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

September 2, 1992

Docket No. 50-400

Mr. R. A. Watson
Senior Vice President
Nuclear Generation
Carolina Power & Light Company
Post Office Box 1551
Raleigh, North Carolina 27602

Dear Mr. Watson:

SUBJECT: ISSUANCE OF AMENDMENT NO. 30 TO FACILITY OPERATING LICENSE NPF-63 REGARDING CHANGE IN REFUELING WATER STORAGE TANK AND SAFETY INJECTION ACCUMULATOR BORON CONCENTRATION - SHEARON HARRIS NUCLEAR POWER PLANT, UNIT 1 (TAC NO. M82941)

The Nuclear Regulatory Commission has issued the enclosed Amendment No. 30 to Facility Operating License No. NPF-63 for the Shearon Harris Nuclear Power Plant, Unit 1. This amendment changes the Technical Specifications (TS) in response to your request dated March 10, 1992, as revised May 11, 1992, and July 10, 1992.

The amendment changes the TS to: (1) increase the boron concentration in the refueling water storage tank and the safety injection system accumulators from 2000-2200 ppmB to 2400-2600 ppmB, (2) increase the specified volume of NaOH in the spray additive tank from 2736-2912 gallons to 3268-3964 gallons and add the level range of 92-96 percent , (3) change the level of boric acid in the boric acid tank from 60 percent (21,400 gallons) to 74 percent (24,150 gallons) in Modes 1-4, and from 17 percent (7100 gallons) to 21 percent (6650 gallons) in Modes 5-6, and (4) reference the Core Operating Limits Report for determining the necessary reactor coolant system and refueling canal boron concentration.

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A copy of the related Safety Evaluation is enclosed. Notice of Issuance will be included in the Commission's regular bi-weekly Federal Register notice.

Sincerely,

Orignal signed by:

Ngoc B. Le, Project Manager
Project Directorate II-1
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Enclosures:
1. Amendment No. 30 to NPF-63
2. Safety Evaluation

cc w/enclosures:
See next page

OFC	LA:PDII-1	PM:PDII-1	OGC	D:PDII-1
NAME	PAnderson	TLe:sl	E. Holler	EAdensam
DATE	8/19/92	8/18/92	8/26/92	9/2/92

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FILENAME: A:\HAR82941.AMD

Mr. R. A. Watson
Carolina Power & Light Company

Shearon Harris Nuclear Power Plant,
Unit 1

cc:

Mr. H. Ray Starling
Manager - Legal Department
Carolina Power & Light Company
P. O. Box 1551
Raleigh, North Carolina 27602

Resident Inspector/Harris NPS
c/o U. S. Nuclear Regulatory Commission
Route 1, Box 315B
New Hill, North Carolina 27562

Mr. Gerald E. Vaughn, Vice President
Harris Nuclear Project
Harris Nuclear Plant
P. O. Box 165
New Hill, North Carolina 27562

Mr. H. A. Cole
Special Deputy Attorney General
State of North Carolina
P. O. Box 629
Raleigh, North Carolina 27602

Public Service Commission
State of South Carolina
P.O. Drawer 11649
Columbia, South Carolina 29211

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

Mr. C. S. Hinnant
Plant General Manager
Harris Nuclear Plant
P. O. Box 165
New Hill, North Carolina 27562

Mr. Dayne H. Brown, Director
Division of Radiation Protection
N. C. Department of Environmental,
Commerce & Natural Resources
P. O. Box 27687
Raleigh, North Carolina 27611-7687

Mr. R. B. Starkey
Vice President
Nuclear Services Department
Carolina Power & Light Company
P. O. Box 1551
Raleigh, North Carolina 27602

AMENDMENT NO. 30 TO FACILITY OPERATING LICENSE NO. NPF-63 - HARRIS, UNIT 1

[redacted]
NRC PDR
Local PDR
PDII-1 Reading
S. Varga (14E4)
E. Adensam
P. Anderson
N. Le
OGC
D. Hagan (MNBB 3302)
G. Hill (4) (P1-37)
Wanda Jones (P-130A)
C. Grimes (11E22)
H. Balukjian
R. C. Jones
ACRS (10)
OPA
OC/LFMB
E. Merschoff, RII

cc: Harris Service List

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

CAROLINA POWER & LIGHT COMPANY, et al.

