Public Service
Electric and Gas
Company

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United States Nuclear Regulatory Commission
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Washington, DC 20555

EXIGENT REQUEST FOR CHANGE TO TECHNICAL SPECIFICATIONS
MOVABLE CONTROL ASSEMBLIES AND POSITION INDICATION SYSTEMS
SALEM GENERATING STATION NO. 2
FACILITY OPERATING LICENSE DPR-75
DOCKET NO. 50-311

Gentlemen:

In accordance with 10CFR50.90, Public Service Electric & Gas (PSE&G) Company requests a revision to the Technical Specifications (TS) for Salem Generating Station Unit No. 2. In accordance with 10CFR50.91(b)(1), a copy of this submittal has been sent to the State of New Jersey.

The proposed TS changes contained herein represent changes to Specification 3/4.1.3.1 "Movable Control Assemblies," and 3/4.1.3.2.1, "Position Indication Systems." These changes involve increasing the allowable band for control and shutdown rod demanded position versus indicated position from ± 12 steps to ± 18 steps when the reactor thermal power is equal to or less than 85% and ± 12 steps when the reactor power is greater than 85%.

PSE&G requests these changes to provide additional operational flexibility, to allow the orderly resumption of startup and preclude unwarranted power transients at Salem Unit 2. As a result of the rod position indication being at -13 steps from demanded position for two rods, Salem Unit 2 completed a Technical Specification required shutdown on August 19, 1997.

From a historical regulatory perspective, similar changes were approved for Florida Power and Light (Turkey Point Units 3 and 4 NRC SER dated July 12, 1996), Virginia Electric and Power (North Anna Units 1 and 2 - NRC SER dated August 27, 1990).

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

considerations.

The basis for the requested change is provided in Attachment 1. A 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.

PSE&G requests that the NRC review this request for amendment on an exigent basis. These proposed changes provide additional operational flexibility and preclude unwarranted power transients at Salem Unit 2.

Upon NRC approval of this proposed change, PSE&G requests that the amendment be made effective on the date of issuance, and fully implemented within 7 days.

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

Sincerely,

E Simpson

Affidavit
Attachments (3)

AUG 19 1997

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REF: LR-N970543
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STATE OF NEW JERSEY)
) SS.
COUNTY OF SALEM)

E. C. Simpson, being duly sworn according to law deposes and says:

I am Senior Vice President - Nuclear Engineering 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, Unit No. 2, are true to the best of my knowledge, information and belief.

E C Simpson

Subscribed and Sworn to before me
this 19th day of August, 1997

Kimberly Jo Brown
Notary Public of New Jersey

KIMBERLY JO BROWN
NOTARY PUBLIC OF NEW JERSEY
My Commission Expires April 21, 1998

My Commission expires _____

I. REQUESTED CHANGE AND PURPOSE

The proposed Technical Specification (TS) changes contained herein represent changes to Specification 3/4.1.3.1 "Movable Control Assemblies," and 3/4.1.3.2.1, "Position Indication Systems" for the Salem Unit 2 Nuclear Generating Station. The Technical Specifications are changed as follows:

1. TS 3.1.3.1 Limiting Condition for Operation (LCO) is changed by deleting phrase "..±12 steps (indicated position).." and replacing it with the following: "..± 18 steps (indicated position) when reactor power is ≤ 85% RATED THERMAL POWER, or ± 12 steps (indicated position) when reactor power is > 85% RATED THERMAL POWER,..."

2. TS 3.1.3.1 Actions b, and c are changed by deleting the phrase "... ±12 steps (indicated position)..." and replacing it with the following: "..± 18 steps (indicated position) at ≤85% RATED THERMAL POWER or ± 12 steps (indicated position) at >85% RATED THERMAL POWER..."

3. TS 3.1.3.1 Action c.2. is changed by deleting the phrase ".. ±12 steps.." and replacing it with the phrase "..± 18 steps (indicated position) at ≤85% RATED THERMAL POWER or ± 12 steps (indicated position) at >85% RATED THERMAL POWER,..."

4. TS Surveillance Requirement (SR) 4.1.3.1.1 is changed by deleting the phrase "..±12 steps (indicated position of the group demand position..." and replacing it with the phrase "..the limits established in the limiting condition for operation,..."

5. TS 3.1.3.2.1 a. LCO is changed by deleting the phrase "..±12 steps.." and replacing it with the phrase "..± 18 steps at ≤85% RATED THERMAL POWER or if reactor power is > 85% RATED THERMAL POWER ± 12 steps ..."

