, 1991

Docket Nos. 50-250
and 50-251

DISTRIBUTION
See attached sheet

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

Dear Mr. Goldberg:

SUBJECT: TURKEY POINT UNITS 3 AND 4 - ISSUANCE OF AMENDMENTS RE: BORIC ACID CONCENTRATION REDUCTION (TAC NOS. 79192 AND 79193)

The Commission has issued the enclosed Amendment No. 144 to Facility Operating License No. DPR-31 and Amendment No. 139 to Facility Operating License No. DPR-41 for the Turkey Point Plant, Units Nos. 3 and 4, respectively. The amendments consist of changes to the Technical Specifications in response to your application transmitted by letter dated November 27, 1990, as supplemented June 12, 1991.

These amendments provide for reduction of the boric acid concentration in the boric acid tanks and removal of heat tracing from the tanks and from the boric acid makeup system piping and valves. The amendments also include changes in the action statements for related component inoperability which affects both units to provide for orderly, sequential dual unit shutdown.

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)

Rajender Auluck, Sr. Project Manager
Project Directorate II-2
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Enclosures:
1. Amendment No. 144 to DPR-31
2. Amendment No. 139 to DPR-41
3. Safety Evaluation

cc w/enclosures:
See next page

CP-1

OFC	:LA:PD22	:PE:PDII-2	:PM:PDII-2	:D:PDII-2	:OGC	:	:
NAME	:DMiller	:DDoyman:kdj	:RAuluck	:HBerkow	:	:	:
DATE	:6/28/91	:7/1/91	:7/1/91	:7/1/91	:7/02/91	:	:

OFFICIAL RECORD COPY
Document Name: AMEND TP 79192/93

Mr. J. H. Goldberg
Florida Power and Light Company

Turkey Point Plant

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DATED: July 16, 1991

AMENDMENT NO. 144 TO FACILITY OPERATING LICENSE NO. DPR-31-TURKEY POINT UNIT 3
AMENDMENT NO. 139 TO FACILITY OPERATING LICENSE NO. DPR-41-TURKEY POINT UNIT 4

Docket File
NRC & Local PDRs
PDII-2 Reading
S. Varga, 14/E/4
G. Lainas, 14/H/3
H. Berkow
D. Miller
D. Dorman
R. Auluck (2)
OGC-WF
R. Jones, 8-E-23
H. Abelson, 8-E-23
D. Hagan, 3302 MNBB
E. Jordan, 3302 MNBB
B. Grimes, 9/A/2
G. Hill (8), P-137
Wanda Jones, P-130A
C. Grimes, 11/F/23
ACRS (10)
GPA/PA
OC/LFMB
PD Plant-specific file [Gray File]
M. Sinkule, R-II
P. Madden 8/D/1
cc: Plant Service list

100040

DF01

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

FLORIDA POWER AND LIGHT COMPANY

DOCKET NO. 50-250

TURKEY POINT PLANT UNIT NO. 3

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 144
License No. DPR-31

1. The Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment by Florida Power and Light Company (the licensee) dated November 27, 1990, as supplemented June 12, 1991, 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, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 3.B of Facility Operating License No. DPR-31 is hereby amended to read as follows:

   (B) Technical Specifications and Environmental Protection Plan

   The Technical Specifications contained in Appendix A, as revised through Amendment No. 144, are hereby incorporated in the license. The Environmental Protection Plan contained in Appendix B is hereby incorporated into the license. The licensee shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

3. This license amendment is effective as of the date of 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: July 16, 1991

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

FLORIDA POWER AND LIGHT COMPANY

DOCKET NO. 50-251

TURKEY POINT PLANT UNIT NO. 4

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 139
License No. DPR-41

1. The Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment by Florida Power and Light Company (the licensee) dated November 27, 1990, as supplemented June 12, 1991, 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, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 3.B of Facility Operating License No. DPR-41 is hereby amended to read as follows:

   (B) <u>Technical Specifications and Environmental Protection Plan</u>

   The Technical Specifications contained in Appendix A, as revised through Amendment No. 139, are hereby incorporated in the license. The Environmental Protection Plan contained in Appendix B is hereby incorporated into the license. The licensee shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

3. This license amendment is effective as of the date of 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: July 16, 1991

ATTACHMENT TO LICENSE AMENDMENT

AMENDMENT NO. 144 FACILITY OPERATING LICENSE NO. DPR-31

AMENDMENT NO. 139 FACILITY OPERATING LICENSE NO. DPR-41

DOCKET NOS. 50-250 AND 50-251

Revise Appendix A as follows:

Remove Pages	Insert Pages
3/4 1-1	3/4 1-1
3/4 1-4	3/4 1-4
3/4 1-8	3/4 1-8
3/4 1-9	3/4 1-9
3/4 1-10	3/4 1-10
3/4 1-12	3/4 1-12
3/4 1-14	3/4 1-14
3/4 1-14a	3/4 1-14a
3/4 1-15	3/4 1-15
3/4 1-16	3/4 1-16
3/4 9-1	3/4 9-1
3/4 10-1	3/4 10-1
B 3/4 1-1	B 3/4 1-1
B 3/4 1-2	B 3/4 1-2
B 3/4 1-3	B 3/4 1-3
B 3/4 1-4	B 3/4 1-4
B 3/4 9-1	B 3/4 9-1

3/4.1 REACTIVITY CONTROL SYSTEMS

3/4.1.1 BORATION CONTROL

SHUTDOWN MARGIN - T_{avg} GREATER THAN 200°F

LIMITING CONDITION FOR OPERATION

3.1.1.1 The SHUTDOWN MARGIN shall be greater than or equal to the applicable value shown in Figure 3.1-1.

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

ACTION:

With the SHUTDOWN MARGIN less than the applicable value shown in Figure 3.1-1, immediately initiate and continue boration at greater than or equal to 16 gpm of a solution containing greater than or equal to 3.0 wt% (5245 ppm) boron or equivalent until the required SHUTDOWN MARGIN is restored.

