



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 130

TO FACILITY OPERATING LICENSE NO. DPR-61

CONNECTICUT YANKEE ATOMIC POWER COMPANY

HADDAM NECK PLANT

DOCKET NO. 50-213

1.0 INTRODUCTION

Pursuant to 10 CFR 50.90, Connecticut Yankee Atomic Power Company (CYAPCO) has proposed to amend Operating License No. DPR-61 for the Haddam Neck Plant. By letter dated July 5, 1990, CYAPCO proposed to reword Technical Specifications (TS) section 3.4.6.2.f to better define which sections of piping need to be included under surveillance requirement 4.4.6.2.1.g. Surveillance requirement 4.4.6.2.1.g has been changed to allow this surveillance requirement, for portions of the high pressure injection safety injection (HPSI) system, charging and residual heat removal (RHR) suction piping, to be performed at lower pressures. CYAPCO has proposed a new surveillance requirement 4.4.6.2.1.i which will require the performance of an operational leakage rate test at operating pressures under accident conditions for those portions of the HPSI, charging and RHR systems outside containment used for or pressurized during recirculation at least once per refueling outage. In addition, Specification 4.0.4 has been determined to be not applicable for this surveillance requirement for the HPSI system for entry into MODE 4. Surveillance requirement 4.4.6.2.1.h and Bases section 3/4.4.9 have also been modified to clarify the TSs. By letter dated August 20, 1990, CYAPCO requested that the proposed amendment request be authorized and approved on an Emergency basis pursuant to 10 CFR 50.91 (a)(5).

2.0 DISCUSSION

On April 26, 1990, the NRC issued to CYAPCO an entire new set of Technical Specifications in the Westinghouse Standard Technical Specification format for the Haddam Neck Plant. The Haddam Neck Plant is in the process of implementing these new Technical Specifications which are much more prescriptive and detailed than the former custom Technical Specifications. It was anticipated that clarifications or rewording would be necessary because of the scope of the TS upgrade. One of the changes provided by the upgraded TS is that surveillance requirement 4.4.6.2.1.g be conducted at the hydrostatic pressure corresponding to the operating pressure under accident conditions. This surveillance test was previously performed at the system pressure at the time of the test which is lower than system pressure during an accident. In writing the procedures for this new surveillance CYAPCO determined that performance of this test during power operation, for certain sections of piping, is either not possible due to physical or

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operational constraints (Charging and residual heat removal (RHR)) or would require the removal of both trains of safety related equipment from service during testing (high pressure safety injection (HPSI) suction piping). As a compensatory measure because certain sections of piping are leak rate tested at lower pressures, CYAPCO has proposed surveillance 4.4.6.2.1.i which will require the performance of an operational leakage rate test at operating pressures under accident conditions for those portions of the HPSI, charging and RHR systems outside containment used for or pressurized during recirculation at least once per refueling outage. In addition the change would also add an exception to specification 4.0.4 to surveillance requirement 4.4.6.2.1.g for the HPSI system for entry into Mode 4. This change was necessary because of conflicting requirements regarding HPSI pump operability during Modes 4, 5 and 6. As a clarification, the note at the end of Surveillance requirement 4.4.6.2.1.h has been modified to explicitly state that it is only applicable to surveillance item "h." Basis section "Low Temperature Overpressurization Protection Systems" (LTOP) has been changed to describe the requirement to lock out one centrifugal charging pump and both HPSI pumps in MODES 4, 5, and 6 with the reactor vessel head installed.

3.0 EVALUATION

3.1 TS Section 3.4.6.2.f

This change would reword TS section 3.4.6.2.f to better define which sections of piping need to be included under surveillance 4.4.6.2.1.g. The change does not change the portions of the systems to be tested or the allowable leak rate. The change will ensure that in addition to those portions of piping of the RHR system, the charging system and the HPSI system used during recirculation, any portions of piping belonging to the above systems that are pressurized during recirculation are also tested. Therefore, the TS change provides a better description of the sections of piping that need to be tested (all ECCS, RHR, HPSI and charging) piping outside containment used or pressurized during recirculation. Based on the above, the staff concludes that this TS change is acceptable.