DOCKET NO. 50-400

SHEARON HARRIS NUCLEAR POWER PLANT, UNIT 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 30
License No. NPF-63

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

   A. The application for amendment by Carolina Power & Light Company, (the licensee), dated March 10, 1992, as revised May 11, 1992, and July 10, 1992, 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 2.C.(2) of Facility Operating License No. NPF-63 is hereby amended to read as follows:

(2) Technical Specifications and Environmental Protection Plan

The Technical Specifications contained in Appendix A, and the Environmental Protection Plan contained in Appendix B, both of which are attached hereto, as revised through Amendment No. 30 , are hereby incorporated into this license. Carolina Power & Light Company 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 its issuance and shall be implemented within 30 days of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

Elinor G. Adensam

Elinor G. Adensam, Director
Project Directorate II-1
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Technical
Specifications

Date of Issuance: September 2, 1992

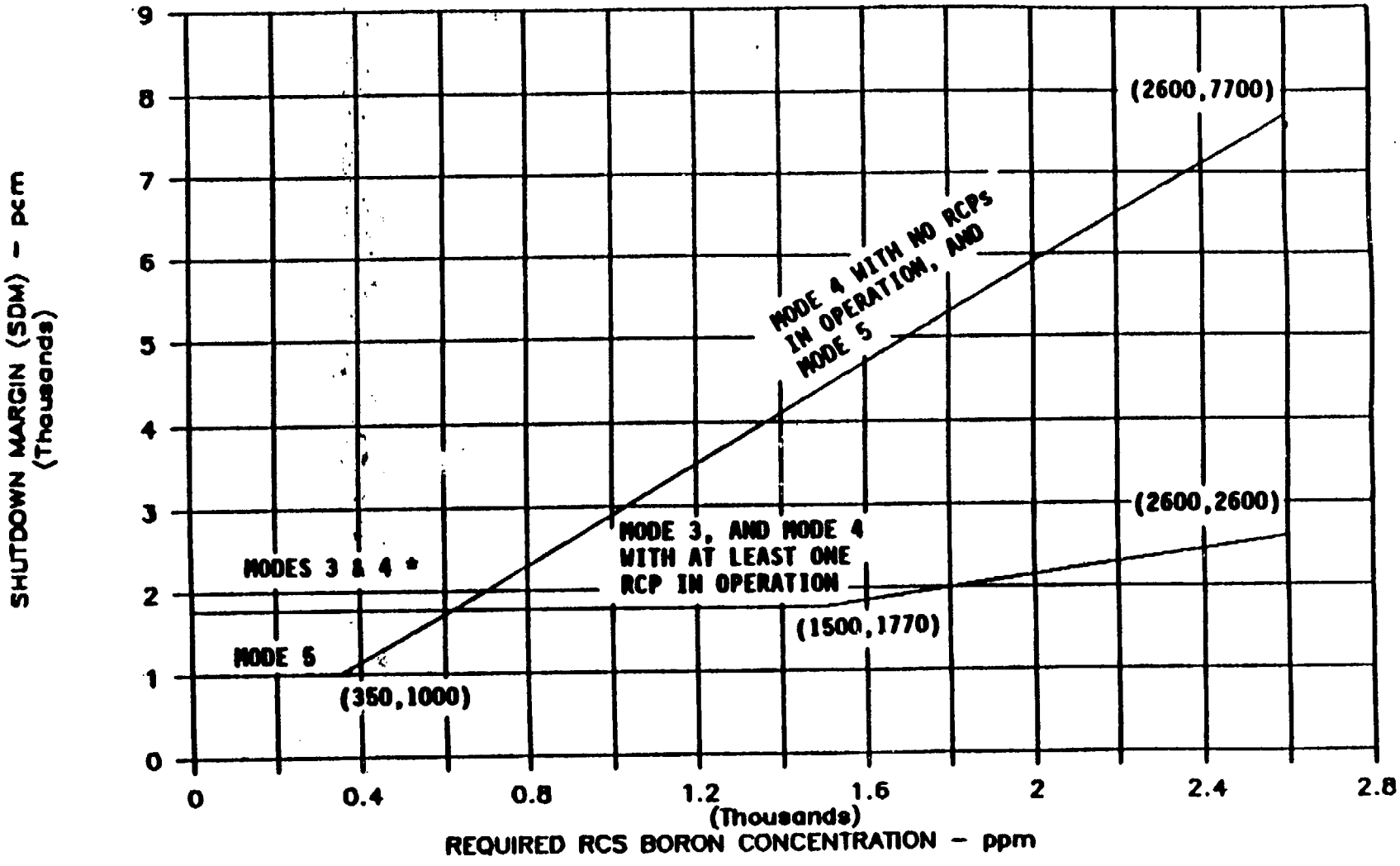
ATTACHMENT TO LICENSE AMENDMENT NO. 30

FACILITY OPERATING LICENSE NO. NPF-63

DOCKET NO. 50-400

Replace the following pages of the Appendix A Technical Specifications with the enclosed pages. The revised areas are indicated by marginal lines.

Remove Pages	Insert Pages
3/4 1-3a	3/4 1-3a
3/4 1-11	3/4 1-11
3/4 1-12	3/4 1-12
3/4 5-1	3/4 5-1
3/4 5-9	3/4 5-9
3/4 6-12	3/4 6-12
3/4 9-1	3/4 9-1
B 3/4 1-2a	B 3/4 1-2a
B 3/4 1-3	B 3/4 1-3
B 3/4 6-3	B 3/4 6-3
6-24	6-24



* Applicable to Mode 4, with or without RCPs in operation

FIGURE 3.1-1

SHUTDOWN MARGIN VERSUS RCS BORON CONCENTRATION

MODES 3, 4 AND 5/DRAINED

LIMITING CONDITION FOR OPERATION

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

a. The boric acid tank with:

1. A minimum contained borated water volume of 6650 gallons which is ensured by maintaining indicated level of greater than or equal to 21%,

2. A boron concentration of between 7000 and 7750 ppm, and

3. A minimum solution temperature of 65°F.