SURVEILLANCE REQUIREMENTS

4.1.1.1.1 The SHUTDOWN MARGIN shall be determined to be greater than or equal to the applicable value shown in Figure 3.1-1:

a. Within 1 hour after detection of an inoperable control rod(s) and at least once per 12 hours thereafter while the rod(s) is inoperable. If the inoperable control rod is immovable or untrippable, the above required SHUTDOWN MARGIN shall be verified acceptable with an increased allowance for the withdrawn worth of the immovable or untrippable control rod(s);

b. When in MODE 1 or MODE 2 with K_{eff} greater than or equal to 1 at least once per 12 hours by verifying that control bank withdrawal is within the limits of Specification 3.1.3.6;

c. When in MODE 2 with K_{eff} less than 1, within 4 hours prior to achieving reactor criticality by verifying that the predicted critical control rod position is within the limits of Specification 3.1.3.6;

d. Prior to initial operation above 5% RATED THERMAL POWER after each fuel loading, by consideration of the factors of Specification 4.1.1.1.1e. below, with the control banks at the maximum insertion limit of Specification 3.1.3.6; and

*See Special Test Exceptions Specification 3.10.1.

SHUTDOWN MARGIN - T_{avg} LESS THAN OR EQUAL TO 200°F

LIMITING CONDITION FOR OPERATION

3.1.1.2 The SHUTDOWN MARGIN shall be greater than or equal to 1% Δk/k.

APPLICABILITY: MODE 5.

ACTION:

With the SHUTDOWN MARGIN less than 1% Δk/k, immediately initiate and continue boration at greater than or equal to 16 gpm of a solution containing greater than or equal to 3.0 wt% (5245 ppm) boron or equivalent until the required SHUTDOWN MARGIN is restored.

SURVEILLANCE REQUIREMENTS

4.1.1.2 The SHUTDOWN MARGIN shall be determined to be greater than or equal to 1% Δk/k:

a. Within 1 hour after detection of an inoperable control rod(s) and at least once per 12 hours thereafter while the rod(s) is inoperable. If the inoperable control rod is immovable or untrippable, the SHUTDOWN MARGIN shall be verified acceptable with an increased allowance for the withdrawn worth of the immovable or untrippable control rod(s); and

b. At least once per 24 hours by consideration of the following factors:

   1) Reactor Coolant System boron concentration,

   2) Control rod position,

   3) Reactor Coolant System average temperature,

   4) Fuel burnup based on gross thermal energy generation,

   5) Xenon concentration, and

   6) Samarium concentration.

3/4.1.2 BORATION SYSTEMS

FLOW PATH - 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 storage tanks via a boric acid transfer pump and a charging pump to the Reactor Coolant System if the boric acid storage tank in Specification 3.1.2.4a. is OPERABLE, or

b. The flow path from the refueling water storage tank via a charging pump to the Reactor Coolant System if the refueling water storage tank in Specification 3.1.2.4b. 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 7 days by verifying that the temperature of the rooms containing flow path components is greater than or equal to 55°F when a flow path from the boric acid tanks is used, and

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.

FLOW PATHS - OPERATING

LIMITING CONDITION FOR OPERATION

3.1.2.2 The following boron injection flow paths shall be OPERABLE:

a. The source path from a boric acid storage tank via a boric acid transfer pump to the charging pump suction*, and

b. At least one of the two source paths from the refueling water storage tank to the charging pump suction; and,

c. The flow path from the charging pump discharge to the Reactor Coolant System via the regenerative heat exchanger.

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

ACTION:

a. With no boration source path from a boric acid storage tank OPERABLE,

1. Demonstrate the OPERABILITY of the second source path from the refueling water storage tank to the charging pump suction by verifying the flow path valve alignment; and

2. Restore the boration source path from a boric acid storage tank to OPERABLE status within 72 hours or be in at least HOT STANDBY and borated to a SHUTDOWN MARGIN equivalent to at least 1% $\Delta k/k$ at 200°F within the next 6 hours; restore the boration source path from a boric acid storage tank to OPERABLE status within the next 72 hours or be in COLD SHUTDOWN within the next 30 hours.

b. With only one boration source path OPERABLE or the regenerative heat exchanger flow path to the RCS inoperable, restore the required flow paths to OPERABLE status within 72 hours or be in at least HOT STANDBY and borated to a SHUTDOWN MARGIN equivalent to at least 1% $\Delta k/k$ at 200°F within the next 6 hours; restore at least two boration source paths to OPERABLE status within the next 72 hours or be in COLD SHUTDOWN within the next 30 hours.

c. With the boration source path from a boric acid storage tank and the charging pump discharge path via the regenerative heat exchanger inoperable, within one hour initiate boration to a SHUTDOWN MARGIN equivalent to 1% $\Delta k/k$ at 200°F and go to COLD SHUTDOWN as soon as possible within the limitations of the boration and pressurizer level control functions of the CVCS.

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*The flow required in Specification 3.1.2.2.a above shall be isolated from the other unit from the boric acid transfer pump discharge to the charging pump suction.

SURVEILLANCE REQUIREMENTS

4.1.2.2 The above required flow paths shall be demonstrated OPERABLE:

a. At least once per 7 days by verifying that the temperature of the rooms containing flow path components is greater than or equal to 55°F when a flow path from the boric acid tanks is used;

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 by verifying that the flow path required by Specification 3.1.2.2a. and c. delivers at least 16 gpm to the RCS.

BORATED WATER SOURCE - SHUTDOWN

LIMITING CONDITION FOR OPERATION

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

a. A Boric Acid Storage System with:

1) A minimum indicated borated water volume of 2,900 gallons per unit,

2) A boron concentration between 3.0 wt% (5245 ppm) and 3.5 wt% (6119 ppm), and

3) A minimum boric acid tanks room temperature of 55°F.

b. The refueling water storage tank (RWST) with:

1) A minimum indicated borated water volume of 20,000 gallons,

2) A minimum boron concentration of 1950 ppm, and

3) A minimum solution temperature of 39°F.