6. TS 3.1.3.2.1, Action c.1. and TS SR 4.1.3.2.1.1 are changed by deleting the phrase "..12 steps.." and replacing it with the phrase "18 steps when reactor power is ≤ 85% RATED THERMAL POWER or if RATED THERMAL POWER is > 85% RATED THERMAL POWER, 12 steps..."

7. The Technical Specification Bases for Reactivity Control and Power Distribution Limits are also changed to delete the reference to ± 12 steps and include the statement "Allowed Rod Misalignment."

The purpose of the proposed changes provides for additional flexibility in the operations of Salem Unit 2, while maintaining the safety margin. Experience with the rod position indication system has shown that indicated misalignment could be greater than ± 12 steps.

TS 3.1.3.2.1, Action statement a.1 requires that an incore flux map be taken every 8 hours to verify the actual location of the rods, when the misalignment is greater than ± 12 steps. However, in most cases these flux maps have shown that there was no actual rod misalignment present.

The proposed changes would allow ± 18 steps misalignment at or below 85% of RATED THERMAL POWER (RTP) and maintain the ± 12 steps requirement above 85% of RTP. Changing the Technical Specifications to allow ± 18 steps misalignment will reduce the number of power transients (shutdowns) initiated as a result of control rod misalignment, as well as reduce the unnecessary use of the flux mapping system.

II. JUSTIFICATION OF REQUESTED CHANGES

BACKGROUND

The major function of the rod control system is to position neutron absorbing control rods in the core to control reactivity. This could take several forms; the system can be used to: 1. add positive reactivity to start-up the plant, 2. add negative reactivity to shutdown the plant, and 3. add reactivity to control reactor coolant temperature. The rod control system, in conjunction with the reactor protection system, can be used to rapidly shutdown the plant in unsafe or potentially unsafe conditions.

Rod position is determined by use of a linear voltage transformer. Primary and secondary windings are stacked alternately around the outside of the pressure housing for each rod. The primary windings are connected to a power supply which provides power to the coils. A voltage signal is induced into the secondary winding by transformer action. The lead screw, which is attached to the control rod, acts as the transformer core. As the control rods are withdrawn from the reactor core, the lead screw is pulled further into the pressure housing. This increases the coupling between the primary and secondary windings of the transformer. The further the lead screw is pulled into the pressure housing, the higher the output voltage from the secondary windings. This output voltage is conditioned and displayed in the control console for each individual rod position indication.

This output is calibrated every 18 months as required by Technical Specifications. This method of determining Rod Position Indication (RPI) has experienced some difficulties with the calibration technique. Some of the basic problems encountered with calibrating the system are associated with;

1. The instrumentation readout design is based on the assumption that secondary voltage is a linear function of rod position. In fact, the steady-state calibration curve is more of an arc-shaped or even an S-shaped curve such that for some rods the steady-state Zero Span adjustment may not always be able to be calibrated to within the ± 12 steps, and

2. The instrument response is highly dependent on temperature changes, such as Reactor Coolant System temperature changes and temperature changes associated with rod motion itself. This "transient" thermal response has been categorized as "overshoot," and this transient indication error tends to be worst near the top of the core (rods withdrawn).

PSE&G has experienced these difficulties in calibrating some of the RPI's.

PRESENT CONDITION

Salem Unit 2 commenced a reactor startup on August 17, 1997, following an extended shutdown. During performance of reactor physics testing for rod swap, two control rods deviated from their group demand counter by 13 steps or one step over the limit. Salem Unit 2 entered Technical Specification Limiting Condition for Operation 3.1.3.2.1. As a result of the rod position indication being greater than ± 12 steps, Salem Unit 2 completed a Technical Specification 3.1.3.2.1 required shutdown on August 19, 1997.

PSE&G requests these changes to provide additional operational flexibility and preclude unwarranted power transients at Salem Unit 2.

JUSTIFICATION

1. TS 3.1.3.1

The new LCO will read "All full length (shutdown and control) rods, shall be OPERABLE and positioned within ± 18 steps (indicated position) when reactor power is ≤ 85%, or ± 12 steps (indicated position) when reactor power is > 85% of their group step counter demand position within one hour after rod motion."

