Public Service
Electric and Gas
Company

Corbin A. McNeill, Jr.
Vice President -
Nuclear

Public Service Electric and Gas Company P.O. Box 236, Hancocks Bridge, NJ 08038 609 339-4800

October 25, 1985

Ref: LCR 85-07

U.S. Nuclear Regulatory Commission
Office of Nuclear Reactor Regulation
Division of Licensing
Washington, D. C. 20555

Attention: Mr. Steven A. Varga, Chief
Operating Reactors Branch 1
Division of Licensing

Gentlemen:

REQUEST FOR AMENDMENT
FACILITY OPERATING LICENSE DPR-70
UNIT NOS. 1 AND 2
SALEM GENERATING STATION
DOCKET NOS. 50-272 AND 50-311

In accordance with the Atomic Energy Act of 1954, as amended and the regulations thereunder, we hereby transmit copies of our request for amendment and our analyses of the changes to Facility Operating Licenses DPR-70 and DPR-75 for Salem Generating Station, Unit Nos. 1 and 2.

This amendment request consists of changes to the Technical Specifications regarding the Boron Injection Tank, its contained volume, Boron concentration, temperature, and the heat tracing of the tank and associated piping.

In accordance with the fee requirements of 10CFR170.21, a check in the amount of $150.00 is enclosed.

A001
S/40 w/check
$150.00
01395242

Pursuant to the requirements of 10CRF50.91, a copy of this request for amendment has been sent to the State of New Jersey as indicated below.

This submittal includes three (3) signed originals and forty (40) copies.

Sincerely,

Enclosure

C Mr. Donald C. Fischer
Licensing Project Manager

Mr. Thomas J. Kenny
Senior Resident Inspector

Mr. Samuel J. Collins, Chief
Projects Branch No. 2, DPRP
Region 1

Mr. Frank Cosolito, Acting Chief
Bureau of Radiation Protection
Department of Environmental Protection
380 Scotch Road
Trenton, N.J. 08628

Honorable Charles M. Oberly, III
Attorney General of the State of Delaware
Department of Justice
820 North French Street
Wilmington, Delaware 19801

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STATE OF NEW JERSEY)
) SS.
COUNTY OF SALEM)

Corbin A. McNeill, Jr., being duly sworn according to law deposes and says:

I am a Vice President of Public Service Electric and Gas Company, and as such, I find the matters set forth in our letter dated October 25, 1985 , concerning our Request for Amendment to Facility Operating Licenses DPR-70 and DPR-75, are true to the best of my knowledge, information and belief.

Subscribed and Sworn to before me
this 25th day of October, 1985

Donna G. Hitchner
Notary Public of New Jersey

DONNA G. HITCHNER
NOTARY PUBLIC OF NEW JERSEY
My Commission Expires March 24, 1987

My Commission expires on _____

PROPOSED CHANGE TO
TECHNICAL SPECIFICATIONS
UNIT NOS. 1 AND 2

LCR 85-07

1. Description of Change

Delete the material contained in Section 3/4.5.4, Boron Injection System, and replace it with the material from Section 3/4.5.5, Refueling Water Storage Tank (RWST) renumbering the affected sections and pages in accordance with the attached modified pages for both Salem Units. Additionally, remove the Bases Section pertaining to Boron Injection, renumber the Refueling Water Storage Tank Bases Section and insert the following paragraph into the RWST Bases Section as per the attached pages for both Salem Units:

"In addition, the OPERABILITY of the RWST as part of the ECCS ensures that sufficient negative reactivity is injected into the core to counteract any positive increase in reactivity caused by RCS cooldown. RCS cooldown can be caused by inadvertent depressurization, a loss-of-coolant accident or a steam line rupture."

2. Reason for Change

The Boron Injection Tank (BIT) is a component of the Safety Injection System whose sole function is to provide concentrated boric acid to the reactor coolant to mitigate the consequences of postulated steamline break accidents. A Boron concentration of 20,000 ppm was used in the existing steamline break analyses presented in the following FSAR Section:

Section 15.4.8.2 - Steamline Breaks

Section 15.2.13 - Accidental Depressurization of the Main Steam System

Section 15.4.2 - Major Secondary System Pipe Rupture

Presently, a minimum boron concentration of 20,100 ppm is maintained by heat tracing the BIT and associated piping to ensure the required solubility temperature. Technical Specifications are applied to the BIT and heat tracing equipment to assure the operability of the BIT by verifying boron concentration, water temperature, and water level in accordance with surveillance requirements specified in Section 3/4.5.4.

High boron concentration in the BIT and its associated recirculation system has caused a number of operational and maintenance problems in the past, such as boron plateout and line plugging, potential degradation due to stress corrosion, increased maintenance of heat tracing equipment, frequent low temperature alarms, stringent Technical Specification requirements leading to potential increase in the unit unavailability, and long recovery time from a spurious safety injection signal. These problems have been recognized by NRC who, in Generic Letter 85-16, encouraged Westinghouse designed plants to present analyses supporting the elimination or reduction of BIT concentration requirements.

In response to the Generic Letter, the spectrum of steamline breaks included in the Salem FSAR was reanalyzed for reduced, as well as 0 ppm, boron concentration to determine the impact on the design bases for containment integrity and fuel failures. The results of these analyses performed by Westinghouse are attached in the format of recommended changes to the Salem FSAR, Chapter 15.

A brief discussion of the results of containment response to mass and energy release, and core integrity is given below.