3.2 TS Section 4.4.6.2.1.g

Surveillance requirement 4.4.6.2.1.g requires that an operational leakage test be performed every 31 days for those portions of the RHR, HPSI and charging piping outside containment used for or pressurized during recirculation. In writing the implementing surveillance procedure the licensee determined that certain portions of the RHR, HPSI and charging suction piping cannot be tested at accident pressure during normal operation. This change to surveillance requirement 4.4.6.2.1.g would allow the monthly surveillance for portions of the RHR, HPSI and charging suction piping to be performed at lower pressures. In addition, the change would add an exception to specification 4.0.4 for the HPSI system for entry into MODE 4 for surveillance requirement 4.4.6.2.1.g. The individual sections of RHR, HPSI and charging piping are discussed below.

A) RHR Suction Piping

The RHR suction piping between the containment sump and the RHR pump suction (see figure 1) cannot be pressurized to accident conditions. During an accident the RHR pump suction piping would be exposed to the pressure associated with the post accident containment internal pressure (40 psig). It is not physically possible to pressurize the RHR suction piping from the sump to the sump isolation valves (RH-MOV-22 and RH-V-808A) during normal operation. The sump is open in containment and cannot be isolated to allow the piping to be pressurized. Even if it were possible to isolate the sump, performing the surveillance would disable the recirculation capability of the plant during the surveillance. To pressurize the RHR suction piping from the sump isolation valves to the RHR pumps suction would require disabling both trains of the RHR during normal operation. The RHR suction piping from the sump to the first isolation valves is always full of water and under a pressure from containment atmosphere and the hydrostatic head from the sump of approximately 6 psi. The RHR piping from the isolation valve to the RHR pump suction is also always full of water and under hydrostatic pressure from the reactor water storage tank of approximately 25 psi. CYAPCO will perform the leakage surveillance once per 31 days as required by TS 4.4.6.2.1.g at these reduced pressures and extrapolate the leak rates to the operating pressure during accident conditions.

Technical Specification 4.4.6.2.1.f requires that this piping be monitored for leakage at least once per 12 hours with all identified leakage quantified and added to the monthly leakage determinations. CYAPCO has proposed TS 4.4.6.2.1.i which requires that 1) during the integrated leak rate test for Appendix J, when the containment is pressurized to 40 psig, the plant will perform a leakage check of the RHR suction piping from the containment sump to the first isolation valves (RH-MOV-783 and RH-V-808A), 2) from the first isolation valves to the first check valves (RH-CV-783 and 808A) the piping will be tested at approximately 6 psi and the leakage extrapolated to the operating pressure under accident conditions, and 3) from the check valves (RH-CV-783 and 808A) to the RHR pumps suction the piping will be tested at approximately 30 psi and the leakage extrapolated to operating pressure under accident conditions. The RHR suction piping from the isolation valves to the RHR pumps will be hydrostatic tested in accordance with Specification 4.0.5, "Inservice Inspection." Based on the above the staff has concluded that CYAPCO has taken appropriate compensatory measures and that the testing for RHR suction piping leakage at accident pressure every 31 days would provide little or no additional assurance of RHR system leakage. The staff concludes that the TS change is acceptable.

B) HPSI Suction Piping

The HPSI suction piping downstream of the HPSI suction valves (SI-MOV-854A and B) and RHR/HPSI Crossclic valves (SI-MOV-901 and 902) and upstream of the HPSI pump suction (see figure 1) during an accident are pressurized to the RHR discharge pressure (approximately 180 psig) plus the containment accident pressure (40 psig maximum). To test this piping during power operation would require aligning the HPSI suction piping to the RHR/LPSI discharge piping. The LPSI discharge design pressure is greater than the HPSI suction piping design pressure. During the test an actuation of the LPSI would damage the

HPSI suction piping. To safely perform the test the licensee believes the LPSI should be disabled to protect the HPSI system. The HPSI suction piping is always full of water and under hydrostatic pressure from the reactor water storage tank of approximately 25 psi. Surveillance 4.4.6.2.1.g will be performed as required but at this lower pressure and the licensee will extrapolate the leak rates to the operating pressure during accident conditions.

Technical Specification 4.4.6.2.1.f requires that this piping be monitored for leakage at least once per 12 hours with all identified leakage quantified and added to the monthly leakage determinations. In addition, the licensee has proposed a new TS surveillance 4.4.6.2.1.i which requires an operational leakage check at accident pressures every 18 months. This new surveillance will test the HPSI suction piping at RHR discharge pressure. At the time of recirculation, the containment pressure is significantly reduced and the RHR discharge pressure is a good approximation of HPSI suction piping accident pressure. The HPSI suction piping is also hydrostatic tested in accordance with Specification 4.0.5 "Inservice Inspection". Based on the above, the staff has concluded that performing the surveillance would require disabling both trains of the LPSI system during power operation and would provide little or no additional assurance of HPSI suction piping leakage. The staff has also concluded that CYAPCO has taken appropriate compensatory measures and the TS change is acceptable.