Justification: Power distribution calculations with rod misalignments of 30 steps (18 steps indicated + 12 steps uncertainty) show that the increase in peaking factors will be accommodated at or below 85% of RTP. The justification for this proposed change is provided in the 10CFR50.92 Section below.

Changes 2 through 6 in section I above

Justification: These proposed changes provide for consistency between the LCO requirements, the Action Statements and the Surveillance Requirements. The allowable action times remained as previously stated in the Technical Specification. These changes can be categorized as editorial in nature. The only proposed change for TS 3.1.3.2.1 is to the allowable ± 12 step rod deviation and not to the allowable ranges described in the LCO.

7. Bases to Technical Specification 3/4.1.3, 3/4.2.2 and 3/4.2.3

Justification: The BASES were changed to be consistent with the changes to the Limiting Condition for Operation of Specification 3.1.3.1 and to reflect the allowable range depending on power level.

CONCLUSIONS

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

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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 No. 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 will increase the band for control and shutdown rod indication versus group demand position from ± 12 steps to ± 18 steps for power level ≤85% RATED THERMAL POWER and ± 12 step for >85% RATED THERMAL POWER.

BASIS

1. **The proposed change does not involve a significant increase in the probability or consequences of an accident previously evaluated.**

The proposed change to the rod misalignment criteria of ±18 steps for core powers equal to or below 85% of RATED THERMAL POWER (RTP) does not increase the probability of previously evaluated accidents. Increasing the magnitude of the allowed control rod misalignment is not a contributor to the mechanistic cause of an accident evaluated in any accident analysis. The magnitude of control rod indicated misalignment is a parameter used to establish the initial conditions for accident evaluation.

The proposed increase in the allowable rod misalignment from the current ±12 steps for reactor powers equal to or less than 85% RTP does not involve a significant increase in the consequence of any previously evaluated accident. Rod misalignment affects power distribution, shutdown margin and the ejected rod accident. An extension of the allowable rod misalignment above and below 85% RTP has been analyzed in Westinghouse WCAP-14672. As provided in WCAP-14672, above 85% the allowable misalignment is governed by the available peaking factor margins as determined by flux maps. PSE&G is simplifying the proposed change by keeping the currently allowed ±12 step misalignment in Technical Specifications 3.1.3.1 and 3.1.3.2.1 for reactor power greater than 85% RTP.

The PSE&G proposed change is to allow ±18 steps misalignments in Technical Specifications 3.1.3.1 and 3.1.3.2.1 for reactor power less than or equal to 85% RTP. As demonstrated in WCAP-14672, for reactor powers less than 85% RTP, the available peaking factor margin increases faster than any penalty associated with a ±18 step misalignment.

As described in Section 4.0 of the Westinghouse WCAP, a conservative penalty factor has been applied to the rod insertion allowance (RIA) of the shutdown margin calculation to account for rods misaligned an additional ±6 steps (for a total of ±18 steps). This conservative penalty factor is applied as part of the reload analysis in order to satisfy Technical Specification 3.1.1.1.

In addition to the normal, or Condition I, operational transients, the impacts of increased rod misalignment on Condition II, III and IV accident analysis have also been evaluated. The proposed increase in rod misalignment does not have a significant effect on any moderator or Doppler reactivity coefficients or defects, boron worth or reactor kinetics parameters.

To account for the potential increase in ejected rod parameters, conservative penalty factors have been applied to the reload safety evaluation to cover the additional ±6 step misalignment. Margin is available in the reload safety analysis to accommodate this impact.

Therefore, the proposed amendment does not increase the probability or consequences of any accident 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 accident scenarios, failure mechanisms or limiting single failures are introduced as a result of the proposed change to the rod misalignment criteria of ±18 steps below 85% RTP. The implementation of the proposed rod misalignment criteria will have no adverse effect on the performance of any other safety related system. Therefore the proposed amendment does not create the possibility of a new or different kind of accident from any previously evaluated.

3. The proposed change does not involve a significant reduction in a margin of safety.

Operation of the facility in accordance with the proposed amendment would not involve a significant reduction in the margin of safety. The Technical Specifications allowed increase in peaking factors as power is reduced accommodates the peaking factor penalty associated with the additional ±6 step misalignment for core powers equal to or less than 85% RTP. Therefore, there is no change to the peaking factors assumed in the safety analysis. In addition to peaking factors, there is no change in any other current limit input into the safety analysis. As the input, or initial conditions, of the safety analysis have not changed, there is no reduction in the margin to safety.

CONCLUSION

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