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

1. A minimum contained borated water volume of 106,000 gallons, which is equivalent to 12% indicated level,

2. A boron concentration of between 2400 and 2600 ppm, and

3. A minimum solution temperature of 40°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

4.1.2.5 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, and

3. Verifying the boric acid tank solution temperature when it is the source of borated water.

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

LIMITING CONDITION FOR OPERATION

3.1.2.6 As a minimum, the following borated water source(s) shall be OPERABLE as required by Specification 3.1.2.2:

a. The boric acid tank with:

1. A minimum contained borated water volume of 24,150 gallons, which is ensured by maintaining indicated level of greater than or equal to 74%,

2. A boron concentration of between 7000 and 7750 ppm, and

3. A minimum solution temperature of 65°F.

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

1. A minimum contained borated water volume of 436,000 gallons, which is equivalent to 92% indicated level.

2. A boron concentration of between 2400 and 2600 ppm,

3. A minimum solution temperature of 40°F, and

4. A maximum solution temperature of 125°F.

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

ACTION:

a. With the boric acid tank inoperable and being used as one of the above required borated water sources, restore the boric acid tank to OPERABLE status within 72 hours or be in at least HOT STANDBY within the next 6 hours and borated to a SHUTDOWN MARGIN as required by Figure 3.1-1 at 200°F; restore the boric acid tank to OPERABLE status within the next 7 days 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.

3/4.5 EMERGENCY CORE COOLING SYSTEMS

3/4.5.1 ACCUMULATORS

COLD LEG INJECTION

LIMITING CONDITION FOR OPERATION

3.5.1 Each Reactor Coolant System (RCS) accumulator shall be OPERABLE with:

a. The isolation valve open with power supply circuit breaker open,

b. A contained borated water volume of between 66 and 96% indicated level,

c. A boron concentration of between 2400 and 2600 ppm, and

d. A nitrogen cover-pressure of between 585 and 665 psig.

