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 FACIL: 50-400 Shearon Harris Nuclear Power Plant, Unit 1, Carolina

AUTH. NAME: STARKEY, R.B.      AUTHOR AFFILIATION: Carolina Power & Light Co.  
 RECIPIENT AFFILIATION: Document Control Branch (Document Control Desk)

SUBJECT: Revised application for amend to License NPF-63, changing TSs re RCS boron concentration & level of boric acid in Boric Acid Tank. Proposed TSs changes, supporting analyses & conclusions of 920310 submittal remain valid.

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NOTES: Application for permit renewal filed.      05000400

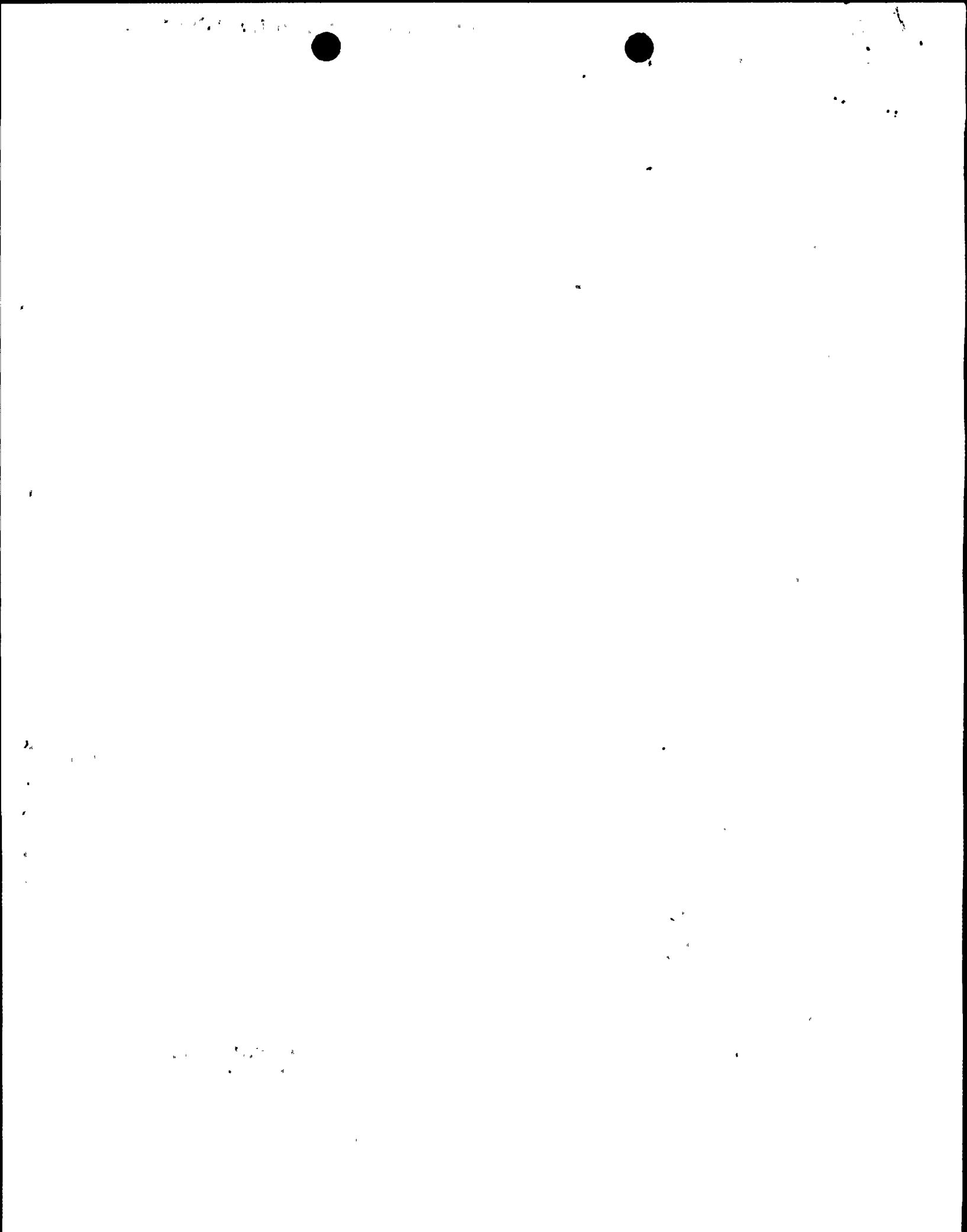
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# CP&L

Carolina Power & Light Company

P.O. Box 1551 • Raleigh, N.C. 27602

MAY 11 1992

R. B. STARKEY, JR.  
Vice President  
Nuclear Services Department

SERIAL: NLS-92-126  
10CFR50.90

United States Nuclear Regulatory Commission  
ATTENTION: Document Control Desk  
Washington, DC 20555

