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SUBJECT: Forwards Proposed Amend 157 to License NPF-14,changing TS 4.5.1.c.4 & Table 3.3.3-1 to reflect pending mod to revise logic which controls automatic transfer of HPCI pump suction source on high suppression pool to address 910731 scram.

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MAY 17 1993

Director of Nuclear Reactor Regulation
Attention: Mr. C. L. Miller, Project Director
Project Directorate I-2
Division of Reactor Projects
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

SUSQUEHANNA STEAM ELECTRIC STATION
PROPOSED AMENDMENT 157 TO LICENSE NO. NPF-14:
CHANGES TO HPCI PUMP SUCTION TRANSFER LOGIC
PLA-3952 **FILES A17-2/R41-2** **Docket No. 50-387**

Reference: *PLA-3707, H.W. Keiser to T.T. Martin, "July 31, 1991 Scram Issue Resolution Plan," dated December 30, 1991.*

Dear Mr. Miller:

The purpose of this letter is to transmit a proposed amendment to the Susquehanna SES Unit 1 Technical Specifications. The proposed changes reflect a pending modification to SSES Unit 1 that will revise the logic which controls the automatic transfer of the HPCI pump suction source on high suppression pool level.

BACKGROUND

On July 31, 1991, SSES Unit 1 experienced a scram with MSIV closure during which the S/RVs were used for pressure control. During the initial phases of the cooldown, HPCI was unavailable for pressure control due to high suppression pool level. Use of the S/RVs is consistent with the design basis, but made reactor water level and pressure control difficult for the operators. The use of HPCI for pressure control (i.e, both pump suction and discharge are aligned to the condensate storage tank (CST)) allows much smoother control of pressure and level. The referenced letter documented our commitment to enhance the operators' ability to use HPCI in this type of scenario in the future.

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DESCRIPTION OF CHANGE

The attached marked-up changes to Specification 4.5.1.c 4 and Table 3.3.3-1 reflect the proposed change to the HPCI suction transfer logic. PP&L is proposing that the logic be modified to function only when the HPCI injection valve is open. The automatic transfer of HPCI pump suction from CST to suppression pool on low CST water level is unaffected by this logic change.

SAFETY ANALYSIS

The physical change to the unit involves a relay being added to the HPCI injection valve (F006) control logic to permit transfer of the HPCI pump suction from the CST to the suppression pool on high suppression pool level only when the F006 valve is open (see Figure 1, attached). The relay will be energized by an existing limit switch on the F006 valve that closes as the valve begins to open. The purpose of the automatic transfer of HPCI suction on high suppression pool level is to preserve the containment loading assumptions in the existing safety analysis. Therefore, the impacts on these assumptions as well as HPCI's safety function were evaluated.

HPCI Function

The safety function of the HPCI system is to maintain reactor vessel inventory following a loss of coolant accident which does not permit the use of the low pressure ECCS systems. The proposed change is designed to ensure that this function will not be affected since the automatic transfer will occur when HPCI injection is required, based on injection valve position. Various failures associated with the new design have been evaluated, and it has been determined that failure of the new logic could affect the proper alignment of the suppression pool suction valve (F042) or the F006 valve. However, in the unlikely event of these failures or previously evaluated ones, ADS will function to ensure that low pressure ECCS systems can provide adequate core cooling. Further, the new postulated failures have been evaluated probabilistically, and the predicted failure rate of each valve was determined not to change significantly.

Containment Analysis

The current containment analysis in the DAR is based on the assumption that the suppression pool level is no higher than 24 feet if a design basis accident occurs. This assures that LOCA-related loads on safety-related components and structures will be acceptable. As previously stated, a LOCA with failure of HPCI is bounded by the

operation of ADS. In this scenario, HPCI would not be in pressure control mode, and suppression pool level would have to be within the Technical Specification limit of 24 feet. Since the new design will allow the operator to bypass this limit as long as HPCI is not injecting (he must also follow the Emergency Operating Procedure on Primary Containment Control), the impact of postulated failures while the HPCI system is being used for pressure control was examined.

