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Electric and Gas
Company

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Gentlemen:

REQUEST FOR AMENDMENT
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 (SGS), Unit Nos. 1 and 2. Pursuant to the requirements of 10CFR50.90 (b) (1), a copy of this request has been sent to the State of New Jersey as indicated below.

The proposed change increases the allowable isolation times associated with the feedwater control valves. Additionally, the change establishes consistent isolation time requirements for Salem Units 1 and 2.

PSE&G believes that the proposed change includes adequate technical justification to conclude that a detailed specialist review should not be required, and that the proposed change can be classified as a Category 2 change.

Attachment 1 contains further discussion and justification for the proposed revision. Attachment 2 is a markup of the existing Technical Specifications to reflect the requested changes.

PSE&G has reviewed the implementation requirements for the proposed amendment and requests a 60 day period from amendment approval to implementation.

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Should you have any questions on this subject transmittal, please do not hesitate to contact us.

Sincerely,

Attachments

C Mr. J. C. Stone
Licensing Project Manager - Salem

Mr. T. Johnson
Senior Resident Inspector

Mr. W. T. Russell, Administrator
Region I

Mr. Kent Tosch, Chief
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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 the Change

This amendment request changes the Feedwater Isolation response times to less than or equal to 10 seconds. Salem Unit 1 and 2 Technical Specifications 3.3.2.1 Table 3.3-5, are revised to establish a less than or equal to 10 seconds response time for all Feedwater Water Isolation functions except Steam Flow in two Steam Lines High - Coincident with Tavg -- Low-Low. The Tavg RTDs have a 5 second total sensor lag time. Adding this lag to the valve and electronics requirements results in a total response time of 15.0 seconds.

The feedwater control valve response time associated with the Containment Isolation function has been changed to less than or equal to 9 seconds. This value acknowledges the time requirements associated with the electronics, and ensures that the Engineered Safety Features (ESF) response time of 10 seconds is not exceeded. Unit 1 Technical Specification 3.6.2.1 Table 3.6-1 is revised to establish a less than or equal to 9 seconds response time for the Feedwater Isolation function. Unit 2 Technical Specification 3.6.3 Table 3.6-1 is revised to establish a less than or equal to 9 seconds response time for the Feedwater Isolation function.

II. Reason for the Proposed Change

PSE&G has experienced difficulty in meeting the current Technical Specification response time requirements associated with Feedwater Isolation. Additionally, feedwater control valve Containment Isolation times are inconsistent between Salem Unit 1 and 2 Technical Specifications, although the feedwater systems are functionally identical. PSE&G conducted an investigation to determine if there was a basis for different Salem Unit response times. The review concluded that there is no meaningful reason for this difference. PSE&G agreed to submit a Technical Specification change in response to a Notice of Violation dated August 9, 1989, associated with feedwater control valve surveillance testing. This amendment request satisfies the commitment to establish consistent feedwater control valve Containment Isolation times between Salem Unit 1 and 2 Technical Specifications.

III. Justification for the Proposed Change

PSE&G contracted Westinghouse Electric Corporation to perform a safety analysis to determine if an increase in feedwater control valve closure time could be supported by the current licensing basis safety analyses.

Two (2) specific areas of concern were addressed within the scope of the safety evaluation.

1) Evaluation of the increase in feedwater valve closure time and failure of a feedwater valve to close for LOCA and Non-LOCA analyses.

2) Evaluation of the increase in feedwater valve closure time and failure of a feedwater valve to close for Containment analyses.

A. EVALUATION OF THE INCREASE IN FEEDWATER VALVE CLOSURE TIME AND FAILURE OF A FEEDWATER VALVE TO CLOSE FOR LOCA AND NON-LOCA ANALYSIS.

1. Increase in feedwater valve closure time.

During small and large break LOCAs, an extension in the time required to isolate feedwater would increase the decay heat removal capability slightly and result in a small benefit during these events. Therefore, increasing the response time to 10 seconds is acceptable. The failure of a feedwater control valve to close results in the same small benefit and is bounded by the single failure assumed in the Salem licensing basis LOCA analyses.

Closure of the feedwater control valves is assumed in the following Non-LOCA design basis safety analyses: demonstration of core integrity during steamline break events and excessive feedwater flow events.

Past analyses done for steamline break core integrity purposes have shown that the minimum DNBR is mildly sensitive to the performance of the main feedwater system with the boron injection tank removed from service. Evaluation results determined that a small increase in core power (maximum of 1%) would result due to the increase in feedwater control valve closure time. The DNBR penalty associated with this slight core power increase does not exceed the design limit value of DNBR. Thus, the consequences and conclusions of the existing Salem steamline break core integrity analysis are still applicable.

Feedwater malfunctions which cause excessive feedwater flow result in an increasing Steam Generator (S/G) inventory and a corresponding cooldown of the Reactor Coolant System (RCS). Termination of the event is accomplished by isolation of main feedwater in conjunction with reactor and turbine trips. The increase in feedwater isolation response time to 10 seconds does not result in S/G overfill. The RCS cooldown results in a core power increase (due to moderator feedback) and DNBR decrease. However, the minimum DNBR occurring during an excessive feedwater flow event is a function of when the reactor and turbine trips occur, not the speed at which the feedwater flow is isolated. Therefore, the consequences and conclusions of the existing Salem excessive feedwater flow analysis are still applicable with a feedwater isolation response time of 10 seconds.

