ACCELERATED DISTRIBUTION DEMONSTRATION SYSTEM

REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR:9207150316 DOC.DATE: 92/07/10 NOTARIZED: NO DOCKET #
FACIL:50-400 Shearon Harris Nuclear Power Plant, Unit 1, Carolina 05000400
AUTH.NAME AUTHOR AFFILIATION
STARKEY,R.B. Carolina Power & Light Co.
RECIP.NAME RECIPIENT AFFILIATION
Document Control Branch (Document Control Desk)

SUBJECT: Submits supplemental info to 920310 application for amend to License NPF-63,revising TS re RWST & safety injection accumulator boron concentrations & spray additive tank & boric acid tank levels,per NRC request.

DISTRIBUTION CODE: A001D COPIES RECEIVED:LTR 1 ENCL 1 SIZE: 5
TITLE: OR Submittal: General Distribution

NOTES:Application for permit renewal filed. 05000400

	RECIPIENT ID CODE/NAME	COPIES LTTR	COPIES ENCL	RECIPIENT ID CODE/NAME	COPIES LTTR	COPIES ENCL
	PD2-1 LA	1	1	PD2-1 PD	1	1
	LE,N	2	2			
INTERNAL:	ACRS	6	6	NRR/DET/ESGB	1	1
	NRR/DOEA/OTSB11	1	1	NRR/DST 8E2	1	1
	NRR/DST/SELB 7E	1	1	NRR/DST/SICB8H7	1	1
	NRR/DST/SRXB 8E	1	1	NUDOCS-ABSTRACT	1	1
	OC/LFMB	1	0	OGC/HDS1	1	0
	REG FILE 01	1	1	RES/DSIR/EIB	1	1
EXTERNAL:	NRC PDR	1	1	NSIC	1	1

R I D S / A D D S

R I D S / A D D S

NOTE TO ALL "RIDS" RECIPIENTS:

PLEASE HELP US TO REDUCE WASTE! CONTACT THE DOCUMENT CONTROL DESK, ROOM P1-37 (EXT. 20079) TO ELIMINATE YOUR NAME FROM DISTRIBUTION LISTS FOR DOCUMENTS YOU DON'T NEED!

TOTAL NUMBER OF COPIES REQUIRED: LTTR 23 ENCL 21

AA2

CP&L

Carolina Power & Light Company

P.O. Box 1551 • Raleigh, N.C. 27602

JUL 10 1992

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

SERIAL: NLS-92-182
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
SUPPLEMENTAL INFORMATION 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. By letter dated May 11, 1992, CP&L revised the values submitted for the Boric Acid Tank. Subsequent to these submittals, the NRC Staff reviewer has requested clarification relative to the impact of this Request for License Amendment on the SHNPP Loss of Coolant Accident (LOCA) analyses.

The purpose of this letter is to provide supplemental information concerning LOCA considerations to facilitate the NRC's review. A summary of those considerations is provided in Enclosure 1. Additionally, CP&L has identified the need for clarification concerning pH levels for the Containment Spray System (CSS). Enclosure 2 outlines the basis for CSS pH and the impact of the proposed Technical Specification change on pH ranges. Both of the above issues have been discussed with the NRC Staff reviewer.

CP&L has reviewed the 10CFR50.92 Evaluation previously submitted on May 11, 1992 and determined that the conclusions of the significant hazards evaluation (probability or consequences of an accident, possibility of a new or different kind of accident, and margin of safety) remain valid.

Please refer any questions regarding this submittal to Mr. Lewis S. Rowell at (919) 546-2770.

Yours very truly,

R. B. Starkey, Jr.

A001

LSR/jbw (1687HNP)

Enclosures:
1. LOCA Considerations
2. Clarifications on pH

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.

Eleanor C Chappell
Notary (Seal)

My commission expires: 2/6/96

ELEANOR C. CHAPPELL NOTARY *** PUBLIC WAKE COUNTY, N.C.

cc: Mr. S. D. Ebneter
Mr. N. B. Le
Mr. J. E. Tedrow

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

LOCA CONSIDERATIONS

A function of the Refueling Water Storage Tank (RWST) is to provide the principal volume of emergency coolant delivered by the Safety Injection System (SIS). Since mitigation of the consequences of a LOCA defines the performance requirements of the SIS, the proposed Request for License Amendment has been carefully evaluated with respect to the SHNPP FSAR Chapter 15 LOCA analyses. While LOCA considerations were mentioned throughout CP&L's original submittal, the following summarizes those considerations:

- 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 Break and control rod insertion for Small Break.

- Since control rod insertion cannot be absolutely assured after a Large Break, calculations show that the Reactor Containment Building sump concentration (combining the RCS, RWST, and other sources of water), alone, is sufficient to keep the core subcritical at the cold conditions that would be applicable in evaluating long-term consequences. This is a standard part of the safety evaluation of reload core designs.