APPLICABILITY: MODES 1, 2, and 3*.

ACTION:

a. With one accumulator inoperable, except as a result of a closed isolation valve, restore the inoperable accumulator to OPERABLE status within 1 hour or be in at least HOT STANDBY within the next 6 hours and reduce pressurizer pressure to less than 1000 psig within the following 6 hours.

b. With one accumulator inoperable due to the isolation valve being closed, either immediately open the isolation valve or be in at least HOT STANDBY within 6 hours and reduce pressurizer pressure to less than 1000 psig within the following 6 hours.

SURVEILLANCE REQUIREMENTS

4.5.1.1 Each accumulator 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 accumulator isolation valve is open.

*RCS pressure above 1000 psig.

3/4.5.4 REFUELING WATER STORAGE TANK

LIMITING CONDITION FOR OPERATION

3.5.4 The refueling water storage tank (RWST) shall be OPERABLE with:

a. A minimum contained borated water volume of 436,000 gallons, which is equivalent to 92% indicated level.

b. A boron concentration of between 2400 and 2600 ppm of boron,

c. A minimum solution temperature of 40°F, and

d. A maximum solution temperature of 125°F.

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

ACTION:

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

SURVEILLANCE REQUIREMENTS

4.5.4 The RWST shall be demonstrated OPERABLE:

a. At least once per 7 days by:

1. Verifying the contained borated water volume in the tank, and
2. Verifying the boron concentration of the water.

b. At least once per 24 hours by verifying the RWST temperature when the outside air temperature is less than 40°F or greater than 125°F.

SPRAY ADDITIVE SYSTEM

LIMITING CONDITION FOR OPERATION

3.6.2.2 The Spray Additive System shall be OPERABLE with:

a. A Spray Additive Tank containing between 28 and 30 weight % NaOH and a contained volume of between 3268 and 3964 gallons which will be ensured by maintaining an indicated level between 92% and 96%, and

b. Two spray additive eductors each capable of adding NaOH solution from the chemical additive tank to a Containment Spray System pump flow.

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

ACTION:

With the Spray Additive System inoperable, restore the system to OPERABLE status within 72 hours or be in at least HOT STANDBY within the next 6 hours; restore the Spray Additive System to OPERABLE status within the next 48 hours or be in COLD SHUTDOWN within the following 30 hours.

SURVEILLANCE REQUIREMENTS

4.6.2.2 The Spray Additive System 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 6 months by:

1. Verifying the contained solution volume in the tank, and
2. Verifying the concentration of the NaOH solution by chemical analysis.

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 a containment spray or containment isolation phase A test signal as applicable; and

d. At least once per 5 years by verifying each eductor flow rate is between 19.5 and 20.5 gpm, using the RWST as the test source containing at least 436,000 gallons of water.

3/4.9 REFUELING OPERATIONS

3/4.9.1 BORON CONCENTRATION

LIMITING CONDITION FOR OPERATION

3.9.1.a 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:

(1) A boron concentration to maintain K_{eff} less than or equal to 0.95 as specified in the COLR, or

(2) A boron concentration of greater than or equal to 2000 ppm.

3.9.1.b The valves listed in Table 3.9-1 shall be in their positions required by Table 3.9-1.

APPLICABILITY: MODE 6.

ACTION:

a. With the requirements of Specification 3.9.1.a not satisfied, immediately suspend all operations involving CORE ALTERATIONS or positive reactivity changes, and initiate and continue boration at greater than or equal to 30 gpm of a solution containing greater than or equal to 7000 ppm boron or its equivalent until the boron concentration to maintain K_{eff} less than or equal to 0.95 as specified in the COLR, or the boron concentration is restored to greater than or equal to 2000 ppm, whichever is the more restrictive.

b. With the requirements of Specification 3.9.1.b not satisfied, immediately suspend all operations involving CORE ALTERATIONS or positive reactivity changes, and initiate action to return the valve(s) to the position required by Table 3.9-1.