Containment Analysis:

A number of large double ended ruptures, small double ended ruptures and split ruptures were analyzed at four different power levels (0, 30, 70, and 102%) using LOFTRAN and COCO codes to determine the containment response to mass and energy release. Multiple single failures were assumed in the analyses to generate conservative pressure and temperature transients. The limiting pressure case, i.e., split rupture at 30 percent power (0 ppm), produced a peak pressure of 46.4 psig which is below the containment design pressure of 47 psig. The maximum temperature reached in the limiting temperature case, small double ended rupture at hot full power (0 ppm), is 345.5°F and it falls below the environmental qualification temperature of 347°F used in qualifying the safety related equipment inside the containment.

Core Response Analysis:

The following steamline break cases presently included in the FSAR were reanalyzed to establish the effect, if any, on core integrity :

- "Hypothetical" Steamline Break, with and without offsite power available, for the largest double ended rupture upstream of the flow restrictors.

- "Hypothetical" Steamline Break, with and without offsite power available, for the largest double ended rupture downstream of the flow restrictors.

- "Credible" Steamline Break, with offsite power available, for the largest single failed open steam generator relief, safety or steam dump valve.

The results of these revised analyses indicate that for a hypothetical steamline break, Condition IV event, the radiation releases are within the requirements of 10CFR Part 100. This design criterion is conservatively met for Salem as no fuel failures are anticipated, even though preventing clad damage in the case of Condition IV events is not a requirement. The DNB ratio remains greater than 1.3. Similarly, for credible breaks, Condition II events, releases fall within the limits of 10CFR Part 20. The DNB design basis is met, i.e., the DNB ratio remains above 1.3, although criticality is attained for 0 ppm and low boron concentrations. This is in compliance with the NRC and ANS criterion which allows return to criticality as long as no consequential fuel failures occur. In the original FSAR calculations for radiation releases, a conservative fuel failure level of 1 percent was assumed. Therefore, the releases resulting from reanalysis are bounded by the 1 percent values shown in the FSAR.

The results of steamline break reanalysis demonstrate that based on standard analytical techniques, boron concentration in the BIT can be reduced from 20,000 ppm to 0 ppm without violating the design criteria for fuel failures or containment integrity. Also, the peak temperature currently utilized in the qualification of safety related equipment is not exceeded. There are no other safety related problems associated with boron concentration reduction or the BIT elimination.

There were three possible system hardware changes considered: delete the heat tracing and maintain the BIT at a boron concentration between 4 weight percent and 0 weight percent, provide valving to bypass the BIT, or remove the BIT and replace it with a section of safety injection piping. The alternative below has been selected for implementation at Salem:

> The BIT will remain physically installed in the Safety Injection System. The heat tracing will be deleted and the BIT will be maintained at a boron concentration between 4 weight percent and 0 weight percent. Further, the BIT will be isolated from the Boric Acid Tank (BAT) and recirculation of the BIT contents will not be required.

Therefore, the Technical Specifications applicable to the verification of operability of the BIT and the associated heat tracing equipment will no longer be required. Accordingly, this proposed license amendment requests modifications to the Salem Technical Specifications as described in the Description of Change.

3. Significant Hazards Consideration Analysis

The proposed license change request does not increase the probability of any accidents previously evaluated nor are any new accidents introduced as a result of Boron Injection Tank elimination. There is no significant hazards consideration involved.

The results of the steamline break reanalysis for 0 ppm concentration show that the pressures and temperatures reached in the worst case scenarios fall below the containment design limits. There is only a small increase in the peak pressure over and above the previously calculated maximum pressure corresponding to 20,000 ppm concentration; that is, 46.4 psig for 0 ppm versus 43.0 psig for 20,000 ppm. No fuel failures are anticipated to occur since the DNB ratio remains above 1.3; and the applicable 10CFR criteria for radiation releases are satisfied.

Furthermore, the results are conservative in that multiple single failures have been assumed in analyzing the various steamline breaks. For instance, in the limiting pressure case, two single failures have been considered simultaneously - namely, main steam isolation valve failure and containment safeguards train failure. For the limiting temperature case, all four of the following single failures have been included:

a) Containment Safeguards Train

b) Main Steam Isolation Valve

c) Main Feedwater Regulating Valve

d) Auxiliary Feed Runout Protection

With only a single failure, containment pressure and temperature transients following postulated steamline breaks will be less limiting.

Also, it should be noted that the Boron Injection Tank removal analyses have been approved by the NRC for several Westinghouse designed U.S. plants including Byron, Braidwood, McGuire, Turkey Point, Wolf Creek, and Comanche Peak.

Revisions to those pages in FSAR Sections 15.2.13, 15.4.2, 15.4.8.2, and Tables 6.3-3 and 15.1-2 which will be required upon implementation of the change to 0 ppm BIT concentration are attached for reference purposes and are indicated by vertical bars in the margin.

4. References

1. PSE-84-878, Report for the BIT Concentration Reduction/BIT Elimination Study - Containment Analysis for Salem Units 1 and 2, dated December 14, 1984.

2. PSE-85-594, Steamline Break Core Response Analysis for BIT Concentration Reduction/BIT Elimination for Salem Units 1 and 2, dated June 11, 1985.

5. Attachments

A. Marked-up Salem FSAR Section 15.4.8.2, Steamline Breaks

B. Revised Salem FSAR Section 15.2.13, Accidental Depressurization of the Main Steam System

C. Revised Salem FSAR Section 15.4.2, Major Secondary System Pipe Rupture

D. Marked-up Salem FSAR Table 6.3-3, Boron Injection Tank Design Parameters

E. Revised Salem FSAR Table 15.1-2, Summary of Initial Conditions and Computer Codes Used.