Public Service
Electric and Gas
Company

Steven E. Miltenberger
Vice President and Chief Nuclear Officer

Public Service Electric and Gas Company P.O. Box 236, Hancocks Bridge, NJ 08038 609-339-4199

NOV 0 6 1989

NLR-N89224

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

Gentlemen:

REQUEST FOR AMENDMENT, REVISION 1
SALEM GENERATING STATION
UNIT NOS. 1 AND 2
FACILITY OPERATING LICENSE NOS. DPR-70 AND DPR-75
DOCKET NOS. 50-272 AND 50-311

In accordance with the requirements of 10CFR50.90, Public Service Electric and Gas Company (PSE&G) hereby transmits a request for amendment of Facility Operating Licenses DPR-70 and DPR-75 for Salem Generating Station, Unit Nos. 1 and 2, respectively. In accordance with 10CFR50.91(b)(1) requirements, a copy of this request has been sent to the State of New Jersey.

On September 11, 1989, PSE&G submitted a proposed amendment request to modify the operation of the Residual Heat Removal (RHR) system, to allow for more flexibility. The change would have removed the required minimum flow rate from the Technical Specifications, and allowed procedural control of required flow rate based on existing decay heat rate and plant conditions.

Based on discussions with Mr. J. Stone, the NRC Project Manager, for Salem Generating Station, we are transmitting Revision 1 to this request. This revision retains the minimum required RHR flow rate within the Technical Specifications, at a value of 1000 gpm.

PSE&G believes that sufficient technical justification is provided to demonstrate that the proposed changes do not involve a significant hazards consideration, and that this LCR does not require a significant amount of technical review and should be processed as a Category 2 change.

Attachment 1 includes a description, justification and significant hazards analysis for the proposed changes. Attachment 2 contains the Technical Specification pages revised with pen and ink changes. Attachment 3 contains the Technical Specification pages with the changes incorporated. Attachment 4 contains the revised bases.

A001
1/1

8911130296 891106
PDR ADOCK 05000272
P PNU

This submittal includes one (1) signed original, including affidavit, and thirty-seven (37) copies to pursuant to 10CFR50.4(b)(2)(ii).

Should you have any questions regarding this transmittal, please feel free to contact us.

Sincerely,

Stan E Pattenburg

Attachment

C Mr. J. C. Stone
Licensing Project Manager

Ms. K. Halvey Gibson
Senior Resident Inspector

Mr. W. T. Russell, Administrator
Region I

Mr. Kent Tosch, Chief
New Jersey Department of Environmental Protection
Division of Environmental Quality
Bureau of Nuclear Engineering
CN 415
Trenton, NJ 08625

REF: NLR-N89224

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

S. Miltenberger, being duly sworn according to law deposes and says:

I am Vice President and Chief Nuclear Officer of Public Service Electric and Gas Company, and as such, I find the matters set forth in our letter dated November 6, 1989 , concerning the Salem Generating Station, Unit Nos. 1 and 2, are true to the best of my knowledge, information and belief.

S. Miltenberger

Subscribed and Sworn to before me
this 6th day of November, 1989

Vanita M. Marshall
Notary Public of New Jersey

VANITA M. MARSHALL
NOTARY PUBLIC OF NEW JERSEY
My Commission Expires May 6, 1993

My Commission expires on _____

ATTACHMENT 1

LCR 88-10

PROPOSED LICENSE CHANGE
SALEM GENERATING STATION
UNIT NOS. 1 AND 2
FACILITY OPERATING LICENSE NOS. DPR-70 AND DPR-75
DOCKET NOS. 50-272 AND 50-311

I. Description of Change

Delete Salem Unit 1 Technical Specification LCO 3.1.1.3. Revise Salem Unit 1 Technical Specification Surveillance 4.9.8 and Salem Unit 2 Technical Specification Surveillance 4.9.8.1 to replace the 3000 gpm minimum flow requirement with a value of 1000 gpm.

The proposed change would revise the numbering of the Unit 1 LCO and Surveillance Requirements from 3.9.8 and 4.9.8 to 3.9.8.1 and 4.9.8.1 respectively. This numbering scheme is consistent with Salem Unit 2 and the Westinghouse Standard Technical Specifications.

II. Reason for the Change

NRC Generic Letters 87-12 and 88-17 requested licensees to evaluate operation of the Residual Heat Removal (RHR) system, when the Reactor Coolant System (RCS) is partially filled. PSE&G performed an evaluation of Salem's RHR system. This evaluation revealed that the reliability of the RHR pumps could be increased by reducing the flow rate below the present Technical Specification limit. Reduced RHR flow rates provide a greater margin against vortexing and preclude an inadvertent loss of decay heat removal capability, due to air entrainment and cavitation of the RHR pumps.