C) Charging Suction Piping

The charging suction piping downstream of the RHR/charging Crosstie valves (RH-MOV-33A and B) and the charging pump suction (see figure 1) during an accident are pressurized to the RHR discharge pressure plus the containment pressure. To test this piping during power operation would require aligning the charging suction piping to the RHR/LPSI discharge piping. To perform the surveillance the charging system would have to be isolated to prevent the injection of highly borated water into the RCS. The charging system is required during power operation for reactivity and chemistry control. The charging suction header is always full of water and under the hydrostatic pressure from the volume control tank (VCT) (approximately 10 psig) plus a 25 to 50 psig gas overpressure in the VCT. Surveillance 4.4.6.2.1.g will be performed at this reduced pressure and the licensee will extrapolate the leak rates to the operating pressure during accident conditions.

Technical Specification 4.4.6.2.1.f requires that this piping be monitored for leakage at least once per 12 hours with all identified leakage quantified and added to the monthly leakage determinations. In addition, the licensee has proposed a new TS surveillance 4.4.6.2.1.i which requires an operational leakage check at accident pressures every 18 months. This new surveillance will test the charging suction piping at RHR discharge pressure. At the time of recirculation, the containment pressure is significantly reduced and the RHR discharge pressure is a good approximation of charging suction piping accident pressure. The charging suction piping is also hydrostatic tested in accordance with Specification 4.0.5. Based on the above, the staff has concluded that the surveillance test would require disabling the charging system during power operation which would severely restrict plant operation and would provide little or no additional assurance of charging suction piping leakage. The staff has also concluded that CYAPCO has taken appropriate compensatory measures and the TS change is acceptable.

D) Surveillance 4.0.4 for Entry Into MODE 4

CYAPCO has also requested to add an exception for Specification 4.0.4 for the HPSI system for entry into MODE 4 for surveillance requirement 4.4.6.2.1.g. Specification 4.0.4 requires that all applicable surveillance be performed prior to entry into the plant mode for which an LCO is applicable (for this case MODE 4). In this case, the surveillance would require operation of the HPSI pumps to determine HPSI system leakage outside containment because of radiological release concerns. However, specification 3.5.2.a requires that both HPSI pumps be inoperable whenever LTOP is required to be operable (MODE 4 with reactor coolant system temperature less than or equal to 315°F and MODES 5 or 6 with the RCS not vented, per specification 3.4.9.3). These are conflicting requirements. Since assurance of operational leakage in MODES 1, 2 and 3 is not affected (the test will be done in MODE 4), design basis accidents which are postulated to occur during power operation will not be affected. Only those accidents initiated from subcritical conditions could be affected. The current TS require the HPSI pumps to be locked out IN MODES 4, 5 and 6 to limit mass and heat transients in the RCS, and this configuration with the HPSI pumps inoperable has been previously analyzed and approved. Because the HPSI system is locked out, leakage from the RCS to outside containment from the HPSI system is not a concern. The plant could perform surveillance 4.4.6.2.1.g but it would require the plant to be placed in MODE 5 with the RCS vented. Venting of the primary system requires removing a code safety valve off the pressurizer and bolting it on after the test. This is a difficult task and requires working in a high radiation area (25 to 50 mR/hr). Based on the above, the staff has concluded this TS exception would not place the plant in an unsafe condition and performing surveillance 4.4.6.2.1.g prior to entering MODE 4 for the HPSI system would not provide any additional assurance for plant safety. The staff concludes that this TS change is acceptable.

3.3 Surveillance 4.4.6.2.1.i

As a compensatory measure because the plant cannot do an operational leakage rate test at operating pressures during an accident for certain sections of piping during power operation, CYAPCO has proposed surveillance 4.4.6.2.1.i. This surveillance would require performance of an operational leakage rate test, for those portions of piping noted in surveillance 4.4.6.2.1.g at the hydrostatic pressure corresponding to the operating pressure under accident conditions at least once per refueling. All sections of piping in surveillance 4.4.6.2.1.g can be tested at the accident pressure except certain sections of the RHR suction piping. The alternate testing provided for the RHR suction piping is:

- 1) Containment sump to first isolation valve will be tested during the ILRT at the accident pressure. The deviation is that the ILRT is required to be performed at approximately an interval of three times every ten years.
- 2) From RH-MOV-22 to RH-CV-783 and RH-V-808A to RH-CV-808A the piping will be tested at approximately 6 psi and the leakage will be extrapolated to the pressure under accident conditions.