APPLICABILITY: MODES 5 and 6.

ACTION:

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

SURVEILLANCE REQUIREMENTS

4.1.2.4 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 indicated borated water volume, and

3) Verifying that the temperature of the boric acid tanks room is greater than or equal to 55°F, when it is the source of borated water.

BORATED WATER SOURCES - OPERATING

LIMITING CONDITION FOR OPERATION

3.1.2.5 The following borated water sources shall be OPERABLE:

a. A Boric Acid Storage System with:

1) A minimum indicated borated water volume in accordance with Figure 3.1.2.5,

2) A boron concentration in accordance with Figure 3.1.2.5, and

3) A minimum boric acid tanks room temperature of 55°F.

b. The refueling water storage tank (RWST) with:

1) A minimum indicated borated water volume of 320,000 gallons,

2) A minimum boron concentration of 1950 ppm,

3) A minimum solution temperature of 39°F, and

4) A maximum solution temperature of 100°F.

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

ACTION:

a. With the required Boric Acid Storage System inoperable verify that the RWST is OPERABLE; restore the system 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 1% $\Delta k/k$ at 200°F; restore the Boric Acid Storage System to OPERABLE status within the next 72 hours or be in COLD SHUTDOWN within the next 30 hours.

b. With the RWST 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.

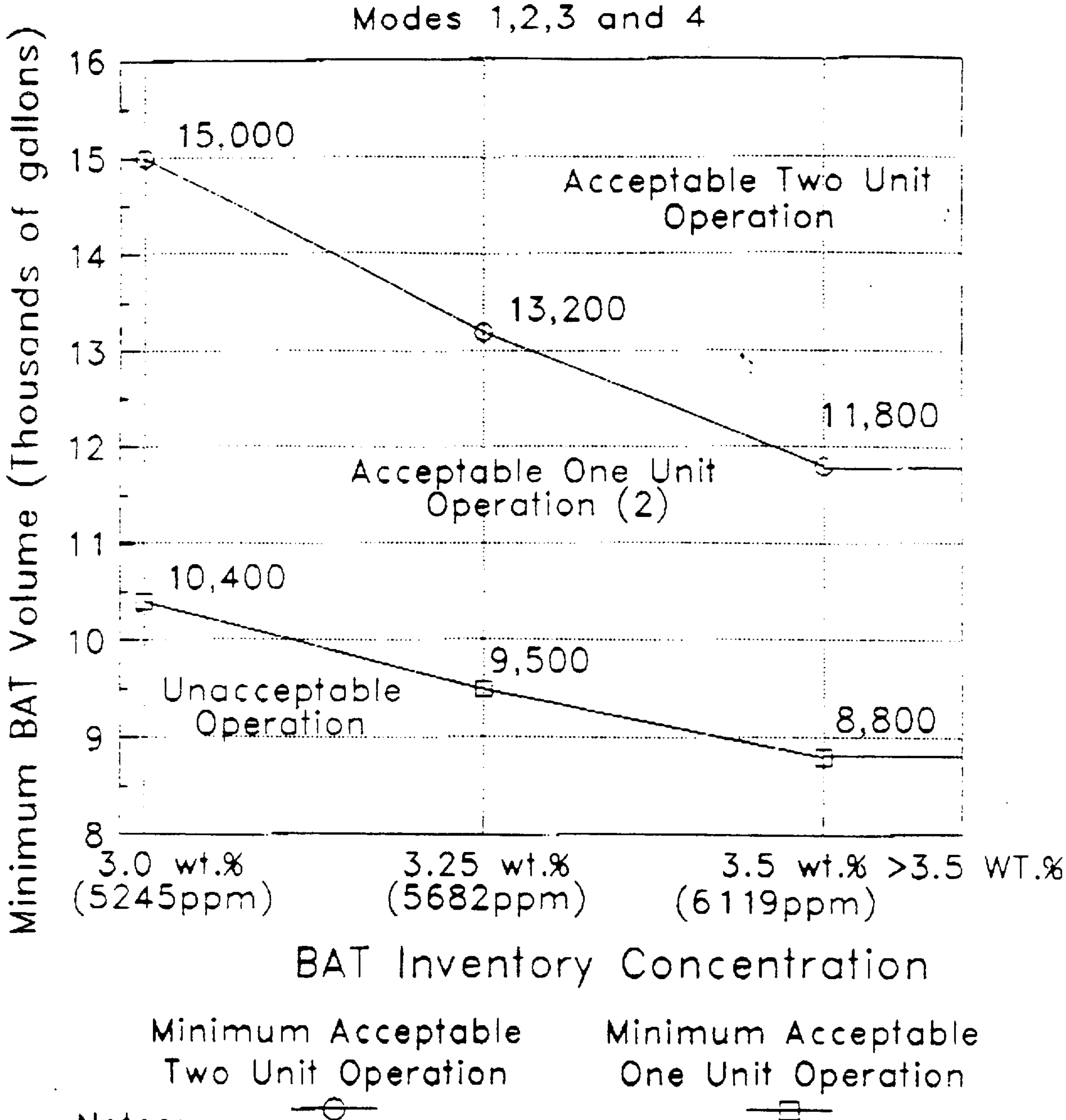
c. With the boric acid tank inventory concentration greater than 3.5 wt%, verify that the boric acid solution temperature for boration sources and flow paths is greater than the solubility limit for the concentration.

*If this action applies to both units simultaneously, be in at least HOT STANDBY within the next twelve hours.

Figure 3.1.2.5

BORIC ACID TANK MINIMUM VOLUME (1)

Modes 1,2,3 and 4



Notes:

(1) Combined volume of all available boric acid tanks assuming RWST boron concentration greater than or equal to 1950 ppm.