2. Failure of a feedwater valve to close.

The design basis steamline break core response analysis assumes the limiting single failure of a Safeguards Train, which minimizes the boron injection capability to terminate the event. If instead, the single failure is assumed to be the feedwater control valve (BF-19), a 30 second delay would be imposed on feedwater isolation. Feedwater isolation would occur when the feedwater isolation valves (BF-13) received a close signal in response to Hi-Hi S/G level. A feedwater addition rate of 125% of full power feedwater flow for an additional 30 seconds was evaluated. The reactivity insertion resulting from the additional cooldown prior to feedwater isolation would be less than the additional boron injection capability provided by the second Safeguards Train. Therefore, the single failure of the feedwater control valves to close would be less limiting than the failure of a Safeguards Train.
The failure of a feedwater control valve to close during a feedwater malfunction results in the previously mentioned 30 second delay in feedwater isolation. This delay increases the S/G inventory. The feedwater addition rate of 125% of full power feedwater flow for an additional 30 seconds was evaluated and resulted in no S/G overfill occurring.

In summary, the conclusions of the current Salem licensing basis analyses for LOCA and Non-LOCA events would be unchanged if the feedwater isolation ESFAS response time was increased to 10 seconds. Additionally, the single failure of a feedwater control valve to close is bounded by the single failure assumptions used for the Salem licensing basis LOCA and Non-LOCA related analyses.

B. EVALUATION OF THE INCREASE IN FEEDWATER VALVE CLOSURE TIME AND FAILURE OF A FEEDWATER VALVE TO CLOSE FOR CONTAINMENT ANALYSIS.

The Salem design basis containment analysis considers: short term and long term mass and energy release analyses for postulated LOCAs, containment response analyses following a LOCA or steamline break inside containment, and subcompartment pressure transient analyses.

Increasing the feedwater control valve closure time would have no effect on the calculated results for short term mass and energy release and subcompartment pressure analyses, because the transient has a duration of 3 seconds or less.

The long term mass and energy release and containment pressure response calculations following a LOCA would improve with increased feedwater control valve closure times, due to the reduction in S/G secondary side temperature as the mass increased. Thus, secondary to primary heat transfer occurring during a LOCA would be reduced.

Containment pressure and temperature responses to mass and energy releases during a steamline break transient are affected by the feedwater control valve closure time. Feedwater isolation delays result in additional S/G inventory which can be released to the containment. The current Salem design basis containment analysis includes multiple failure assumptions. The most limiting containment pressure occurs for a 0.944 ft2 split rupture initiated at 30% power, with the failure of a Main Steam Isolation Valve (MSIV) and a containment Safeguards Train. The associated peak pressure is 46.4 psig. The most limiting containment temperature occurs for a 0.6 ft2 small double ended rupture initiated at 102% power, with failures of an MSIV, feedwater control valve, auxiliary feedwater pump runout protection, and a containment Safeguards Train. The associated peak containment temperature is 345.5 degrees F.
The most limiting analyses were performed with the feedwater control valve closure time increased to 10 seconds. The containment pressure was maintained below the design pressure of 47 psig for all single failures analyzed. The most limiting single failure for the peak pressure case was the failure of a containment safeguards train which yielded a peak pressure of 46.53 psig. Containment temperature was maintained below 340 degrees F for all single failures analyzed. The most limiting single failure for peak temperature was the failure of an MSIV which yielded a peak temperature of 338.3 degrees F.

In summary, the increase in feedwater control valve closure time had no effect on the LOCA containment analysis and the short term subcompartment analysis. The increase did affect the steamline break containment analysis. However, the conclusions presented in the current Salem FSAR remain valid for the containment integrity analyses discussed above.

IV. Significant Hazards Analysis Consideration

The proposed changes to the Technical Specifications:

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

   The effect of the increase in feedwater control valve closure time was evaluated with regard to LOCA, Non-LOCA and Containment Integrity analyses.

   The increased closure time had no effect on the short term mass and energy release, and the short term subcompartment analysis. The long term mass and energy release, and the containment pressure response calculations following a LOCA improved with increased feedwater isolation times, due to the reduction in S/G secondary side temperature as the mass increased. The increase in valve closure time affected the steamline break containment analysis slightly. The current Salem Design Basis Containment Analysis for steamline break contains multiple failure assumptions. The most limiting analyses were reevaluated with the feedwater control valve closure time increased to 10 seconds. The containment pressure was maintained below the design pressure of 47 psig and the containment temperature was maintained below 340 degrees F for all analyses. It was also concluded that the single failure of a feedwater control valve is bounded by the single failure of a safeguards train assumed in the Salem Safety Analysis Report.

   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 or different kind of accident from any accident previously evaluated.

No physical plant modifications or new operating configurations result from these changes. The proposed changes do not adversely affect the design or operation of any system or component important to safety. The increase in feedwater control valve closure time is justified by analysis and controlled by the Technical Specifications.

Therefore, no new or different accident from any previously evaluated will be created.

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

Existing LOCA, Non-LOCA and Containment Integrity analyses were evaluated to determine the affect of an increase in feedwater control valve closure time. The results of these analyses demonstrated that this increase does not reduce the existing margin of safety. The design limit valve for DNBR is maintained in all cases (i.e. DNBR remains greater than or equal to 1.3). The most limiting containment integrity analyses, reevaluated with the increase in valve closure time, did not exceed the containment design pressure of 47 psig or a containment temperature of 340 degrees F.

The change also results in consistent Containment Isolation closure times specified in Salem Unit 1 and 2 Technical Specifications.

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 change satisfies the criteria for a no significant hazards consideration.

ATTACHMENT 2