SURVEILLANCE REQUIREMENTS

4.9.1.1 The more restrictive of the two reactivity conditions of Specification 3.9.1.a shall be determined prior to:

a. Removing or unbolting the reactor vessel head, and

b. Withdrawal of any 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 to be within the limits of Specification 3.9.1.a at least once per 72 hours.

4.9.1.3 At least once per 31 days, verify that the valves listed in Table 3.9-1 are in their positions required by Table 3.9-1.

BORATION SYSTEMS (Continued)

from full power equilibrium xenon conditions and requires 24,150 gallons of 7000 ppm borated water be maintained in the boric acid storage tanks or 436,000 gallons of 2400-2600 ppm borated water be maintained in the refueling water storage tank (RWST).

With the RCS temperature below 350°F, one boron injection flow path is acceptable without single failure consideration on the basis of the stable reactivity

BORATION SYSTEMS (Continued)

condition of the reactor and the additional restrictions prohibiting CORE ALTERATIONS and positive reactivity changes in the event the single boron injection flow path becomes inoperable.

The limitation for a maximum of one charging/safety injection pump (CSIP) to be OPERABLE and the Surveillance Requirement to verify all CSIPs except the required OPERABLE pump to be inoperable below 325°F provides assurance that a mass addition pressure transient can be relieved by the operation of a single PORV.

The boron capability required below 200°F is sufficient to provide the required SHUTDOWN MARGIN as defined by Specification 3/4.1.1.2 after xenon decay and cooldown from 200°F to 140°F. This condition requires either 6650 gallons of 7000 ppm borated water be maintained in the boric acid storage tanks or 106,000 gallons of 2400-2600 ppm borated water be maintained in the RWST.

The gallons given above are the amounts that need to be maintained in the tank in the various circumstances. To get the specified indicated levels used for surveillance testing, each value had added to it an allowance for the unusable volume of water in the tank, allowances for other identified needs, and an allowance for possible instrument error. In addition, for human factors purposes, the percent indicated levels were then raised to either the next whole percent or the next even percent and the gallon figures rounded off. This makes the LCO values conservative to the analyzed values.

The limits on contained water volume and boron concentration of the RWST also ensure a pH value of between 8.5 and 11.0 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 BAT minimum temperature of 65°F ensures that boron solubility is maintained for concentrations of at least the 7750 ppm limit. The RWST minimum temperature is consistent with the STS value and is based upon other considerations since solubility is not an issue at the specified concentration levels. The RWST high temperature was selected to be consistent with analytical assumptions for containment heat load.

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

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.

CONTAINMENT VENTILATION SYSTEM (Continued)

gross leakage failures could develop. The 0.60 L_a leakage limit of Specification 3.6.1.2b. shall not be exceeded when the leakage rates determined by the leakage integrity tests of these valves are added to the previously determined total for all valves and penetrations subject to Type B and C tests.

3/4.6.2 DEPRESSURIZATION AND COOLING SYSTEMS

3/4.6.2.1 CONTAINMENT SPRAY SYSTEM

The OPERABILITY of the Containment Spray System ensures that containment depressurization and cooling capability will be available in the event of a LOCA or steam line break. The pressure reduction and resultant lower containment leakage rate are consistent with the assumptions used in the safety analyses.

The Containment Spray System and the Containment Fan Coolers are redundant to each other in providing 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 SPRAY ADDITIVE SYSTEM

The OPERABILITY of the Spray Additive System ensures that sufficient NaOH is added to the containment spray in the event of a LOCA. The limits on NaOH volume and concentration ensure a pH value of between 8.5 and 11.0 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 solution volume limit includes an allowance for solution 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.

The maximum and minimum volumes for the Spray Additive Tank are based on the analytical limits. The specified indicated levels used for surveillance include instrument uncertainties and unusable tank volume.