In our response to GL 88-17, PSE&G committed to process a Technical Specification change to the required RHR flow rate. We are requesting a reduction of the present 3000 gpm minimum flow limit to 1000 gpm, with further flow limitations specified within plant procedures. Flow limitations in excess of the 1000 gpm specified in the Technical Specifications will be determined based on decay heat rate, as a function of time after shutdown. This amendment request satisfies that commitment.

III. Justification for Change

Evaluation of Salem's RHR system revealed that, reducing the RHR flow rate to <1800 gpm precludes air entrapment and vortex formation. Further review considered the minimum RHR flow rate necessary to: (1) remove decay heat (2) preclude boron stratification, and (3) provide an adequate flow rate for boron dilution accident concerns.

Table 1 (attached) indicates the required RHR flow rate for specified periods of time after shutdown. Mid-loop operation is not implemented at Salem until at least 72 hours after shutdown (by procedure). Adequate decay heat removal can be accomplished with <1500 gpm RHR flow at this time. The required flow rate decreases further with increased time after shutdown. This is graphically depicted in Figure 1 (attached).

Westinghouse evaluated the effect on net positive suction head (NPSH), for flow rates between 1000 and 3000 gpm. Sufficient RHR pump suction head is available at these reduced flow rates.

The potential for boron stratification was evaluated for RHR flow rates greater than 1000 gpm. The basis for preventing boron stratification in the RCS is to minimize the potential for a boron dilution accident. RHR flow rates greater than 1000 gpm ensure that adequate mixing occurs within the RCS. Thus, there is no concern for boron stratification above an RHR flow rate of 1000 gpm.

Figure 2 (attached) depicts limitations on RHR flow rate for various RCS hot leg water levels. The data reveals that RHR flow rates should be maintained between 1000 and 1800 gpm when RCS hot leg water level is < 6 inches above centerline. RHR flow rates can be extended from a maximum of 1800 gpm to 3000 gpm, when RCS hot leg water level is > 6 inches above centerline. Figures 1 and 2 show that required RHR flow rates vary based on RCS water level and the time after shutdown. More importantly, the present Technical Specification minimum flow rate (3000 gpm) exceeds the maximum flow rate specified for vortexing concerns.

PSE&G believes that the RHR minimum required flow rate of 3000 is too restrictive and that the minimum required flow rate should be reduced to 1000 gpm. Due to the many factors influencing RHR flow rate requirements, further limitations on RHR flow rate are more appropriately controlled administratively within plant procedures, with the Design Basis documented in the UFSAR. These changes will allow more flexibility in mid-loop operation and address such factors as actual decay heat, RCS hot leg water level and RHR pump vortexing.

Salem Unit 1 Technical Specification LCO 3.1.1.3 is not in the Standard Technical Specification (NUREG-0452), nor is it a Salem Unit 2 requirement. Consequently, its deletion will provide consistency between all of these documents. Deletion is justified, because operation in Modes 1-3 requires a minimum of at least one Reactor Coolant Pump (RCP) in service. This guarantees that the flow rate is much greater than 3000 gpm.

Operation in Modes 4-6 will require a minimum flow rate of 1000 gpm. Further limitations will be specified within plant procedures and will be based on: decay heat, RCS water level, boron stratification and vortexing concerns.

IV. Significant Hazards Consideration

The proposed changes to the Technical Specifications:

1. Do not involve a significant increase in the probability or consequence of an accident previously evaluated.

   The Technical Specification requirement to maintain the minimum Reactor Coolant Loop in operation will ensure adequate RCS flow for Modes 1-4. The RHR loop OPERABLE LCO will ensure adequate RHR availability. The minimum RHR flow requirement will be reduced to 1000 gpm in the Technical Specification with further limitations specified in plant procedures. This change will increase the overall reliability of the RHR pumps by addressing vortexing concerns at higher flow rates. Therefore, it may be concluded that the proposed changes do not involve a significant increase in the probability or consequences of an accident previously evaluated.

2. Do not create the possibility of a new of different kind of accident from any accident previously evaluated.

   The proposed change only allows reduced flow rates when the RHR system is in service. The reduced flow rates are justified by analysis and controlled by the Technical Specifications and plant procedures. Since the RHR system will be maintained at a minimum flow rate of 1000 gpm, per Technical Specifications, no new or different accident from any previously evaluated will be created.

3. Do not involve a significant reduction in a margin of safety.

   The proposed changes allow a reduction in the minimum RHR flow rate from 3000 gpm to 1000 gpm. Although this results in a reduced capability to remove decay heat and decreases the amount of mixing in the RCS, the minimum flow specified in the Technical Specifications ensures that adequate margin is maintained.