- 3) From RH-CV-783 and RH-CV-808A to the RHR pumps suction will be tested at approximately 30 psi and the leakage will be extrapolated to the pressure under accident conditions.

Surveillance 4.4.6.2.1.i provides additional limitations, restrictions or controls not previously included in the Haddam Neck TS. The staff has concluded this surveillance will provide additional assurance of limiting operational leakage from ECCS during an accident. Therefore, the staff concludes that this TS change is acceptable.

3.4 Surveillance 4.4.6.2.1.H

The note at the end of surveillance 4.4.6.2.1.h, which permits transition into MODES 3 and 4 prior to completion of surveillance, has also been modified to state that this note applies to item "h" only and not the entire surveillance. As currently physically positioned in the TS, this note could be misinterpreted as applying to the entire surveillance 4.4.6.2.1. This change clarifies the note by limiting its applicability to item "h" of the surveillance. Based on the above, the staff has concluded that this TS change is administrative in nature and provides a more concise TS. The staff concludes that this change is acceptable.

3.5 Bases-Section 3/4.4.9 "Low Temperature Overpressurization Protection Systems"

This change to the Bases describes the requirement to lock out one centrifugal charging pump and both HPSI pumps in MODES 4, 5 and 6 with the reactor vessel head installed to preclude mass and heat inputs more severe than those assumed in the safety analysis. The requirement to disable the HPSI pumps is included in Specification 3.5.2.a. The change is being made for the purpose of making the discussion in Bases 3/4.4.9 consistent with TS 3.5.2.a. The staff has reviewed this change and agrees that the change to the bases is consistent with TS 3.5.2.a and is acceptable.

4.0 EMERGENCY CIRCUMSTANCES

By letter dated April 26, 1990, the Staff transmitted Amendment No. 125 to Facility Operating License No. DPR-61 for the Haddam Neck Plant. The amendment revised the entire set of custom Technical Specifications. Upon receipt of the approved amendment, CYAPCO personnel began a final review of the license amendment to determine the adequacy of existing surveillance procedures and the need for new or revised procedures. During the review of the section on reactor coolant system operational leakage, it was discovered that certain portions of High-Pressure Safety Injection (HPSI), Charging, and Residual Heat Removal (RHR) suction piping, which would be used for or pressurized during containment recirculation, could not be tested during normal power operation as required by 4.4.6.2.1.g. At present the plant is in MODE 1 progressing with startup from the Cycle 15 refueling outage. To perform this surveillance would require the plant to go to a cold shutdown condition (MODE 5).

Emergency approval is necessary because "an emergency situation exists, in that failure to act in a timely way would result in derating or shutdown of a nuclear power plant. . . ." CYAPCO expeditiously processed a proposed change to the TS and submitted a license amendment request on July 5, 1990. The Federal Register notice on this amendment request expires on September 12, 1990 and the amendment could not be issued until at least that date. The staff believes CYAPCO made good faith efforts to have this license amendment processed under normal circumstances. However, because of the timing of the previous surveillance, even with the 25% allowance for surveillance intervals, the plant would need to shutdown by August 23, 1990 to perform the existing surveillance. Therefore, on August 20, 1990, pursuant to 10 CFR 50.91(a)(5), CYAPCO requested NRC emergency authorization and approval of the proposed amendment to TS section on Reactor Coolant System Leakage. The NRC staff does not believe that the licensee has abused the emergency provisions in this instance. Accordingly, the Commission has determined that emergency circumstances exist warranting prompt approval, in that failure to act will cause the plant to shutdown, the situation could not have been avoided and the amendment, as discussed in Section 5.0, does not involve a significant hazards consideration.

5.0 FINAL NO SIGNIFICANT HAZARDS CONSIDERATION DETERMINATION

The Commission's regulations in 10 CFR 50.92 state that the Commission may make a final determination that license amendment involves no significant hazards considerations. If operation of the facility, in accordance with the amendment would not:

- (1) involve a significant increase in the probability or consequences of an accident previously evaluated; or
- (2) create the possibility of a new or different kind of accident from any accident previously evaluated; or
- (3) involve a significant reduction in a margin of safety.

