

Public Service  
Electric and Gas  
Company

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Senior Vice President - Nuclear Operations

**MAR 04 1997**

LR-N97125  
LCR S95-37

United States Nuclear Regulatory Commission  
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Washington, DC 20555

**CHANGE TO TECHNICAL SPECIFICATIONS  
ECCS SURVEILLANCE TEST ACCEPTANCE  
SALEM GENERATING STATION NOS. 1 AND 2  
FACILITY OPERATING LICENSES DPR-70 AND DPR-75  
DOCKET NOS. 50-272 AND 50-311**

Gentlemen:

In accordance with 10CFR50.90, Public Service Electric & Gas (PSE&G) Company requests a revision to the Technical Specifications (TS) for the Salem Generating Station Unit 1 and 2. In accordance with 10CFR50.91(b)(1), a copy of this submittal has been sent to the State of New Jersey.

The proposed changes contained herein represent changes to TS 3/4.5.2, "Emergency Core Cooling System Subsystem -  $T_{avg} \geq 350^{\circ}F.$ " These changes propose to modify the Emergency Core Cooling System (ECCS) surveillance test acceptance criteria for the Centrifugal Charging (CH) and the Safety Injection (SI) Pumps. Specifically, changes to the specified flow values are requested to account for system alignments that effect the suction pressure to the pumps. In recirculation mode, increased flow occurs when the CH and SI pumps are aligned with, and take suction from, the discharge of the Residual Heat Removal pumps.

The proposed changes have been evaluated in accordance with 10CFR50.91(a)(1), using the criteria in 10CFR50.92(c), and it has been determined that this request involves no significant hazards considerations.

The basis for the requested change is provided in Attachment 1. The revised 10CFR50.92 evaluation with a determination of no significant hazards consideration is provided in Attachment 2. The marked up TS pages affected by the proposed changes are provided in Attachment 3.

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Upon NRC approval of this proposed change, PSE&G requests that the amendment be made effective on the date of issuance, but allow an implementation period of sixty days to provide sufficient time for associated administrative activities.

Should you have any questions regarding this request, we will be pleased to discuss them with you.

Sincerely,



Affidavit  
Attachments (3)

C Mr. H. J. Miller, Administrator - Region I  
U. S. Nuclear Regulatory Commission  
475 Allendale Road  
King of Prussia, PA 19406

Mr. L. Olshan, Licensing Project Manager - Salem  
U. S. Nuclear Regulatory Commission  
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Rockville, MD 20852

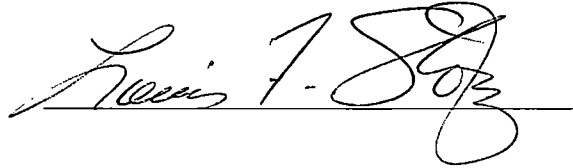
Mr. C. Marschall (X24)  
USNRC Senior Resident Inspector - Salem

Mr. K. Tosch, Manager IV  
Bureau of Nuclear Engineering  
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CN 415  
Trenton, NJ 08625

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

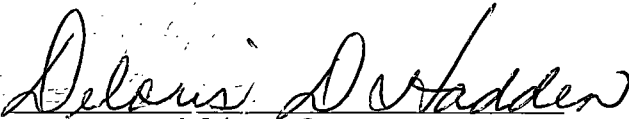
L. F. Storz, being duly sworn according to law deposes and says:

I am Senior Vice President - Nuclear Operations of Public Service Electric and Gas Company, and as such, I find the matters set forth in the above referenced letter, concerning the Salem Generating Station, Units 1 and 2, are true to the best of my knowledge, information and belief.



Subscribed and Sworn to before me

this 4th day of March, 1997

  
Notary Public of New Jersey

**DELORIS D. HADDEN**  
Notary Public of New Jersey  
My Commission Expires  
**03-29-2000**

My commission expires on \_\_\_\_\_

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

The basis for the proposed change is to modify Safety Injection and Centrifugal Charging Pump total flow test acceptance criteria to address the phenomenon of "suction boost". Suction boost involves an effect on the pump discharge pressure and results in higher pump flows for any given fixed system resistance.

REQUESTED CHANGE AND PURPOSE

This proposed amendment modifies the emergency core cooling system (ECCS) surveillance test acceptance criteria contained in Surveillance Requirement 4.5.2.h to address an evaluation of ECCS pump runout flow due to increased pump suction pressures, termed "suction boost". These changes apply to both Salem Units 1 and 2.