SHEARON HARRIS NUCLEAR POWER PLANT  
DOCKET NO. 50-400/LICENSE NO. NPF-63  
REVISION TO REQUEST FOR LICENSE AMENDMENT  
RWST AND SAFETY INJECTION ACCUMULATOR BORON CONCENTRATIONS; SPRAY ADDITIVE  
TANK AND BORIC ACID TANK LEVELS

Gentlemen:

On March 10, 1992, Carolina Power & Light Company (CP&L) submitted a Request for License Amendment for the Shearon Harris Nuclear Power Plant (SHNPP) pertaining to the Refueling Water Storage Tank (RWST) and Safety Injection Accumulator boron concentrations, and the Boric Acid Tank (BAT) and Spray Additive Tank (SAT) levels. The purpose of this letter is to revise the values submitted for the Boric Acid Tank.

CP&L recently revised its Nuclear Operating Plan by increasing the SHNPP assumed Cycle 5 capacity factor from 90 percent to 93 percent. This results in a fourteen Effective Full Power Day (EFPD) increase in the Cycle 5 core design. Due to this change, it will be necessary to use more Integral Fuel Burnable Absorbers (IFBAs), incorporate a number of Wet Annual Burnable Absorbers (WABAs) in the core, and revise the Boric Acid Tank levels for Cycle 5.

The proposed Technical Specification (TS) changes, supporting analyses, and conclusions which CP&L submitted on March 10, 1992 remain valid. However, the following changes to that submittal are necessary:

- Reactor Coolant System (RCS) boron concentration will be increased to permit reduction and eventual elimination of all of the Wet Annular Burnable Absorbers (WABAs) and many of the other Burnable Poisons (BPs).
- The level of boric acid in the Boric Acid Tank (BAT) will change 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 (Technical Specification Sections 3.1.2.5.a.1 and 3.1.2.6.a.1). The proposed indicated levels reflect the application of a more conservative setpoint methodology consistent with the guidance of Regulatory Guide 1.105.

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Enclosure 1 details, in accordance with 10CFR50.91(a), the basis for the Company's determination that the proposed changes do not involve a significant hazards consideration. Although the basis is unchanged from CP&L's March 10, 1992 submittal, it is being resubmitted to reflect the changes described above.

Enclosure 2 provides revised Technical Specification pages 3/4 1-11, 3/4 1-12, B 3/4 1-2a, and B 3/4 1-3.

In accordance with 10CFR50.91(b), CP&L is providing the State of North Carolina with a copy of the proposed license amendment.

As noted in CP&L's previous submittal, the NRC is requested to provide an acknowledgement on the acceptability of the proposed amendment by May 29, 1992. However, an issued amendment is not required until September 1, 1992. CP&L requests that the proposed amendment, once approved by the NRC, be issued with an effective date to be no later than 60 days from the issuance of the amendment.

Please refer any questions regarding this submittal to Mr. R. W. Prunty at (919) 546-7318.

Yours very truly,



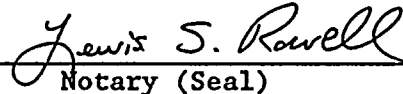
R. B. Starkey, Jr.

LSR/jbw

Enclosures:

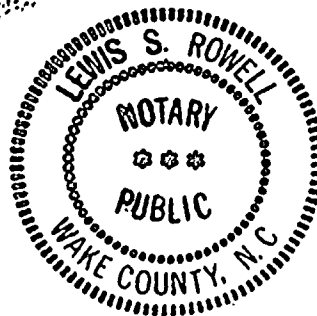
1. 10CFR50.92 Evaluation
2. Technical Specification Pages

R. B. Starkey, Jr., having been first duly sworn, did depose and say that the information contained herein is true and correct to the best of his information, knowledge and belief; and the sources of his information are officers, employees, contractors, and agents of Carolina Power & Light Company.

  
Notary (Seal)

My commission expires: 7/12/94

cc: Mr. Dayne H. Brown  
Mr. S. D. Ebnetter  
Ms. B. L. Mozafari  
Mr. J. E. Tedrow



SHEARON HARRIS NUCLEAR POWER PLANT  
DOCKET NO. 50-400/LICENSE NO. NPF-63  
REVISION TO REQUEST FOR LICENSE AMENDMENT  
RWST AND SAFETY INJECTION ACCUMULATOR BORON CONCENTRATION  
SPRAY ADDITIVE TANK AND BORIC ACID TANK LEVELS