(2) Includes 2900 gallons for shutdown unit.

SURVEILLANCE REQUIREMENTS

4.1.2.5 Each borated water source shall be demonstrated OPERABLE:

a. At least once per 7 days by:

1) Verifying the boron concentration in the water,

2) Verifying the indicated borated water volume of the water source, and

3) Verifying that the temperature of the boric acid tanks room is greater than or equal to 55°F, when it is the source of borated water.

b. By verifying the RWST temperature is within limits whenever the outside air temperature is less than 39°F or greater than 100°F at the following frequencies:

1) Within one hour upon the outside temperature exceeding its limit for 23 consecutive hours, and

2) At least once per 24 hours while the outside temperature exceeds its limits.

HEAT TRACING

LIMITING CONDITION FOR OPERATION

(*)3.1.2.6 At least two independent channels of heat tracing shall be OPERABLE for the boric acid storage tank and for the heat traced portions of the associated flow paths required by Specification 3.1.2.2.

APPLICABILITY: MODES 1, 2, 3 and 4
MODES 5 and 6 (when the boric acid storage tank is the borated water source per Specification 3.1.2.4)

ACTION:

MODES 1, 2, 3 and 4

With only one channel of heat tracing on either the boric acid storage tank or on the heat traced portion of an associated flow path OPERABLE, operation may continue for up to 30 days provided the tank and flow path temperatures are verified to be greater than or equal to 145°F at least once per 8 hours; otherwise, be in at least HOT STANDBY within 6 hours and in COLD SHUTDOWN within the following 30 hours.

MODES 5 and 6

With only one channel of heat tracing on either the boric acid storage tank or on the heat traced portion of an associated flow path OPERABLE, operations involving CORE ALTERATIONS or positive reactivity additions may continue for up to 30 days provided the tank and flow path temperatures are verified to be greater than or equal to 145°F at least once per 8 hours; otherwise, suspend all activities involving CORE ALTERATIONS or positive reactivity changes.

SURVEILLANCE REQUIREMENTS

4.1.2.6 Each heat tracing channel for the boric acid storage tank and associated flow path required by Specification 3.1.2.2 shall be demonstrated OPERABLE:

a. At least once per 31 days by energizing each heat tracing channel, and

b. At least once per 7 days by verifying the tank and flow path temperatures to be greater than or equal to 145°F. The tank temperature shall be determined by measurement. The flow path temperature shall be determined by either measurement or recirculation flow until establishment of equilibrium temperatures within the tank.

*This is no longer applicable once boric acid tanks inventory and boric acid source and flow paths inventories have been diluted to less than or equal to 3.5 weight percent (wt%).

3/4.9 REFUELING OPERATIONS

3/4.9.1 BORON CONCENTRATION

LIMITING CONDITION FOR OPERATION

3.9.1 The boron concentration of all filled portions of the Reactor Coolant System and the refueling canal shall be maintained uniform and sufficient to ensure that the more restrictive of the following reactivity conditions is met; either:

a. A K_{eff} of 0.95 or less, or

b. A boron concentration of greater than or equal to 1950 ppm.

APPLICABILITY: MODE 6.*

ACTION:

With the requirements of the above specification not satisfied, immediately suspend all operations involving CORE ALTERATIONS or positive reactivity changes and initiate and continue boration at greater than or equal to 16 gpm of a solution containing greater than or equal to 3.0 wt% (5245 ppm) boron or its equivalent until K_{eff} is reduced to less than or equal to 0.95 or the boron concentration is restored to greater than or equal to 1950 ppm, whichever is the more restrictive.

SURVEILLANCE REQUIREMENTS

4.9.1.1 The more restrictive of the above two reactivity conditions shall be determined prior to:

a. Removing or unbolting the reactor vessel head, and

b. Withdrawal of any full-length control rod in excess of 3 feet from its fully inserted position within the reactor vessel.

4.9.1.2 The boron concentration of the Reactor Coolant System and the refueling canal shall be determined by chemical analysis at least once per 72 hours.

4.9.1.3 Valves isolating unborated water sources** shall be verified closed and secured in position by mechanical stops or by removal of air or electrical power at least once per 31 days.

4.9.1.4 The spent fuel pit boron concentration shall be determined at least once per 31 days.

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*The reactor shall be maintained in MODE 6 whenever fuel is in the reactor vessel with the vessel head closure bolts less than fully tensioned or with the head removed.

**The primary water supply to the boric acid blender may be opened under administrative controls for makeup.

3/4.10 SPECIAL TEST EXCEPTIONS

3/4.10.1 SHUTDOWN MARGIN

LIMITING CONDITION FOR OPERATION

3.10.1 The SHUTDOWN MARGIN requirement of Specification 3.1.1.1 may be suspended for measurement of control rod worth and SHUTDOWN MARGIN provided reactivity equivalent to at least the highest estimated control rod worth is available for trip insertion from OPERABLE control rod(s).

APPLICABILITY: MODE 2.

ACTION:

a. With any full-length control rod not fully inserted and with less than the above reactivity equivalent available for trip insertion, immediately initiate and continue boration at greater than or equal to 16 gpm of a solution containing greater than or equal to 3.0 wt% (5245 ppm) boron or its equivalent until the SHUTDOWN MARGIN required by Specification 3.1.1.1 is restored.

b. With all full-length control rods fully inserted and the reactor subcritical by less than the above reactivity equivalent, immediately initiate and continue boration at greater than or equal to 16 gpm of a solution containing greater than or equal to 3.0 wt% (5245 ppm), boron or its equivalent until the SHUTDOWN MARGIN required by Specification 3.1.1.1 is restored.

SURVEILLANCE REQUIREMENTS

4.10.1.1 The position of each full-length control rod either partially or fully withdrawn shall be determined at least once per 2 hours.