The proposed amendment has been evaluated against the standards in 10 CFR 50.92. It does not involve a significant hazards consideration because the changes would not:

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

The proposed change to Section 3.4.6.2.f is a rewording of the specification to better define which sections of piping need to be included under Surveillance 4.4.6.2.1.g. The proposed changes would remove the requirement to perform a monthly pressure test on portions of HPSI, Charging and RHR suction piping which would be used for or pressurized during containment recirculation. Performance of this test during normal operation for certain sections of piping is either not possible due to physical or operational

constraints (Charging and RHR suction piping) or would require the removal of both trains of safety-related equipment from service during testing (HPSI suction piping). The proposed change would be in keeping with safety and the desire to maintain high ECCS availability. These sections of piping will be tested pursuant to Technical Specification 4.0.5 and the Haddam Neck Inservice Test (IST) program. In addition, Technical Specifications require that this piping be monitored for leakage at least once per twelve hours, and provides assurance that there is no gross leakage associated with this piping between pressure tests. Therefore, there are no failure modes associated with the proposed change nor any design basis accidents impacted by the change.

The change to Section 4.4.6.2.1.g also permits entry into MODE 4 prior to performing the leakage surveillance. Specification 4.0.4 requires that all applicable surveillances be performed prior to entry into the plant mode for which an LCO is applicable (i.e., in this case, MODE 4). However, Specification 3.5.2.a requires that both HPSI pumps be inoperable whenever LTOP is required (MODE 4 with RCS temperature less than or equal to 315°F and MODES 5 or 6 with the RCS not vented, per Specification 3.4.9.3). Because of these conflicting requirements, the plant would be required to be placed in Mode 5 with the RCS vented to perform the HPSI discharge piping leakage surveillance prior to startup from a shutdown (MODES 4, 5, or 6) if Surveillance 4.4.6.2.1.g has not been performed in the previous 31 days. This change provides a window at the upper end of MODE 4 (RCS temperature between 315 and 350°F) to perform HPSI discharge piping leakage testing. There are no technical specification requirements for HPSI pump operability or inoperability while operating in this temperature band.

The note at the end of Surveillance 4.4.6.2.1.h, which permits transition into MODES 3 and 4 prior to completion of surveillances, has also been modified to state that this note applies to item h only and not the entire specification. The applicability of this note has resulted in some confusion. This change has no negative safety significance since it is editorial and eliminates the potential misapplication of a specification.

The change to Section 3.4/4.9--Low Temperature Overpressurization Protection System Bases has no safety impact since it is being made to be consistent with Technical Specification 3.5.2.a which requires that one centrifugal charging and no HPSI pumps shall be operable whenever the LTOP system is required.

For these reasons, the proposed changes do not increase the probability or consequences of any accident previously analyzed.

2. Create the possibility of a new or different kind of accident from that previously analyzed.

The rewording of Section 3.4.6.2.f allows it to be consistent with surveillance 4.4.6.2.1.g by better defining the portions of piping tested.

The exception to Specification 4.0.4 in Surveillance 4.4.6.2.1.g alleviates a conflict with Specification 3.5.2.a.

The change to the note in Surveillance 4.4.6.2.1.h clarifies that the note only pertains to item h. This will mitigate the confusion over application of the exception.

The requirement to lock out one centrifugal charging pump and both HPSI pumps is being made for the purpose of making the discussion in Bases 3/4.4.9 consistent with Technical Specification 3.5.2.

There are no changes in the way the plant is operated or in the operation of equipment credited in the design basis accidents. Therefore, the potential for an unanalyzed accident is not created.

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

The intent of the Technical Specification for all changes remains unchanged. The change to Section 4.4.6.2.1.g prevents the removal of portions of the ECCS during plant operation. This proposed change maintains high ECCS availability. The change to Specification 4.4.6.2.1.g permits entry into MODE 4 prior to performing the leakage surveillance. This prevents the plant from going to MODE 5 to perform the surveillance. The changes to the Bases are editorial in nature. The proposed changes will not impact any protective boundary and do not affect the consequences of any accident previously analyzed. Therefore, there is no reduction in the margin of safety.

5.0 STATE CONSULTATION

In accordance with the Commission's regulations, efforts were made to contact the Connecticut State representatives. The state representative was contacted and had no comments.