10CFR50.92 EVALUATION

The Commission has provided standards in 10CFR50.92(c) for determining whether a significant hazards consideration exists. A proposed amendment to an operating license for a facility involves no significant hazards consideration if operation of the facility in accordance with the proposed amendment would not: (1) involve a significant increase in the probability or consequences of, an accident previously evaluated, (2) create the possibility of a new or different kind of accident from any accident previously evaluated, or (3) involve a significant reduction in a margin of safety. Carolina Power & Light Company has reviewed this proposed license amendment request and determined that its adoption would not involve a significant hazards determination. The bases for this determination are as follows:

Proposed Change

The proposed Technical Specification (TS) changes will provide for an increase in RCS boron concentration starting with Cycle 5. Reactor Coolant System (RCS) boron concentration will be increased to permit reduction and eventual elimination of all of the Wet Annular Burnable Absorbers (WABAs) and many of the other Burnable Poisons (BPs). Specifically, the proposed changes will:

- Increase the boron concentration in the Refueling Water Storage Tank (RWST) and Safety Injection System Accumulators from 2000-2200 ppmB to 2400-2600 ppmB (Technical Specification 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).
- Increase the specified volume of NaOH in the Spray Additive Tank (SAT) from 2736-2912 gallons to 3268-3964 gallons and add the level range, 92-96 percent (Technical Specification Section 3.6.2.2.a.).
- Change the level of boric acid in the Boric Acid Tank (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 5-6 (Technical Specification Sections 3.1.2.5.a.1 and 3.1.2.6.a.1). The proposed indicated levels reflect the application of a more conservative setpoint methodology consistent with the guidance of Regulatory Guide 1.105.
- Reference the Core Operating Limits Report (COLR) for determining the necessary RCS and refueling canal boron concentrations, thus assuring  $k_{eff} \leq 0.95$  during refueling operations (Technical Specification Section 3.9.1.a and associated ACTION statements 6.9.1.6.1 and 6.9.1.6.2).

Additionally, the proposed changes will revise Technical Specifications Bases Sections B 3/4.1.2 and B 3/4.6.2.2 to be consistent with the proposed changes above and to clarify the relationship and margins between the specified volumes and indicated levels.

Basis

These changes do not involve a significant hazards consideration for the following reasons:

1. The proposed amendment does not involve a significant increase in the probability or consequences of an accident previously evaluated.

- (a) Increase in Boron Concentration in the RWST and Safety Injection Accumulators: The higher boron concentration does not increase the accident initiation probability for any of the Final Safety Analysis Report (FSAR) events. CP&L has determined that a) the higher boron concentration in the RWST, SI System, and RCS will have no adverse effect on the stainless steel container materials, despite a slightly lower pH at 2600 ppmB than at 2200 ppmB; b) there is no danger of boron precipitation; and c) corrosion of carbon steel by leakage of the more highly borated water will not be increased significantly because the pH change is small and still in the range where corrosion rates are nearly independent of pH. Therefore, the probability of an accident is not increased by the higher boron concentration.

The higher boron concentration in the RCS causes a very small increase in tritium production rate in the coolant for a short period near the beginning of cycle. This does not contribute significantly to off-site doses or to personnel doses. All radionuclide source terms used in the FSAR off-site dose calculations remain unchanged because tritium is not currently modeled in the FSAR Chapter 15 off-site dose calculations. The post-LOCA hydrogen production may increase by about 3.5 percent (due to containment spray reacting with zinc) because of the higher boron concentration. This increase is considered insignificant. To ensure that the containment spray retains its capability of removing iodine from the containment atmosphere following a LOCA, and to ensure that the sump solution will retain the iodine, it is proposed to increase the NaOH volume in the Spray Additive Tank to maintain spray and sump pH between 8.5 and 11.0. Therefore, there will be no increase in the consequences of an accident previously evaluated due to the higher boron concentration.

- (b) Increase in NaOH Volume: Neither the Spray Additive Tank (SAT), the NaOH solution, nor failure of the tank contributes to the initiation of any FSAR Chapter 15 event. The proposed increase in NaOH volume does not increase any of the accident initiation probabilities. Therefore, the probability of an accident is not increased by the larger NaOH volume.

The increase in NaOH volume compensates for the higher boron concentration so that pH in the containment spray and sump remains between 8.5 and 11.0 for effective iodine absorption by the containment spray and iodine retention in the sump. Thus, the proposed amendment does not involve a significant increase in the consequences of any accidents due to the increase in boron concentration when the NaOH volume is also increased.

- (c) Change in Minimum Level of Boric Acid in the Boric Acid Tank: Neither the Boric Acid Tank, the boric acid, nor failure of the tank contributes to the initiation of any FSAR Chapter 15 event. The proposed change in minimum level does not increase any of the accident initiation probabilities. Therefore, the probability of each accident previously evaluated in the FSAR is not increased by the proposed minimum boric acid level.