If HPCI is being used for pressure control, an MSIV closure and reactor scram have occurred, and several minutes have passed since the scram. With this in mind, although suppression pool level could be above 24 feet, postulating pipe breaks as single failures to maximize containment loading would not impact the safety analysis for the following reasons: 1) if the break is small and suppression pool water level is high, HPCI will realign on injection valve movement in response to a high drywell pressure signal. Since HPCI would be available for injection (the single failure was the break), reactor water level and pressure would be controlled, and unacceptable loads on the containment would be avoided. 2) If the break is large, the scram that had already occurred would ensure that the energy in the core had been reduced such that containment impacts would be bounded by existing analysis.

Monitoring and maintaining suppression pool water level within Technical Specification limits during all HPCI testing will continue to be the responsibility of the operator.

NO SIGNIFICANT HAZARDS CONSIDERATIONS

The proposed change does not:

1. **Involve a significant increase in the probability or consequences of an accident previously evaluated.**

   All pertinent FSAR and DAR evaluations were reexamined based on the proposed modification. The probability of a failure of the new relay has been minimized by the use of the same type already in use in Engineered Safety Feature control systems. Further, its operability will be confirmed through periodic testing. A probabilistic evaluation based on a review of reliability studies performed for the Susquehanna IPE considered failures of the F042 and F006 valves to open. This evaluation determined that the increase in failure rate due to the addition of the relay falls within the error band of the predicted failure rate of the valves without the additional relay installed. The new relay has no interconnections with any other components which could impact safety. Therefore, the proposed change will not significantly increase the probability of previously evaluated events.

With regard to the consequences of previously evaluated events, as stated earlier, HPCI failure is bounded by the operation of ADS by design. If rather than HPCI failure, a pipe break is assumed while HPCI is aligned for pressure control with suppression pool level potentially greater than 24 feet, the resulting loads on safety-related components and structures are bounded by existing analysis as discussed previously. Based on the above, the consequences are bounded by existing analysis, and therefore do not constitute any increase in the consequences of previously evaluated events.

2. **Create the possibility of a new or different kind of accident from any accident previously evaluated.**

Postulated failures of the new design, as described above, could result in the loss of the HPCI ECCS function. However, the ADS system exists as part of the design basis for this purpose. Other failures postulated while HPCI is operating in pressure control mode are bounded by previously evaluated events as described in 1. above. Therefore, the proposed change will not create the possibility of a new or different kind of event.

3. **Involve a significant reduction in a margin of safety.**

The motivation for proposing this modification is to improve the operators' ability to control level and pressure in the reactor after an MSIV closure event. PP&L believes this will improve the safe operation of Susquehanna SES. It will not significantly reduce any margin of safety because:

- It will continue to ensure that HPCI realigns to the suppression pool for HPCI injection if suppression pool level approaches the Technical Specification limit and injection into the vessel is required.

- Failure of the new relay will prevent the above realignment when required, but other single failures exist which can create this effect, and we have determined that the increase in failure rate due to the new relay is within the error band of the currently predicted failure rate (without the relay installed).

- When HPCI is in pressure control mode the change does not prevent operation of suppression pool level above the Technical Specification limit as long as HPCI is not required to inject. However, based on consideration of worst case single failures while in pressure control mode, it is concluded that the impact of such events on containment analysis results is bounded by previous analysis.

IMPLEMENTATION

PP&L requests that these amendments be approved prior to the Unit 1 seventh refueling and inspection outage (scheduled to begin September 11, 1993) and be conditioned to become effective prior to startup following the outage. Startup is currently scheduled to occur November 4, 1993; we will keep you informed of any schedule changes.

Questions regarding the above proposal should be directed to Mr. A.K. Maron at (215) 774-7852.

Very truly yours,

R. G. Byram

Attachment

cc: NRC Document Control Desk (original)
NRC Region I
Mr. G. S. Barber, NRC Sr. Resident Inspector
Mr. J. J. Raleigh, NRC Project Manager