3/4.6.2.3 CONTAINMENT COOLING SYSTEM

The OPERABILITY of the Containment Fan Coolers ensures that adequate heat removal capacity is available when operated in conjunction with the Containment Spray Systems during post-LOCA conditions.

The Containment Fan Coolers and the Containment Spray System are redundant to each other in providing post-accident cooling of the containment atmosphere.

6.9.1.6 CORE OPERATING LIMITS REPORT

6.9.1.6.1 Core operating limits shall be established and documented in the CORE OPERATING LIMITS REPORT (COLR), plant procedure PLP-106, prior to each reload cycle, or prior to any remaining portion of a reload cycle, for the following:

a. Moderator Temperature Coefficient Positive and Negative Limits and 300 ppm surveillance limit for Specification 3/4.1.1.3,

b. Shutdown Bank Insertion Limits for Specification 3/4.1.3.5,

c. Control Bank Insertion Limits for Specification 3/4.1.3.6,

d. Axial Flux Difference Limits, target band, and APL^{ND} for Specification 3/4.2.1,

e. Heat Flux Hot Channel Factor, F_Q^{RTP}, K(Z), W(Z), APL^{ND} and $W(Z)_{BL}$ for Specification 3/4.2.2,

f. Enthalpy Rise Hot Channel Factor, $F_{\Delta H}^{RTP}$, and Power Factor Multiplier, $PF_{\Delta H}$ for Specification 3/4.2.3.

g. Boron Concentration for Specification 3/4.9.1.

6.9.1.6.2 The analytical methods used to determine the core operating limits shall be those previously reviewed and approved by the NRC, specifically those described in the following documents:

a. WCAP-9272-P-A, "WESTINGHOUSE RELOAD SAFETY EVALUATION METHODOLOGY", July 1985 (W Proprietary).

(Methodology for Specification 3.1.1.3 - Moderator Temperature Coefficient, 3.1.3.5 - Shutdown Bank Insertion Limit, 3.1.3.6 - Control Bank Insertion Limit, 3.2.1 - Axial Flux Difference, 3.2.2 - Heat Flux Hot Channel Factor, 3.2.3 - Nuclear Enthalpy Rise Hot Channel Factor, and 3.9.1 - Boron Concentration).

b. WCAP-11914, "SAFETY EVALUATION SUPPORTING A MORE NEGATIVE EOL MODERATOR TEMPERATURE COEFFICIENT TECHNICAL SPECIFICATION FOR THE SHEARON HARRIS NUCLEAR POWER PLANT", August 1988 (W Proprietary). Approved by NRC Safety Evaluation dated May 22, 1989.

(Methodology for Specification 3.1.1.3 - Moderator Temperature Coefficient).

c. WCAP-10216-P-A, "RELAXATION OF CONSTANT AXIAL OFFSET CONTROL F_Q SURVEILLANCE TECHNICAL SPECIFICATION", JUNE 1983 (W Proprietary).

(Methodology for Specifications 3.2.1 - Axial Flux Difference (Relaxed Axial Offset Control) and 3.2.2 - Heat Flux Hot Channel Factor (F_Q Methodology for W(Z) surveillance requirements)).

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 30 TO FACILITY OPERATING LICENSE NO. NPF-63

