Safety Analysis for Operability (SAO)

SAO #91-01 Revision 0

Initiation Date: February 6, 1991

I. EXISTING CONDITION

The CVCS charging line enters containment via penetration M-3. During upgrade of design basis documentation an open item was identified concerning containment penetration M-3. The open item involves the licensing basis for not performing Type C leak testing per the requirements of 10 CFR 50 Appendix J. The basis for not testing this penetration is documented in an SER dated January 10, 1986. This SER has been affected by revisions made to the containment pressure analysis after the SER was issued.

The NRC's January 10, 1986 SER states the following regarding M-3:

> "The staff finds that an exemption from the Type C testing requirements of Appendix J is not needed for the containment isolation valve associated with penetration M-3, since the valve is not included in the valve categories of paragraph II.H of Appendix J, which are required to be Type C tested. Furthermore, the staff has determined that penetration M-3 does not constitute a potential containment atmospheric leak path, for the reasons stated above. Therefore, the licensee may exclude the subject valve from the Type C test program."

The basis in the SER that penetration M-3 does not constitute a potential containment atmospheric leak path has been affected by revisions to the containment pressure analysis.

The SER states that the charging pumps and the hydraulic head in the system provide a seal against containment leakage through penetration M-3. The charging pumps start and the system automatically aligns on an SIAS to inject boric acid into the RCS. The SER states that the discharge pressure of the charging pumps, up to 2200 psig, will prevent leakage through the penetration with a maximum containment accident pressure of 60 psig. Following completion of the injection phase, the charging pumps will be shut down and the hydraulic head of 6 psig remaining in the system will provide a seal against air leakage out of containment for the remainder of the accident. The remaining hydraulic head (6 psig) would be above containment pressure for the duration of the accident. The hydraulic head in the system is provided by the physical configuration and elevation of system components which remain filled with boric acid solution.

The SER concludes that the penetration does not constitute a potential containment atmospheric leak path, for the reasons stated above. Therefore, penetration M-3 may be excluded from Type C testing.

Revised containment pressure analysis at approximately 30 minutes into post-LOCA conditions has increased the pressure in containment to 20-40 psig. This increase in containment pressure invalidates the basis of the SER.

II. Safety Analysis for Operability with Existing Conditions

The operability of penetration M-3 and integrity of the containment can be assured on an interim basis through operator actions. The charging pumps' discharge isolation valves, CH-190, CH-192 and CH-193, will be closed by manual operator actions once boric acid injection has been terminated during accident conditions. Closure of these three isolation valves will ensure the charging header is isolated and no potential leakage path is available for containment leakage through penetration M-3.

These manual isolation valves are located in Room 7, which would be accessible prior to hot leg injection when the valves are required to be closed. These valves are considered to be leak-tight. Confidence in these valves is based on their use as isolation valves during charging pump maintenance. During maintenance activities these valves provide isolation against the pressure of a running charging pump with a discharge pressure of 2100 psig. The pump is normally disassembled for several days with no indication identified of any leakage through any of the three discharge isolation valves. The three valves were last used for isolation purposes in November and December of 1990, validating the above assumptions.

In addition to the three charging pump discharge isolation valves, each pump has a discharge check valve in series with the isolation valves (see attached figure). These check valves will provide redundancy to the manually closed isolation valves. The check valves were rebuilt in April of 1990 with the valve seats lapped and "blue checked." Also the valves were refurbished with tolerances returned to an as-designed condition. Confidence in these valves to prevent back leakage is based on performance of the valves during normal operations when the check valves prevent back leakage through the non-running charging pumps against 2100 psig discharge pressure. No back flow problems through the pumps have been identified for any of the charging pumps.

Further verification of the integrity of these check valves is provided during normal operations by the bi-weekly performance of preventive maintenance to verify the pressure on the charging pump discharge pulsation dampeners. Procedurally, this pressure is checked and adjusted by depressurizing the charging pump discharge piping between the pump and the check valve. The check valves provide isolation during the performance of this procedure. Failure of the check valves to provide isolation would prevent performance of this procedure.

In addition to the manually closed isolation valves and the in-series check valves, the charging header has other check valves that would prevent leakage from containment. To have the containment atmospheric leakage through this line, containment atmosphere would have to displace the liquid in the lines backward to a component vented to atmosphere (Safety Injection Refueling Water Tank or a Boric Acid Storage Tank). This would require liquid displacement backwards through at least four check valves in series and backwards through a positive displacement charging pump, which acts as two more check valves in series.

Except for the manually closed isolation valves and the in-series check valves the operability of the other header check valves to prevent reverse flow is considered indeterminate. However, there is no indication that these valves are not operable. All check valves are full stroke tested open per the requirements of ASME Section XI.

Penetration M-3 as described in the USAR figure 5.9-13, Sheet 4, shows a single check valve, CH-198, outside of containment. This check valve, per the referenced SER, is not required to be Type C tested. This check valve has not been included in the Appendix J program as requiring a Type C test, local leak rate test. CH-198 is located in the mechanical penetration room, #13, as close as practicable to the containment boundary. The valves on the charging pump discharge are located in Room 7.

The charging header is pressurized above 2100 psig during normal operation with any leakage identified per performance of daily RCS leakrate Surveillance Test. The normal operating pressure is much greater than the post-accident pressure of less than 60 psig. The charging header piping is CQE and seismically qualified. In addition, the charging header integrity was demonstrated when the header was hydrostatically tested above 3000 psig in 1990 as a 10-year inservice test per the requirements of ASME Section XI. Also, the charging header was open to the containment atmosphere during the successful completion of the Type A integrated containment leakrate test during the 1990 Refueling Outage. Therefore, any significant external leakage from the charging header is unlikely and therefore not considered a creditable leakage path.