4.10.1.2 Each full-length control rod not fully inserted shall be demonstrated capable of full insertion when tripped from at least the 50% withdrawn position within 24 hours prior to reducing the SHUTDOWN MARGIN to less than the limits of Specification 3.1.1.1.

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. Figure 3.1-1 shows the SHUTDOWN MARGIN equivalent to 1.77% $\Delta k/k$ at the end-of-core-life with respect to an uncontrolled cooldown. Accordingly, the SHUTDOWN MARGIN requirement is based upon this limiting condition and is consistent with FSAR safety analysis assumptions. With T_{avg} less than 200°F, the reactivity transients resulting from an inadvertent cooldown of the RCS or an inadvertent dilution of RCS boron are minimal and a 1% $\Delta k/k$ SHUTDOWN MARGIN provides adequate protection.

The boron rate requirement of 16 gpm of 3.0 wt% (5245 ppm) boron or equivalent ensures the capability to restore the shutdown margin with one OPERABLE charging pump.

3/4.1.1.3 MODERATOR TEMPERATURE COEFFICIENT

The limitations on moderator temperature coefficient (MTC) are provided to ensure that the value of this coefficient remains within the limiting condition assumed in the FSAR accident and transient analyses.

The MTC values of this specification are applicable to a specific set of plant conditions; accordingly, verification of MTC values at conditions other than those explicitly stated will require extrapolation to those conditions in order to permit an accurate comparison.

The most negative MTC, value equivalent to the most positive moderator density coefficient (MDC), was obtained by incrementally correcting the MDC used in the FSAR analyses to nominal operating conditions. These corrections

MODERATOR TEMPERATURE COEFFICIENT (Continued)

involved subtracting the incremental change in the MDC associated with a core condition of all rods inserted (most positive MDC) to an all rods withdrawn condition and, a conversion for the rate of change of moderator density with temperature at RATED THERMAL POWER conditions. This value of the MDC was then transformed into the limiting MTC value -3.5×10^{-4} $\Delta k/k/^{\circ}F$. The MTC value of -3.0×10^{-4} $\Delta k/k/^{\circ}F$ represents a conservative value (with corrections for burnup and soluble boron) at a core condition of 300 ppm equilibrium boron concentration and is obtained by making these corrections to the limiting MTC value of -3.5×10^{-4} $\Delta k/k/^{\circ}F$.

The Surveillance Requirements for measurement of the MTC at the beginning and near the end of the fuel cycle are adequate to confirm that the MTC remains within its limits since this coefficient changes slowly due principally to the reduction in RCS boron concentration associated with fuel burnup.

3/4.1.1.4 MINIMUM TEMPERATURE FOR CRITICALITY

This specification ensures that the reactor will not be made critical with the Reactor Coolant System average temperature less than 541°F. This limitation is required to ensure: (1) the moderator temperature coefficient is within it analyzed temperature range, (2) the trip 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 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, and (4) boric acid transfer pumps.

With the RCS average temperature above 200°F, a minimum of two boron injection flow paths are required to ensure single functional capability in the event an assumed failure renders one of the flow paths inoperable. One flow path from the charging pump discharge is acceptable since the flow path components subject to an active failure are upstream of the charging pumps.

BORATION SYSTEMS (Continued)

The boration flow path specification allows the RWST and the boric acid storage tank to be the boron sources. Due to the lower boron concentration in the RWST, borating the RCS from this source is less effective than borating from the boric acid tank and additional time may be required to achieve the desired SHUTDOWN MARGIN required by ACTION statement restrictions. ACTION times allow for an orderly sequential shutdown of both units when the inoperability of a component(s) affects both units with equal severity. When a single unit is affected, the time to be in HOT STANDBY is 6 hours. When an ACTION statement requires a dual unit shutdown, the time to be in HOT STANDBY is 12 hours.

The ACTION statement restrictions for the boration flow paths allow continued operation in mode 1 for a limited time period with either boration source flow path or the normal flow path to the RCS (via the regenerative heat exchanger) inoperable. In this case, the plant capability to borate and charge into the RCS is limited and the potential operational impact of this limitation on mode 1 operation must be addressed. With both the flow path from the boric acid tanks and the regenerative heat exchanger flow path inoperable, immediate initiation of action to go to COLD SHUTDOWN is required but no time is specified for the mode reduction due to the reduced plant capability with these flow paths inoperable.

Two charging pumps are required to be OPERABLE to ensure single functional capability in the event an assumed failure renders one of the pumps or power supplies inoperable. Each bus supplying the pumps can be fed from either the Emergency Diesel Generator or the offsite grid through a startup transformer.

The boration capability of either flow path is sufficient to provide the required SHUTDOWN MARGIN in accordance with Figure 3.1-1 from expected operating conditions after xenon decay and cooldown to 200°F. The maximum expected boration capability requirement occurs at EOL peak xenon conditions without letdown such that boration occurs only during the makeup provided for coolant contraction. This requirement can be met for a range of boric acid concentrations in the boric acid tank and the refueling water storage tank. The range of boric acid tanks requirements is defined by Technical Specification 3.1.2.5.

With the RCS temperature below 200°F, one boron injection source flow path 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 boron injection system source flow path becomes inoperable.

The boron capability required below 200°F is sufficient to provide a SHUTDOWN MARGIN of 1% $\Delta k/k$ after xenon decay and cooldown from 200°F to 140°F. This condition requires either 2,900 gallons of at least 3.0 wt% (5245 ppm) borated water per unit from the boric acid storage tanks or 20,000 gallons of 1950 ppm borated water from the RWST.

BORATION SYSTEMS (Continued)

The charging pumps are demonstrated to be OPERABLE by testing as required by Section XI of the ASME code or by specific surveillance requirements in the specification. These requirements are adequate to determine OPERABILITY because no safety analysis assumption relating to the charging pump performance is more restrictive than these acceptance criteria for the pumps.