CAROLINA POWER & LIGHT COMPANY

SHEARON HARRIS NUCLEAR POWER PLANT, UNIT 1

DOCKET NO. 50-400

1.0 INTRODUCTION

By letter dated March 10, 1992, as revised May 11, 1992, and July 10, 1992, the Carolina Power & Light Company (CP&L or the licensee) submitted a request for changes to the Shearon Harris Nuclear Power Plant, Unit 1, (Shearon Harris) Technical Specifications (TS). These changes would: (1) increase the limits for boron concentration in the refueling water storage tank (RWST) and the safety injection system (SIS) accumulators from 2000-2200 ppm to 2400-2600 ppm (TS Sections 3.1.2.5.b.2, 3.1.2.6.b.2, 3.5.1.c, 3.5.4.b and Figure 3.1-1, Shutdown Margin versus RCS (reactor coolant system) Boron Concentration; (2) increase the specified volume (level) of NaOH in the spray additive tank (SAT) from 2736-2912 gallons to 3268-3964 gallons and add the level range, 92-96 percent (TS Section 3.6.2.2.a.); (3) change the minimum level in the boric acid tank (BAT) from 60 percent (21,400 gallon) to 74 percent (24,150 gallons) in Modes 1-4, and from 17 percent (7100 gallons) to 21 percent (6650 gallons) (the minimum volume for the 21 percent indicated tank level is lower than the volume for the previous 17 percent indicated tank levels because of increased uncertainties applied to the indicated level of 21 percent) in Modes 5-6 (TS Sections 3.1.2.5.a.1 and 3.1.2.6.a.1); and (4) provide for specification of the boron concentration in the RCS and refueling canal via the Core Operating Limits Report (COLR), (TS Section 3.9.1.a and associated ACTION Statements 6.9.1.6.1 and 6.9.1.6.2). Additionally, the proposed changes were to standardize and clarify the TS wording used for the BAT, the safety injection accumulator, and the SAT, and to clarify the relationship between volume and level in the TS Bases.

2.0 BACKGROUND

Currently the operation of the Shearon Harris plant requires the use of wet annular burnable absorbers (WABAs) and other burnable poisons (BPs). By increasing the boron concentrations in the RWST and the safety injection accumulators, as well as adjusting BAT and SAT levels, the WABAs and many of the other BPs can be eliminated. Similar changes have previously been approved by the NRC for a number of other plants (Surry and Indian Point 3).

3.0 EVALUATION

The licensee has evaluated the effect of the proposed increased boron concentration limits on each of the Chapter 15 transients presented in the Shearon Harris FSAR. Increasing the maximum boron concentration in the RWST to 2600 ppm required reanalysis of the boron dilution accident, post-LOCA hot leg to cold leg switch over time, and post-LOCA containment sump pH after the RWST water mixes with RCS coolant and other water volumes.

In the letter dated July 10, 1992, the licensee stated that changing the RWST boron concentration does not affect the calculation of peak cladding temperature or the percentage of zirconium-water reaction analyzed in FSAR section 15.6.5. In the relatively short period covered by this calculation, the negative reactivity needed to shutdown power production in the core is provided by other means: void formation for large breaks and control rod insertion for small breaks.

Reanalysis of the boron dilution accident for Modes 3, 4, and 5 resulted in a slightly revised TS Figure 3.1-1 to ensure a minimum of 15 minutes for operator action prior to a loss of shutdown margin in a dilution accident and to ensure that all shutdown margin criteria satisfy all TS Bases. CP&L has found that the current analysis result for the inadvertent boron dilution event in Modes 1, 2, and 6 remains valid. Also, an inadvertent boron dilution event in Mode 6 is precluded by administrative procedures. The boron dilution event is sensitive to core design and is evaluated by CP&L in the reload safety evaluation (RSE) for each cycle.

A reanalysis of the post-LOCA cold leg to hot leg switchover time to ensure protection against boron precipitation (with 4 weight percent margin) in the RCS resulted in a change from 24 hours to 6.5 hours. This change is attributed, in part, to an improved, more conservative plant-specific model and partially to the increase in boron concentration.

The cold leg to hot leg switchover time and the NaOH level are independent of the fuel design and are not reevaluated in the RSE unless necessitated by other, non-fuel related, modifications.

Reanalysis of the post-LOCA containment sump pH after mixing with RCS coolant and other water volumes showed that the NaOH volume in the SAT must be increased to maintain a sump pH between 8.5 and 11.0. This pH range minimizes iodine evolution and chloride and caustic stress corrosion in the components

and systems needed for post-LOCA operations (TS Bases 3/4.1.2). To maintain sump pH between 8.5 and 11.0, the licensee proposed to increase the volume of the NaOH solution in the SAT to the range of 3268-3964 gallons. This range is 92-96 percent of the indicated level (about 50% of the tank's full capacity). These changes are presented in TS Section 3.6.2.2.a. The tank and structural supports were seismically qualified based on a full tank assuming a NaOH concentration of 30 percent and remain qualified with the proposed increase of NaOH solution volume in the tank.