The HPSI header is connected to the charging header for hot leg injection for long term core cooling. Manual operator actions to close the charging pump discharge valves do not impact the capability to provide hot leg injection.

The HPSI header (via HCV-308 and HCV-2988) is not considered to be a possible leakage path from containment via the charging header and penetration M-3. The HPSI header, post-accident, is always pressurized at or above containment pressure with a water seal to prevent any possible leakage.

Once the charging pumps have been isolated following the completion of boric acid injection and the SIRWT is below 72 inches, the charging pumps have completed their design function and would not be required to be unisolated. Closing of the charging pump isolation valves following stopping of the charging pumps would be prompted by the same procedural step in the EOPs that satisfies the requirements for stopping the charging pumps. With the interim Operations Memorandum 91-01 letter providing direction on closing these isolation valves, there is no significant misleading information or direction provided to the operators concerning the required actions that must be taken (i.e., close pump discharge isolation valves).

This SAO Does not propose actions that conflict with existing SAOs.

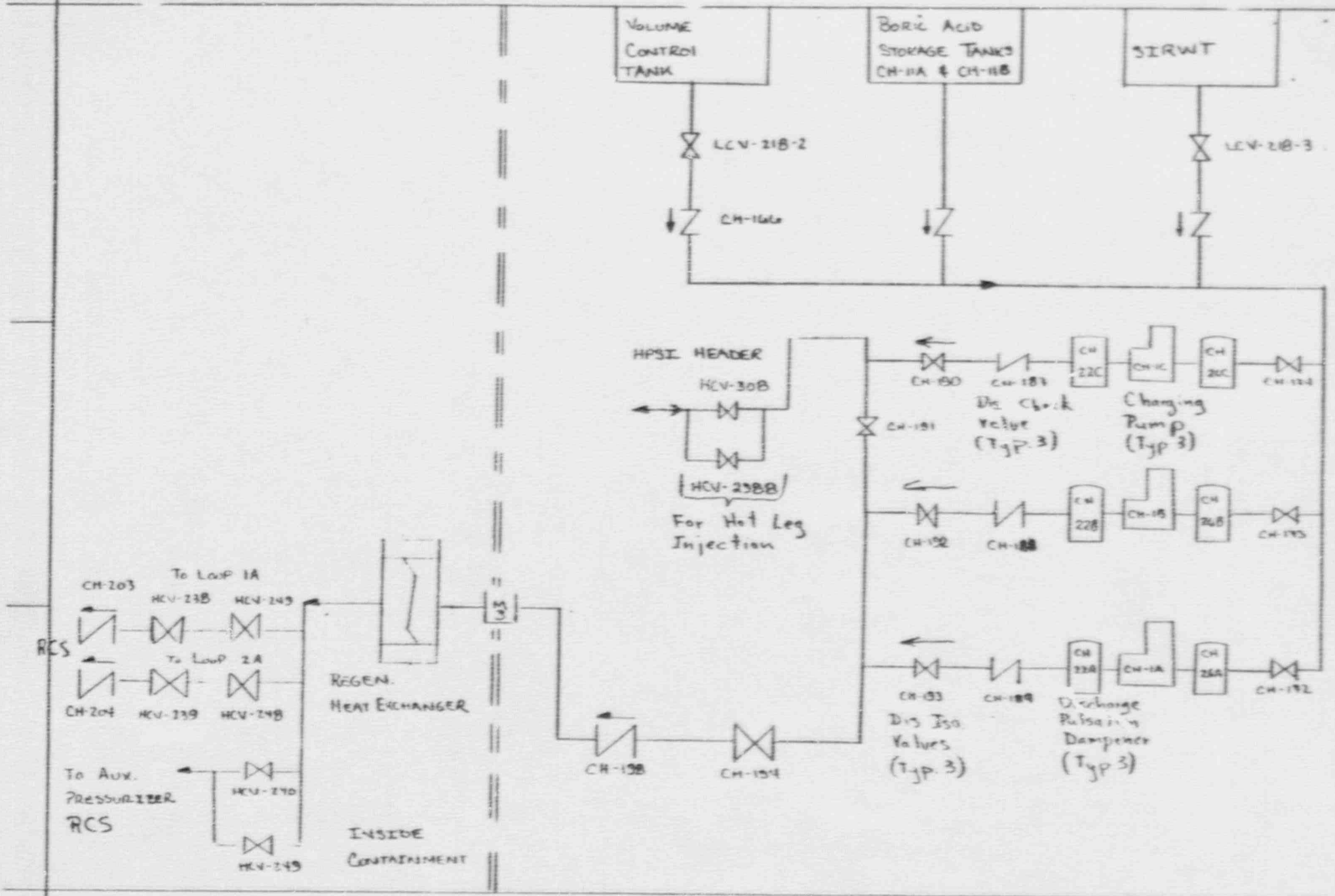
III. SAR Duration and Special Conditions

The duration of this SAO is limited to the next refueling outage or until Licensing design basis concerns with the subject SER are resolved. An action plan is being developed to address this design basis concern. The SAO will be revised as applicable.

Reportability Determination: (check as many as apply)

10 CFR 20	10 CFR 21	10 CFR 50.9	10 CFR 50.72	10 CFR 50.73	10 CFR 73
			X	X	

SAC 91-01



22-141 50 SHEETS
22-142 100 SHEETS
22-144 200 SHEETS

IV. REGULATORY ACTION

Waiver of Compliance	Compliance with Tech Spec LCO	Shutdown	Violation	Other
				X

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CLOSURE APPROVAL

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PRC RECOMMENDS APPROVAL

FEB 06 1991

PRC MTG. MINUTES