- pH considerations are described in Enclosure 2.

- Avoiding excessive boron precipitation in the core following a LOCA is necessary for maintaining a core geometry that is amenable to long term cooling. This is the purpose for switching from RCS cold leg injection to RCS hot leg injection during the long term cooling phase. The primary objective is to backflush the core. With the increase in RWST boron concentration, operators are directed to perform this switchover earlier. This change in switchover time is described in CP&L's March 10, 1992 submittal. Since there will be increased core decay heat at this earlier time of switchover to hot leg injection, hot leg delivery flowrates have been evaluated with respect to cooling requirements and found acceptable.

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

CLARIFICATIONS ON pH

The SHNPP Containment Spray System (CSS) was originally designed to maintain a spray pH in the range of 8.5 to 11.0 and its effectiveness in removing elemental iodine is described in SHNPP FSAR Section 6.5.2.3.2. The method of calculating the spray removal time constant described in the FSAR does not require the use of a time dependent spray pH value. The NRC's review and acceptance of the SHNPP CSS design is documented in NUREG-1038, "Safety Evaluation Report Related to the Operation of Shearon Harris Nuclear Power Plant," November 1983.

The radiological off-site calculations for a LOCA event are described in FSAR Section 15.6.5 and FSAR Appendix 15.0.A. Regardless of the calculated value for the spray removal time constant, the actual value used in the off-site dose calculations is conservatively limited. The NRC staff's review and acceptance of the SHNPP off-site calculation results, including the conservative assumptions regarding the spray removal coefficient, are documented in NUREG-1038.

In December 1988, Revision 2 of Standard Review Plan (SRP) 6.5.2 (NUREG-0800) was issued. That revision recognized minimal dependence on the pH value for fresh spray solution having no dissolved iodine and deleted the requirement (Section II(1)) for following the guidance of ANSI/ANS 56.5-1979, "PWR and BWR Containment Spray System Design Criteria," as it related to spray additive and pH control systems. Further, the method for calculating the spray removal coefficient was revised. The revised method is now independent of the spray pH value and is the same method as that used and described in SHNPP FSAR Section 6.5.2.3.2. Revision 2 of SRP 6.5.2.II(1).g was also revised to require that an assumption of long-term iodine retention only be made when the equilibrium sump solution pH at the onset of the spray recirculation mode is above 7.

The proposed change to the SHNPP Technical Specifications increases the volume of sodium hydroxide used as a spray additive. As described in SHNPP Technical Specification Bases 3/4.5.4 and 3/4.6.2.2, the objective is to maintain the containment sump solution pH within the range 8.5 to 11.0 to minimize the evolution of iodine and the effects of chloride and caustic stress corrosion. As shown in FSAR Figures 6.5.2-2 and 6.5.2-3, the sump solution has a low pH value initially, but it rapidly increases as sodium hydroxide in the spray solution is added to the containment sump inventory. However, since the sodium hydroxide concentration, eductor, and spray flowrates remain unchanged, the initial spray pH will decrease from 8.6 to approximately 8.2 due to the increase in RWST boron concentration. During long-term recirculation, the spray pH will increase to within the range of 8.5 to 11.0.

This small reduction in pH will have no affect on the calculated spray removal coefficient since the pH value was not specifically required in the method described in the SHNPP FSAR. Further, since SRP 6.5.2, Revision 2 has adopted a similar approach, it is concluded that there will be no adverse impact on the calculated spray coefficient or the radiological dose calculations which use a more conservative value. Long-term retention of iodine is assured because the sump solution will reach a pH of at least 7 at the onset of the spray recirculation mode and will rapidly increase to a value of approximately 8.5 at the completion of the sodium hydroxide addition. This is the required minimum value stated in the Bases of the SHNPP Technical Specifications previously referenced. The maximum spray and sump solution pH value will not be revised and does not exceed 11.0 as is currently required.

There will be no adverse impact on material conditions (corrosion) or equipment qualification because, while the minimum pH value will decrease slightly from 8.6 to 8.2, it will still be above the neutral pH of 7.0 which is considered to be a minimum value necessary to prevent stress corrosion cracking as recommended in SRP 6.1.1, Revision 2, Section III.B (a). Since the maximum pH value is not changed, the calculated hydrogen production rate from aluminum corrosion will not change either. The hydrogen produced from zinc corrosion due to the increased acidic affect of changing the RWST and SIS accumulator boron concentration from a maximum 2200 ppmB to a maximum of 2600 ppmB is discussed in CP&L's March 10, 1992 and May 11, 1992 submittals.

Based on the above, a slight reduction in the minimum spray pH will have no impact on the proposed Technical Specification changes, supporting analyses, or conclusions that CP&L submitted on March 10, 1992.