The boron concentration of the RWST in conjunction with manual addition of borax ensures that the solution recirculated within containment after a LOCA will be basic. The basic solution minimizes the evolution of iodine and minimizes the effect of chloride and caustic stress corrosion on mechanical systems and components. The temperature requirements for the RWST are based on the containment integrity and large break LOCA analysis assumptions.

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

The OPERABILITY requirement of 55°F and corresponding surveillance intervals associated with the boric acid tank system ensures that the solubility of the boron solution will be maintained. The temperature limit of 55°F includes a 5°F margin over the 50°F solubility limit of 3.5 wt.% boric acid. Portable instrumentation may be used to measure the temperature of the rooms containing boric acid sources and flow paths.

(*)One channel of heat tracing is sufficient to maintain the specified temperature limit. Since one channel of heat tracing is sufficient to maintain the specified temperature, operation with one channel out-of-service is permitted for a period of 30 days provided additional temperature surveillance is performed.

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 rod misalignment on associated accident analyses are limited. OPERABILITY of the control rod position indicators is required to determine control rod positions and thereby ensure compliance with the control rod alignment and insertion limits continue. OPERABLE condition for the analog rod position indicators is defined as being capable of indicating rod position to within ±12 steps of the demand counter position. For the Shutdown Banks and Control Banks A and B, the Position Indication requirement is defined as the group demand counter indicated position between 0 and 30 steps withdrawn inclusive, and between 200 and 228 steps withdrawn inclusive. This permits the operator to verify that the control rods in these banks are either fully withdrawn or fully inserted, the normal operating modes for these banks. Knowledge of these bank positions in these two areas satisfies all accident analysis assumptions concerning their position. For Control Banks C and D, the Position Indication requirement is defined as the group demand counter indicated position between 0 and 228 steps withdrawn inclusive.

(*)This is no longer applicable once boric acid tanks inventory and boric acid source and flow path inventories have been diluted to less than or equal to 3.5 weight percent (wt%).

BASES

3/4.9.1 BORON CONCENTRATION

The limitations on reactivity conditions during REFUELING ensure that: (1) the reactor will remain subcritical during CORE ALTERATIONS, and (2) a uniform boron concentration is maintained for reactivity control in the water volume having direct access to the reactor vessel. These limitations are consistent with the initial conditions assumed for the boron dilution incident in the safety analyses. With the required valves closed during refueling operations the possibility of uncontrolled boron dilution of the filled portion of the RCS is precluded. This action prevents flow to the RCS of unborated water by closing flow paths from sources of unborated water. The boration rate requirement of 16 gpm of 3.0 wt% (5245 ppm) boron or equivalent ensures the capability to restore the SHUTDOWN MARGIN with one OPERABLE charging pump.

3/4.9.2 INSTRUMENTATION

The OPERABILITY of the Source Range Neutron Flux Monitors ensures that redundant monitoring capability is available to detect changes in the reactivity condition of the core. There are four source range neutron flux channels, two primary and two backup. All four channels have visual and alarm indication in the control room and interface with the containment evacuation alarm system. The primary source range neutron flux channels can also generate reactor trip signals and provide audible indication of the count rate in the control room and containment. At least one primary source range neutron flux channel to provide the required audible indication, in addition to its other functions, and one of the three remaining source range channels shall be OPERABLE to satisfy the LCO.

3/4.9.3 DECAY TIME

The minimum requirement for reactor subcriticality prior to movement of irradiated fuel assemblies in the reactor vessel ensures that sufficient time has elapsed to allow the radioactive decay of the short-lived fission products. This decay time is consistent with the assumptions used in the safety analyses.

3/4.9.4 CONTAINMENT BUILDING PENETRATIONS

The requirements on containment building penetration closure and OPERABILITY ensure that a release of radioactive material within containment will be restricted from leakage to the environment. The OPERABILITY and closure restrictions are sufficient to restrict radioactive material release from a fuel element rupture based upon the lack of containment pressurization potential while in the REFUELING MODE.

3/4.9.5 COMMUNICATIONS

The requirement for communications capability ensures that refueling station personnel can be promptly informed of significant changes in the facility status or core reactivity conditions during CORE ALTERATIONS.

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 144 TO FACILITY OPERATING LICENSE NO. DPR-31

AND AMENDMENT NO.139 TO FACILITY OPERATING LICENSE NO. DPR-41

FLORIDA POWER AND LIGHT COMPANY

TURKEY POINT UNIT NOS. 3 AND 4

DOCKET NOS. 50-250 AND 50-251

1.0 INTRODUCTION

By letter dated November 27, 1990, as supplemented June 12, 1991, Florida Power and Light Company (FPL or the licensee) requested amendments to Facility Operating Licenses DPR-31 and DPR-41 for Turkey Point Units 3 and 4, respectively. The proposed revisions reflect the licensee's plans to reduce the boron concentration required to be maintained in the three boric acid tanks (BATs) which serve Units 3 and 4. At the reduced concentration, the need to heat trace the BATs and the piping and valves in the boric acid makeup system (BAMS) will be eliminated. The normally anticipated ambient temperatures in the auxiliary building (where this equipment is located) are sufficiently high to prevent boric acid precipitation and deposits at the reduced concentration. To provide a technical basis for the proposed changes, the licensee's submittal included Combustion Engineering Report No. 849963-MPS-5MISC-003 entitled, "Boric Acid Concentration Reduction Technical Bases and Operational Analysis." The June 12, 1991 letter provided supplemental information which did not change the initial proposed no significant hazards consideration determination.

