PSE&G

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Nuclear Business Unit

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United States Nuclear Regulatory Commission
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ADDITIONAL INFORMATION FOR CORRECTIONS TO AMENDMENT 69 SAFETY EVALUATION REPORT SALEM GENERATING STATION UNIT NO. 2 DOCKET NO. 50-311

Ladies and Gentlemen:

On May 27, 1997, Public Service Electric and Gas (PSE&G) submitted letter LR-N970293 for corrections to the Safety Evaluation Report for Amendment 69 to the Salem Unit 2 Technical Specifications. As a result of this letter, the NRC requested, during a conference call, that PSE&G provide additional information regarding the mitigation of a Loss of Coolant Accident (LOCA) in Mode 4. The specific information requested by the NRC and PSE&G's overall response are provided below:

NRC Questions:

- Why is the Refueling Water Storage Tank (RWST) draindown times during a Mode 4 LOCA longer than the Mode 1-3 LOCA?
- In general, what does the procedure entail for mitigation of the Mode 4 LOCA?
- What would the draindown time in Mode 4 (past and present) be for Unit 2?

PSE&G Response:

In a letter dated January 5, 1987, PSE&G responded to an NRC request for additional information regarding the mitigation of a Mode 4 LOCA. In the letter, PSE&G indicated that if a LOCA were to occur during MODE 4 operation, with the semi-automatic switchover system disarmed, the operator would initiate manual actions consistent with the procedures in place, to shift each train over to the containment sump.

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The draindown time of the RWST from the low level alarm to the unusable water level with the assumption that the operator fails to stop a containment spray pump for conservatism was calculated to be approximately 18.5 minutes.

This time of 18.5 minutes was based on an available RWST volume of 129,300 gallons and a total pump flow of approximately 7000 gallons. The 7000 gpm included an assumed maximum flow rate of 5200 gpm for two (2) Containment Spray (CS) pumps. The current analysis uses a maximum flow rate of approximately 7200 gpm (depending on Containment pressure conditions) for two (2) CS pumps. This CS pump flow rate is a major factor in the current RWST draindown rates.

Recent RWST draindown evaluations have resulted in revised draindown times. The limiting draindown time for a Unit 2 LOCA in Modes 1-3 is 11.2 minutes. The RWST draindown times for a LOCA in Mode 4 is conservatively estimated to be in excess of 18 minutes. The reason for the increased time is described below.

The Mode 4 LOCA procedure, S2.OP-AB.LOCA-0001(Q) "Shutdown LOCA", is different than the Mode 1-3 LOCA procedures EOP-LOCA-1 through 5. A major difference is that for Mode 4 LOCA mitigation, the operators must prevent the potential for overpressurization of the Reactor Coolant System (RCS). The Mode 4 LOCA procedure requires that a single train be aligned and pumps started in a controlled, conservative manner so as to not create an overpressure condition.

The Shutdown LOCA procedure is applicable for a LOCA that occurs after isolation of the accumulators, in the lower end of Mode 3, or in Mode 4. In the Shutdown LOCA procedure, the minimum number of pumps would be started to provide sufficient core cooling but not overpressurize the RCS. Since the number of pumps operating is controlled by the procedure (to avoid possible overpressure situations), the drawdown rate on the RWST is reduced. This reduced drawdown rate significantly extends the draindown time of the RWST beyond the limiting MODE 1-3 analysis time of 11.2 minutes.

In a Mode 4 LOCA scenario, when the RWST low level alarm is received, transfer to cold leg recirculation (single train) is manually initiated. The transfer procedure is contained in Attachment 2 of the AB LOCA procedure and is similar for both Units.

In order to conservatively bound the MODE 4 LOCA draindown time, one Safety Injection (SI) pump and one Charging/SI (C/SI) pump is assumed to continue to take suction from the RWST and inject into the core during the entire transfer to cold leg recirculation. Additionally, one Residual Heat Removal (RHR) pump is assumed to be transferred to the containment sump within 4 minutes of the receipt of the RWST low level alarm and one CS pump continues to draw from the RWST until the CS pump is stopped at the RWST low-low level alarm.

Based on the conservative assumptions above, the minimum time available for switchover to cold leg recirculation to occur (from the RWST low level alarm setpoint to the RWST low-low level alarm setpoint) is greater than 19 minutes.

Salem Unit 2 RWST Draindown	Past (Amendment 69) MODE 4 LOCA Available RWST Volume = 129,300 gal.	Current MODE 4 LOCA Available RWST Volume = 108,500 gal.
Recirculation Mode	≈18.5 minutes	≈19.1 minutes

If you have any questions concerning the above information, please do not hesitate to contact us.

Sincerely,

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