The proposed change in minimum BAT volume is necessary to satisfy shutdown margin criteria via boration control due to the reduction and eventual elimination of the WABAs and reduction of the other burnable poisons. Shutdown margins are verified each cycle in the Reload Safety Evaluation. The BAT does not contribute to the consequences of any FSAR Chapter 15 accident. Thus, the consequences of each accident previously evaluated in the FSAR is not significantly increased by the proposed minimum boric acid volume.

- (d) Core Operating Limits Report: Boron concentration during refueling does not contribute to the initiation of any FSAR Chapter 15 event. The proposed change does not increase any of the accident initiation probabilities. It is concluded that the probability of each accident previously evaluated in the FSAR is not increased by the higher boron concentration.

The purpose of this proposed Technical Specification change is to ensure adequate shutdown during refueling. The consequences of the accidents previously evaluated in the FSAR are not increased by changing the Technical Specifications to refer to the COLR for a potentially more restrictive refueling boron concentration.

2. The proposed amendment does not create the possibility of a new or different kind of accident from any accident previously evaluated.

- (a) Increase in Boron Concentration in the RWST and Safety Injection Accumulators: The proposed changes do not change normal plant operations except as required to maintain the modified boron, lithium, and pH control program. No changes are made to system functional requirements and no new accident scenarios have been identified. Therefore, the proposed amendment does not create the possibility of a new or different kind of accident from any accident previously evaluated.

- (b) Increase in NaOH Volume: The proposed change does not change plant design or operation except to fill and maintain the SAT at the new level range. No new accidents have been identified. Therefore, the proposed increase in NaOH volume does not create the possibility of a new or different kind of accident from any accident previously evaluated.
- (c) Change in Minimum Level of Boric Acid in the Boric Acid Tank: The proposed change does not change plant design or operation except to maintain the proposed new minimum level. Therefore, the proposed increase in minimum boric acid level does not create the possibility of a new or different kind of accident from any accident previously evaluated.
- (d) Core Operating Limits Report: The proposed change does not change plant design or refueling operations except to require a boron concentration of  $\geq 2000$  ppmB or as specified in the Core Operating Limits Report (COLR), which ever is more limiting (higher). No new or different accident scenario has been identified. Therefore, the proposed increase in minimum boron concentration does not create the possibility of a new or different kind of accident from any accident previously evaluated.
3. The proposed amendment does not involve a significant reduction in a margin of safety.
- (a) Increase in Boron Concentration in the RWST and Safety Injection Accumulators: The inadvertent boron dilution event in Modes 3, 4 and 5 were reanalyzed and Technical Specification Figure 3.1-1 will be revised to ensure that all shutdown margin criteria satisfy all Bases despite the higher boron concentration. The current analysis results for the inadvertent boron dilution event in Modes 1, 2 and 6 remains valid since the analysis assumptions with respect to boron concentrations delineated in FSAR Section 15.4.6 are unchanged due to the increase in boron concentration. Furthermore, an inadvertent boron dilution event in Mode 6 is precluded by administrative procedures. All acceptance criteria in the Bases of Technical Specifications are satisfied without revision. The higher boron concentration together with the proposed revision to Figure 3.1-1 ensures that the Limiting Conditions for Operation are retained. The Reload Safety Evaluation will confirm that all applicable criteria are satisfied with no reduction in margins of safety. Therefore, the higher boron concentration does not involve a significant reduction in the margin of safety.
- (b) Increase in NaOH Volume: The permissible range of the proposed NaOH volume is larger than before; thus margins to the maximum and minimum Technical Specification limits will be easier to maintain. Since the structural and seismic analyses were based on the tank filled to capacity and the proposed volume will be about 50 percent of capacity, these analyses continue to have sufficient margin. The calculated containment spray and sump pH transients show ample margin within the required pH range, 8.5-11.0, for



solutions of 28-30 percent NaOH. Therefore, the proposed change does not involve a significant reduction in the margin of safety.

- (c) Change in Minimum Level of Boric Acid in the Boric Acid Tank: The margins of safety of interest are the shutdown margin criteria specified in the Technical Specification Bases 3/4.1.2. Those criteria are verified for the final fuel design and final core loading pattern each cycle in the Reload Safety Evaluation. The proposed minimum level, based on the Cycle 5 design, will provide adequate margin for future cycles. Therefore, the proposed minimum boric acid level does not involve a significant reduction in the margin of safety.
- (d) Core Operating Limits Report: The margins of safety of interest are the shutdown margin criteria specified in the Technical Specification Bases 3/4.9.1 and requires that  $k_{eff} \leq 0.95$ . Since this criterion is not measurable, it is proposed to specify the boron concentration necessary to achieve this criterion in the COLR for each reload. The Technical Specification will require the more restrictive of either the value in the COLR or 2000 ppmB. This change ensures that the shutdown margin specified in the Technical Specification Bases is satisfied. Therefore, the proposed change does not involve a significant reduction in the margin of safety.