The total Safety Injection (SI) pump flow is reduced from  $\leq 675$  gpm to  $\leq 664$  gpm in cold leg alignment mode and  $\leq 654$  gpm in hot leg alignment mode. The current TS uses  $\leq 675$  gpm for total SI pump flow and does not differentiate between the cold and hot leg alignment modes.

The total pump flow limit for the Centrifugal Charging pumps is reduced from  $\leq 560$  gpm to  $\leq 554$  gpm.

In addition, a typographical error (deleting the double use of the word "the") in Salem Unit 1 Technical Specification section 4.5.2.h.1.a is being corrected.

BACKGROUND

Technical Specification Amendment 143 and Amendment 118 for Salem Units 1 and 2, revised the ECCS surveillance test acceptance criteria as requested in LCR 91-03 transmitted under NLR-N91025. Those changes facilitated surveillance flow testing in an extended acceptance window and allowed for flow measurement uncertainties to be accounted for in the surveillance testing.

During the injection phase of the ECCS in response to a Loss of Coolant Accident (LOCA), which initiates SI actuation, the ECCS

pumps take suction from the Refueling Water Storage Tank (RWST). When the RWST low level is reached, the ECCS pumps are realigned to take suction from the containment sump to allow for long-term core cooling (i.e., cold leg circulation). The Salem ECCS design has the Centrifugal Charging/Safety Injection (CH/SI) (i.e., high head safety injection) and Safety Injection (SI) (i.e., intermediate head safety injection) taking suction from the discharge of the Residual Heat Removal (RHR) pumps. In this configuration, the pressure at the CH/SI and SI pumps' suction will be higher than the pump suction pressure while aligned to the RWST. Higher suction pressure increases the pump discharge pressure and results in higher pump flows for any given fixed system resistance. This phenomenon is termed "suction boost".

Westinghouse (PSE-94-759) identified this generic concern and evaluated the effect of suction boost on the CH/SI and SI pumps for Salem. The flows were calculated to be greater than the current pump flow limits under certain worst case conditions. After evaluating the results of full flow tests for ECCS pumps in previous cycles, it was determined that they did not exceed or violate the current ECCS acceptance windows; however, a permanent change to the TS acceptance criteria is warranted to align the Technical Specifications with design bases.

#### **JUSTIFICATION OF REQUESTED CHANGES**

Surveillance Requirements contained in TS 4.5.2.h verify that the plant configuration is consistent with the assumptions used in the design and safety analysis. ECCS surveillance test acceptance criteria is bounded in the Salem accident analyses as was detailed in LCR 91-03, for TS Amendment 143 and 118. However, after the approval of those amendments, Westinghouse identified the concern known as suction boost. In order to account for the effects of suction boost, a change is needed to decrease flow from the CH/SI and SI pumps to prevent pump runout. Narrowing the TS allowable flow limits ensures the subject pumps remain within the design and performance analysis.

Two considerations need to be addressed when reducing flow: pump runout and adequate flow to the reactor core. Pump flow rates can be reduced without adverse effects on electrical motor loading or pump integrity. Cavitation and motor horsepower capacities are of concern when increasing pump flows, but when reducing the flow, as in this change, the parameter change ensures the pumps remain within design limits. The use of reduced TS limits result in flows which remain less than the

generic pump maximum allowable limits and do not challenge the operability of the equipment or effect pump runout. Additionally, the flows calculated to address suction boost are adequate to maintain flows to the core and the impact of the modified limits have been determined to be bounded by our original request for Technical Specification revision under LCR 91-03.

The current testing configuration will be retained, due to the need for RHR core cooling during the mode in which ECCS flow testing is performed. In order to assure that the long term post-LOCA configurations would not result in conditions that could exceed pump runout, the acceptance criteria is reduced to account for the increased CH/SI and SI suction pressures. In the previous submittal net flow was the limiting factor and no differentiation between hot and cold leg configuration was needed, as the acceptance criteria was expressed in total flow. In this request, differences in piping resistance and configuration were considered when evaluating the effects of suction boost and the differences in hot and cold leg flow values are proposed in this change.

This request narrows the allowable acceptance windows approved in TS Amendments 143 and 118. By limiting the maximum CH/SI and SI pump flows (by valve throttling) the effects of suction boost are taken into account. The proposed changes maintain flow within the bounds of analysis for the ECCS as well as maintain the validity of previous assumptions.