The higher boron concentration in the RCS causes a very small increase in tritium production in the coolant but does not contribute significantly to offsite doses or to personnel doses. The post-LOCA hydrogen production may increase by about 3.5 percent because of higher boron concentration but this increase is considered insignificant.

The minimum and maximum boron concentration (2400 ppm-2600 ppm) required for the SIS accumulators is consistent with that required for the RWST and is given in TS Section 3.5.1.c for Modes 1 and 2, and Mode 3 if RCS pressure is greater than 1000 psig.

The minimum volume of boric acid in the BAT for Modes 1 to 4 was increased from 21,400 gallons to 24,150 gallons based on a minimum analytical limit together with the total unmeasurable channel uncertainty. The proposed new tank level, 74 percent, is based on the minimum analytical limit together with total indicated channel uncertainty. These changes are presented in TS Section 3.1.2.6.a.1. The tank and structural supports were seismically qualified assuming the tank was filled.

The minimum volume of boric acid in the BAT for Modes 5 and 6 was decreased from 7,100 gallons to 6650 gallons based on a minimum analytical limit together with the unmeasurable channel uncertainty. The proposed new tank level, 21 percent, is based on the minimum analytical limit together with total uncertainty in the indicator channel used for surveillance. These changes are presented in TS Section 3.1.2.5.a.1. Although the proposed new specifications have margin for anticipated variation of future core designs, the shutdown margin requirements for Modes 5 and 6 will be verified each cycle using approved methodology.

CP&L has determined that: (1) the higher boron concentration in the RWST, safety injection system (SIS), and RCS will have no adverse affect on the stainless steel container material, despite the slightly lower pH level at 2600 ppm than at 2200 ppm; (2) there is no danger of boron precipitation; and (3) corrosion of carbon steel by leakage of the more highly borated water will

not be increased significantly because the pH change is small and remains in the range where the corrosion rate is nearly independent of pH level. Also, although the volume of NaOH solution is increased, the concentration will not change. Therefore, equipment integrity remains unchanged.

To ensure a Keff equal or less than 0.95 during refueling operations (Mode 6), as required in TS Section 3.9.1.a, the minimum boron concentration as calculated each cycle will be provided in the COLR. The TS will require the more restrictive of either the value in the COLR or 2000 ppm.

4.0 SUMMARY

The staff has reviewed the effects of the proposed increased boron concentration limits on the Chapter 15 transients, the time to switchover between cold and hot leg recirculation following LOCA, the post-LOCA containment sump pH, and the equipment qualification requirements, and concludes that all pertinent safety criteria are satisfactorily met. Therefore, based on the above, the licensee's request to increase the specified boron concentration from 2000-2200 ppm to 2400-2600 ppm in the RWST and SIS accumulators; increase the specified volume of NaOH solution in the SAT from 2736-2912 gallons to 3268-3964 gallons and to add the indicated level range of 92-96 percent is acceptable. Also, the licensee's request to change the level of the BAT from 60 percent (21,400 gallons) to 74 percent (24,150 gallons) in Modes 1-4, and from 17 percent (7100 gallons) to 21 percent (6650 gallons) in Modes 5 and 6 and reference the COLR for determining the necessary RCS and refueling canal boron concentrations is acceptable.

5.0 STATE CONSULTATION

In accordance with the Commission's regulations, the State of North Carolina official was notified of the proposed issuance of the amendment. The State official had no comments.

6.0 ENVIRONMENTAL CONSIDERATION

The amendment changes a requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20. The NRC staff has determined that the 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 issued a proposed finding that the amendment involves no significant hazards consideration, and there has been no public comment on such finding (57 FR 13128 and 57 FR 34580). Accordingly, the amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9) and (c)(10). Pursuant to 10 CFR 51.22(b) no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendment.

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

Principal Contributor: H. Balukjian

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