The current minimum boron concentration required for each of the three BATs is 20,000 ppm (or 11.4 weight percent). To keep boric acid in solution at this concentration, heating networks must maintain the BATs and BAMS piping and valves at a temperature above 145°F. This concentration and the current minimum BAT level (3080 gallons) are based on the ability to borate the reactor coolant system (RCS) to the required cold shutdown concentration through a feed-and-bleed process. Prior to commencing cooldown, the RCS is borated to a concentration required to provide a shutdown margin of 1% delta-k/k at 200°F. This necessitates the existing high concentration in the BATs. In addition, the BAMS must provide blended makeup to compensate for coolant contraction as a result of cooldown. RCS boron concentration is maintained constant during the cooldown process.

The proposed reduction in boron concentration for the BATs is obtained through a basic change in methodology for carrying out the boration and cooldown operations. Rather than achieving the required boration prior to cooldown, boration is accomplished concurrently with cooldown as part of normal inventory makeup resulting from coolant contraction. By eliminating the boric acid loss resulting from the feed-and-bleed process, and by using the refueling water storage tank (RWST) to supplement the BATs for makeup, the minimum required boric acid concentration in the BATs can be reduced by a factor of approximately four (i.e., to 3.0 weight percent). To compensate for the reduced concentration, the borated water volume in the BATs is increased accordingly.

2.0 EVALUATION

2.1 Supporting Calculations

Two sets of calculations were provided in the licensee's submittal to support the proposed reduction in boron concentration for the BATs. The first calculation determines the minimum boron concentration required in the RCS to maintain a safe shutdown margin at any time (or temperature) during cooldown. The second calculation determines the expected boron delivery from the BATs and RWST to the RCS at any time during cooldown under specified cooldown scenarios. Maintenance of the shutdown margin is assured throughout cooldown provided that the actual amount of boron supplied to the RCS via makeup always maintains RCS boron concentration above the minimum value required. The following is the staff's evaluation of the licensee's calculations.

2.1.1 Required Boron Concentration

These calculations were performed using codes previously approved by the NRC. Shutdown margin requirements employed in the calculation for all operating modes are those specified in the Turkey Point TS (i.e., 1.77% delta-k/k above 200°F, 1% delta-k/k below 200°F). The reactivity balance performed takes into account the positive reactivity addition of moderator cooldown, as well as the positive reactivity addition of xenon decay. Conservative core physics assumptions were made to bound the reactivity effects of any cooldown scenario which may occur at any point in the fuel cycle, and to maximize boron demand. These assumptions included the following:

- End of cycle (EOC) moderator temperature coefficient (the most negative limit in TS 3.1.1.3 was used)
- EOC boron concentration of 0 ppm
- Xenon assumed to return to full power equilibrium level prior to initiation of cooldown
- A low cooldown rate (10°F/hr) to allow for significant xenon decay during cooldown
- A conservative scram worth (most reactive control rod stuck full out)
- EOC required shutdown margins (see above values)
- EOC inverse boron worth
- Conservative starting and end point temperatures for cooldown

In addition, appropriate analytical and measurement uncertainties were applied to all reactivity effects to ensure that upper bound boron requirements were predicted.

Based on the above, the staff finds the licensee's calculation for required boron concentration to be acceptable.

2.1.2 Expected Boron Delivery to RCS

This calculation establishes the new (reduced) BAT minimum concentration requirement and associated minimum volume requirements, as specified in the revised TS. By performing a boron mass balance, the actual boron concentrations in the RCS at various temperatures during a cooldown from 572°F to 135°F were determined. Normal coolant shrinkage resulting from the decreasing temperatures was calculated and borated water (from either the BATs or the RWST) was assumed delivered to the RCS to compensate for this shrinkage. Pressurizer level was assumed to be constant. With a known boron content of the makeup water, the accumulated boron in the RCS and, thus, the RCS boron concentration was determined for each temperature. In the cooldown scenario from hot standby to cold shutdown (200°F), the borated makeup water source is switched from the BATs to the RWST at some point during the process. Thus, the BAT minimum concentration and volume requirements are determined such that the RCS boron concentration is first raised to a level wherein subsequent makeup supplied solely by the RWST (at a lower concentration of 1950 ppm) is adequate to maintain the required safe shutdown margins. For Mode 5 cooldown from cold shutdown (200°F) to the refueling temperature (assumed at 135°F), the calculation was performed for two scenarios: using only the BATs as a source of makeup, and using only the RWST as a source of makeup. Various conservative assumptions were employed in these calculations concerning system volumes, makeup source temperatures, RCS leakage, letdown, and boron mixing in the RCS, in order to conservatively estimate boron delivery to the RCS.

The licensee has demonstrated that, for each of the cooldown scenarios presented, the calculated RCS boron concentration at each temperature exceeds the minimum required to maintain the specified shutdown margins, as determined by the calculations described earlier.

Based on the above, the staff finds that the licensee's calculation of actual boron concentration during cooldown is acceptable and provides an adequate basis for determining minimum concentration and volume requirements for the BATs.

2.2 Response to Emergency Situations

2.2.1 Transient and Accident Analyses

For the accidents and transients addressed in Chapter 14 of the Turkey Point Final Safety Analysis Report, credit is not taken for any concentrated boric acid addition from the BATs to the RCS for the purpose of controlling reactivity. The only boron source given such credit is the lower concentration

RWST. The only safety function associated with the boric acid contained in the BATs is maintenance of post-operation shutdown margin. The proposed reduction in BAT concentration, therefore, will not adversely impact the consequences of events such as boron dilution, a steam line break and overcooling.

2.2.2 Shutdown Margin Recovery

Current TS 3.1.1.1, 3.1.1.2, 3.9.1, and 3.10.1 require commencement of boration at greater than 4 gpm using a solution of at least 20,000 ppm boron in the event the required shutdown margin is lost. Therefore, the proposed reduction in BAT concentration by a factor of four will require a corresponding increase in delivery capacity to 16 gpm to ensure equivalent recovery capability. Accordingly, the licensee plans to modify the blended makeup flow control valve FCV-113A to accommodate this increased capacity for the normal boration flowpath. The staff finds this modification to be acceptable.