6.0 ENVIRONMENTAL CONSIDERATION

This amendment changes a requirement with respect to the installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 and changes surveillance requirements. The staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously published a proposed finding that the amendment involves no significant hazards consideration and there has been no public comment on such finding. The Commission has also made a final no significant hazards consideration determination. Accordingly, the amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR & 51.22(c)(9). Pursuant to 10 CFR & 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendment.

7.0 CONCLUSION

We have concluded, based on the considerations discussed above, that (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, and (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

Dated: August 23 1990

Principal Contributor:

A. Wang

HADDAM NECK ECCS RECIRCULATION LINEUPS BASELINE

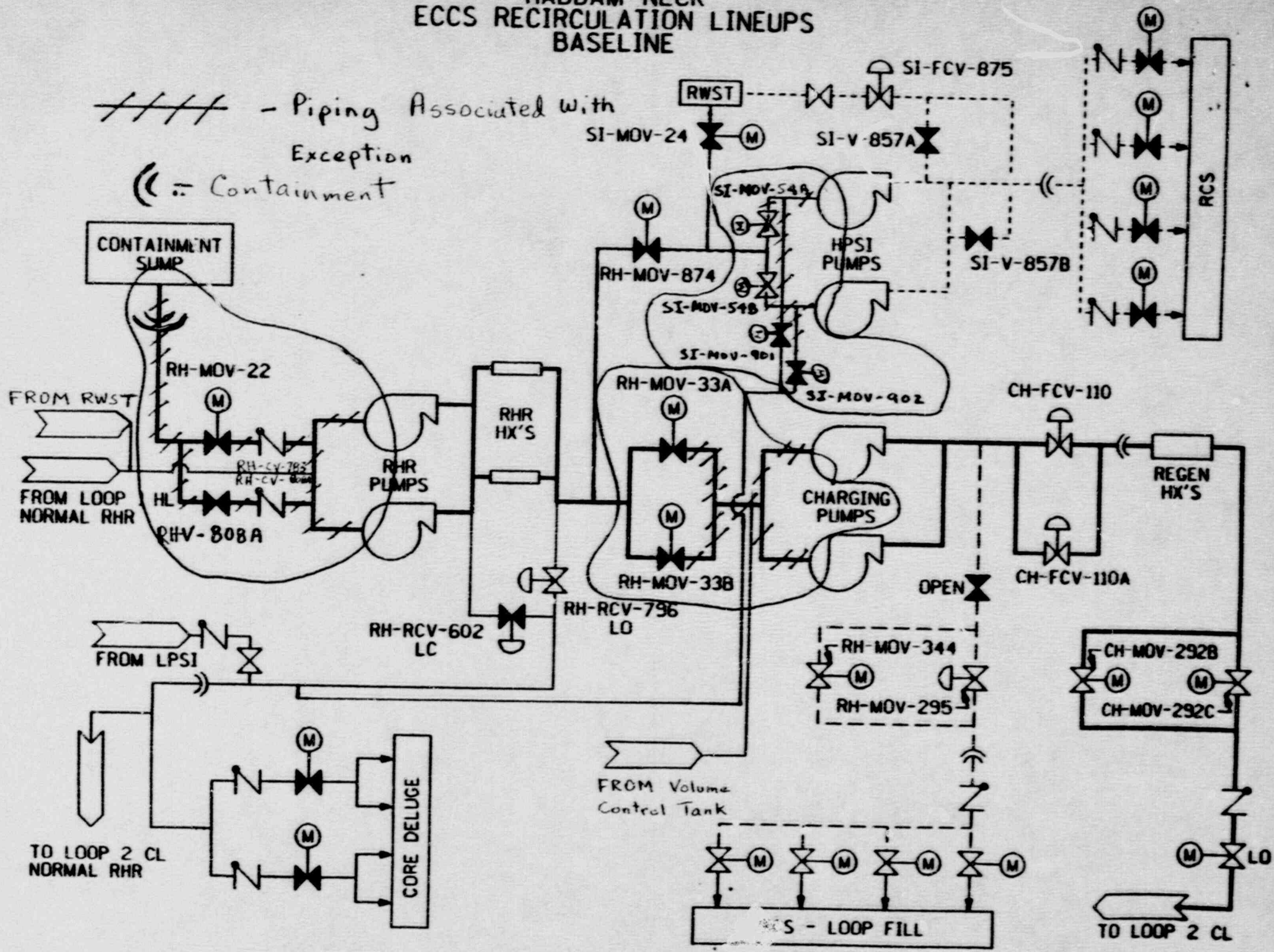


FIGURE 1