The flow reduction eliminates the potential for air entrapment and vortexing of the RHR pumps due to excessive flow rates. Thereby, increasing the reliability of the RHR pumps, while maintaining sufficient flow to ensure the RHR design requirements are met. Therefore, it may be concluded that the proposed changes do not involve a significant reduction in a margin of safety.

V. Conclusions

Based on the information presented above, PSE&G has concluded that the proposed changes satisfy the criteria for a no significant hazards consideration.

TABLE 1

MINIMUM REQUIRED RHR FLOW VERSUS TIME AFTER SHUTDOWN

MINIMUM REQUIRED RHR FLOW VERSUS TIME AFTER SHUTDOWN	
TIME AFTER S/D (HOURS)	TOTAL RHR FLOW (GPM)
13	3000
42	1900
54	1500
79	1250
114	1000

FIGURE 1

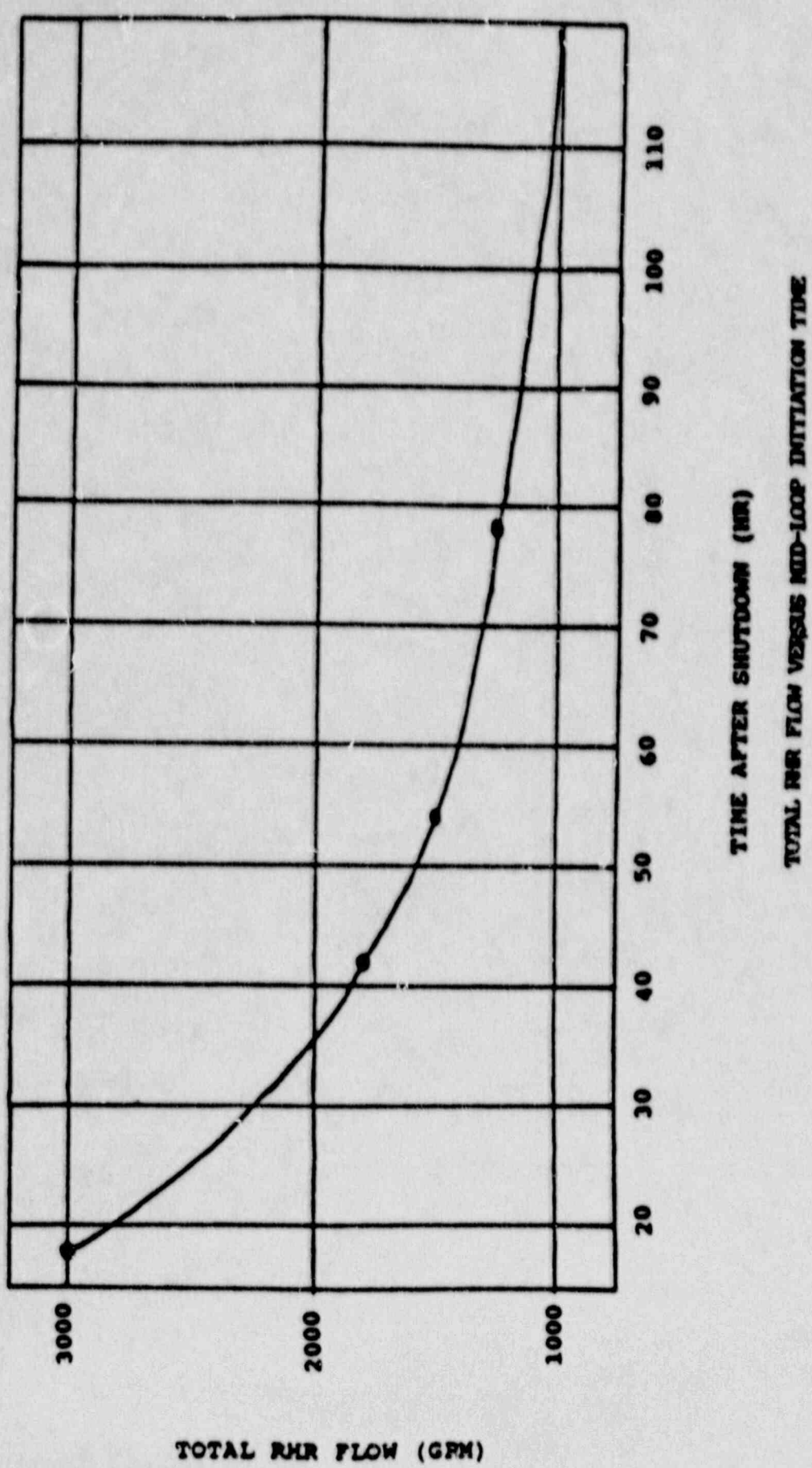
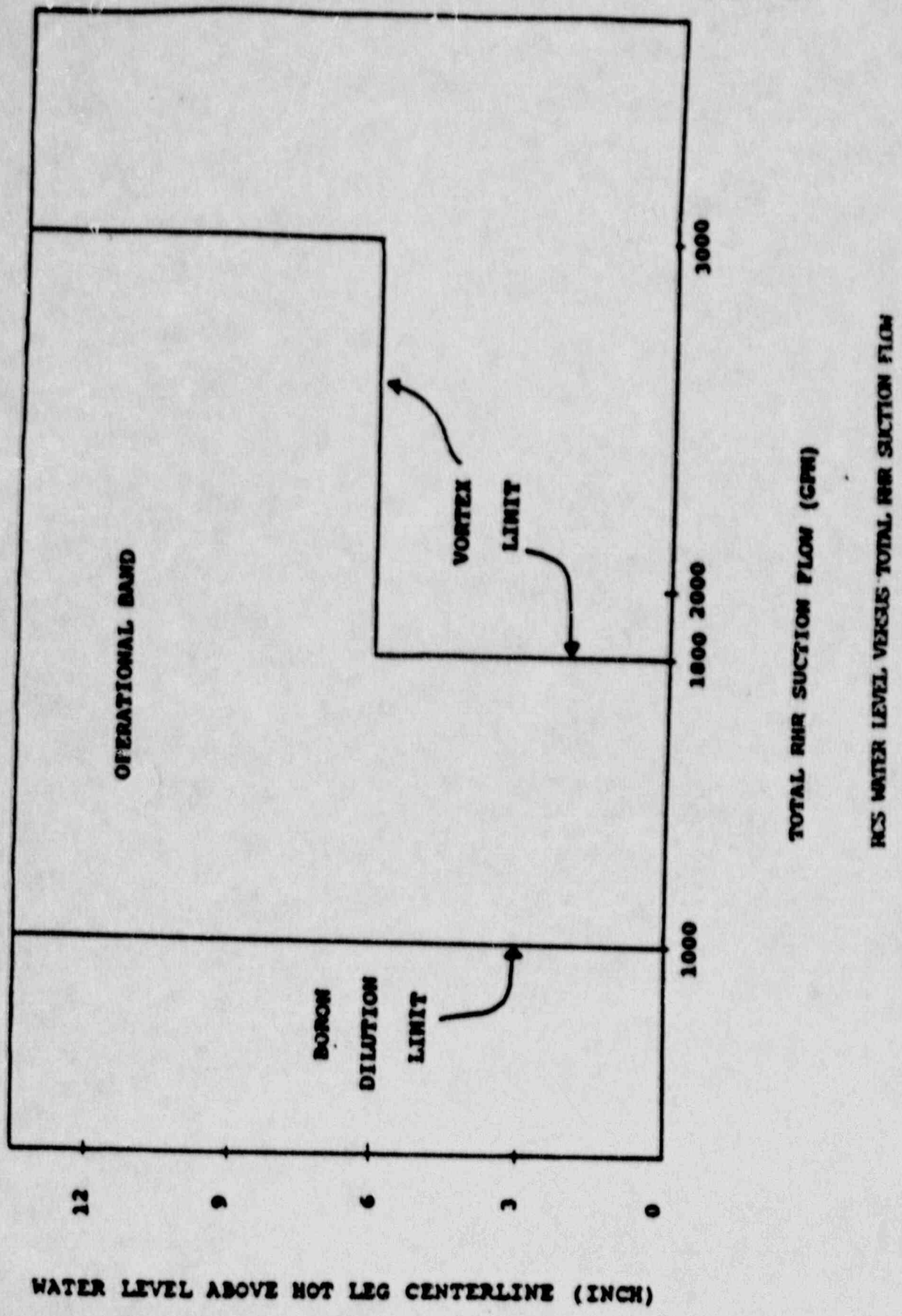

3000
2000
1000
20
30
40
50
60
70
80
90
100
110
TOTAL RHR FLOW (GPM)
TIME AFTER SHUTDOWN (HR)
TOTAL RHR FLOW VERSUS MID-LOOP INITIATION TIME

FIGURE 2


OPERATIONAL BAND
VORTEX
LIMIT
BORON
DILUTION
LIMIT
12
9
6
3
0
1000
2000
3000
WATER LEVEL ABOVE HOT LEG CENTERLINE (INCH)
TOTAL RHR SUCTION FLOW (GPM)
RCS WATER LEVEL VERSUS TOTAL RHR SUCTION FLOW

ATTACHMENT 2