2.2.3 Emergency Boration

The licensee has examined the impact of the proposed BAT concentration reduction on the emergency boration flowpath from the boric acid transfer pump discharge directly to the charging pump suction. This flowpath utilizes the surge volume available in the pressurizer and assumes no letdown. The licensee has calculated the delivery volume required from the BATs (at the proposed reduced concentration) to achieve shutdown to hot zero power and has shown that this volume is well within the available pressurizer surge volume.

2.2.4 Appendix R Alternative Shutdown Reactivity Control Capability

As a result of a fire condition requiring the plant to be placed in a safe shutdown condition via the use of alternative shutdown capability, reactivity control would be provided by the following subsystems: (1) rod cluster control assemblies (RCCAs), and (2) boric acid addition via the Chemical Volume and Control System. The RCCAs are adequate to achieve and maintain subcritical conditions during long-term, hot standby conditions. In order to proceed with the cooldown from hot plant conditions, boric acid injection capability is required to assure reactivity control. Boron addition and RCS makeup for contraction during plant cooldown is achieved under these conditions by using a charging pump aligned to the refueling water storage tank. Therefore, the proposed reduction in BAT concentration will not impact the ability of the plant's alternative shutdown capability to achieve and maintain cold shutdown conditions and is considered acceptable.

2.3 Technical Specification Changes

The planned reduction in BAT boron concentration (from 20,000 ppm-22,500 ppm boron to 3.0 wt% (5245 ppm) - 3.5 wt% (6119 ppm) (boron)) requires that all TS containing the current values be revised to reflect the new values. Similarly, the corresponding increase in delivery capacity from 4 gpm to 16 gpm (discussed in 2.2.2 above) requires the appropriate TS revisions. The following TS are affected by these changes: 3.1.1.1, 3.1.1.2, 4.1.2.2.c, 3.1.2.4.a.2, 3.9.1, 3.10.1 (a and b), 3.1.2.5.a (1 and 2), and the associated Bases sections. Figure 3.1.2.5 has been added to TS 3.1.2.5 to define the new BAT operability requirements for volume and concentration. The volumes represented in the figure are the combined volumes of the three BATs, with allowance for minimum required volume for two operating units in Modes 1 through 4 and for one operating and one shutdown unit in Modes 5 and 6. For the shutdown unit, the minimum BAT volume required to provide a shutdown margin of 1% delta-k/k during cooldown from 200°F to refueling temperature, as specified in TS 3.1.2.4.a.1 (and associated Bases section) is changed from 500 gallons to 2900 gallons.

The elimination of the heat tracing networks for the BATs and BAMS piping and valves (no longer required at the reduced boron concentration) requires revisions to the relevant TS operability and surveillance requirements. The current TS require that at least once every 7 days operability of at least one boron flowpath from the BATs be demonstrated by verifying that the temperature of the heat traced portions of the path is greater than 145°F. The solubility temperature at the new maximum specified BAT boron concentration (3.5 wt%) is 50°F. With a 5°F margin added to this value, the revised surveillance requirements specify that the temperature of the rooms housing the boration flowpaths from the BATs be verified greater than 55°F at least once every 7 days. It should also be noted that the temperature of these rooms will be continuously monitored and a control room alarm will be provided. The following TS are affected by these changes: 4.1.2.1.a, 4.1.2.2.a, 3.1.2.4.a.3, 4.1.2.4.a.3, 3.1.2.5.a.3, 3.1.2.5.c, 4.1.2.5.a.3, 3.1.2.6 and the associated Bases sections.

Currently, Units 3 and 4 each have one dedicated BAT containing a boric acid volume that is adequate to accomplish cold shutdown for that unit. The third BAT serves as a backup for either unit. The current TS 3.1.2.2 requires that the entire boration source path for each unit, from the dedicated BAT via a boric acid transfer pump to the charging pump suction, be isolated from that of the other unit. Under the proposed modifications, all three BATs will be interconnected via the transfer pump suction line. This lineup will maximize the available volume from the BATs without requiring valve manipulations to access the entire inventory. New Figure 3.1.2.5 will ensure that the three BATs now shared between the two units will have the total minimum required volume to support both units. Isolation between units will now occur only from the transfer pump discharge to the charging pump suction. Because this portion of the flowpath contains the components which are subject to an active failure, the redundancy provided by the revised separation requirement is acceptable. Accordingly, the footnote to TS 3.1.2.2 is revised.

As a result of modifications accomplished by the Turkey Point Emergency Power System (EPS) Enhancement Project, the possibility exists that component inoperability may affect both units, requiring a dual unit shutdown. In order to allow for an orderly sequential shutdown of both units under these circumstances, the licensee proposed that 12 hours be allowed to place both units in HOT STANDBY. Where component inoperability affects only one unit, that unit must still be in HOT STANDBY within 6 hours, as currently required. Similar proposals for other equipment related to the EPS Enhancement Project have been previously approved by the NRC, and, therefore, this proposal is also acceptable. This change affects TS 3.1.2.5 and TS Bases 3/4.1.2.

The licensee's proposal also requested a change to the wording of TS Bases 3/4.1.2 with respect to charging pump emergency power supplies. This change was previously accepted and issued in Amendment Nos. 138 and 133.

3.0 SUMMARY

The staff has completed its review of the planned reduction in BAT boron concentration, the associated elimination of boric acid flowpath heat tracing, the resulting revisions to the relevant TS, and the analytical bases to support these actions, as described in the licensee's submittal. Based on the evaluation provided above, the licensee's planned modifications and revisions to the supporting TS are acceptable.

4.0 STATE CONSULTATION

Based upon the written notice of the proposed amendments, the Florida State official had no comments.

5.0 ENVIRONMENTAL CONSIDERATION

These amendments change a requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 and changes surveillance requirements. The NRC staff has determined that the amendments involve no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendments involve no significant hazards consideration and there has been no public comment on such finding (56 FR 4863). 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.

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