#### CONCLUSION

The proposed changes to TS 3/4.5.2 surveillance requirement 4.5.2.h reduce total flow to the SI pumps from  $\leq 675$  gpm to  $\leq 664$  gpm in cold leg alignment and  $\leq 654$  gpm in hot leg alignment. The total flow from the CH pump is reduced from  $\leq 560$  gpm to  $\leq 554$  gpm. These changes to the ECCS performance assumptions are consistent with the assumptions in the accident analysis. By narrowing the flow rate acceptance windows for these pumps, the effects of suction boost are taken into account and adequate flow to the reactor core is maintained. The proposed changes to the acceptance criteria ensure the subject pumps remain within the design analysis and are consistent with prior amendments.

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10CFR50.92 EVALUATION

Public Service Electric & Gas (PSE&G) has concluded that the proposed changes to the Salem Generating Station Unit Nos. 1 and 2 Technical Specifications (TS) do not involve a significant hazards consideration. In support of this determination, an evaluation of each of the three standards set forth in 10CFR50.92 is provided below.

**REQUESTED CHANGE**

The proposed changes represent changes to TS 3/4.5.2, "Emergency Core Cooling System Subsystems -  $T_{avg} \geq 350^{\circ}\text{F}$ ." These changes propose to modify the Emergency Core Cooling System (ECCS) surveillance test acceptance criteria contained in Surveillance Requirements for the Centrifugal Charging Pumps and the Safety Injection Pumps. A Westinghouse evaluation (PSE-94-759) of the ECCS pump runout identified an increase in flow that occurs when the pumps' suction is aligned with the discharge of the Residual Heat Removal (RHR) pumps. These changes to the specified flow values are to account for conditions when the Loss of Coolant Accident (LOCA) configurations are considered for surveillance test acceptance criteria. Specifically:

1. The total pump flow from the Safety Injection pump is reduced from  $\leq 675$  gpm to  $\leq 664$  gpm in cold leg alignment mode and  $\leq 654$  gpm in hot leg alignment mode. The current TS acceptance criteria for total SI pump flow does not differentiate between the cold and hot alignment modes.
2. The total pump flow acceptance criteria from the Centrifugal Charging pump is reduced from  $\leq 560$  gpm to  $\leq 554$  gpm.

In addition, a typographical error (deleting the double use of the word "the") in Salem Unit 1 Technical Specification section 4.5.2.h.1.a is being corrected.

**BASIS**

1. The proposed change does not involve a significant increase in the probability or consequences of an accident previously evaluated. The evaluations performed by Westinghouse determined that, with the proposed changes, the subject

pumps remain operable and the safety analyses criteria remain valid.

Previous conclusions under LCR 91-03 evaluating the consequences of the LOCA considered in the Salem Units 1 & 2 licensing basis remain unchanged. With respect to the LOCA, the Peak Cladding Temperature (PCT) continues to conform to the 10CFR50.46 guidelines of less than 2200°F. Evaluation of LOCA mass and energy releases previously found acceptable remain valid. Decreasing the acceptance window to accommodate the potential of an increase to pump runout flow, assures that the current limits on pump runout flows continue to be met. This change ensures pump integrity is maintained during the accident. The reduction of the flow by throttling valves to compensate for the potential suction boost remains within the current analysis and therefore more conservative values are being proposed. Additionally, the proposed change balances the pump flows more appropriately by differentiating between the hot and cold leg alignments. Flow to the reactor core is unaffected by the very slight reduction in the upper flow limits. Since the design limitations continue to be met and the integrity of the reactor coolant system pressure boundary is not challenged, offsite dose assumptions and calculations remain valid. Further, the ECCS is a post-accident mitigation system and is not postulated to initiate any accidents therefore the probability of an accident is not increased by this proposed change. Lastly, the correction of double use of the word "the" in Salem Unit 1 Technical Specification section 4.5.2.h.1.a is of editorial nature.

Based on the above information, the proposed changes do not increase the risk or consequences of any accidents previously evaluated.

2. The proposed change does not create the possibility of a new or different kind of accident from any accident previously evaluated. No new single failures are initiated. The proposed changes will therefore not create the possibility of a new or different kind of accident from any accident previously evaluated. The proposed change addresses suction boost by changing the Technical Specification surveillance acceptance criteria. The typographical correction is of editorial nature.
3. The proposed change does not involve a significant reduction in a margin of safety. The evaluation of LOCA accident analysis previously performed by Westinghouse continues to be met and verifies that, with the proposed changes to the



TS, plant operations will be maintained within the bounds of safe, analyzed conditions as defined in the UFSAR and that conclusions presented in the UFSAR remain valid. The peak cladding temperatures (PTC) remains unchanged as no effective differences in the operating parameters have occurred. The typographical correction is of editorial nature. The proposed changes will therefore not reduce the margin of safety.

#### **CONCLUSION**

Based on the above, PSE&G has determined that the proposed changes do not involve a significant hazards consideration.