3.0 LIMITING CONDITIONS FOR OPERATION

3.1 REACTOR COOLANT SYSTEM

Applicability

Applies to the operating status of the Reactor Coolant System.

Objective

To specify those limiting conditions for operation of the Reactor Coolant System which must be met to ensure safe reactor operation.

Specifications

a. OPERATIONAL COMPONENTS

Specification:

1. Reactor Coolant Pumps

   A. At least one reactor coolant pump or one residual heat removal pump shall be in operation when a reduction is made in the boron concentration of the reactor coolant.

   B. When the reactor is in the operating mode of operation, except for low power tests, both reactor coolant pumps shall be in operation.

2. Steam Generator

   A. One steam generator shall be operable whenever the average reactor coolant temperature is above 350°F.

   B. Reactor power shall not be maintained above 10% of rated power when one steam generator is isolated.

3. Pressurizer Safety Valves

A. At least one pressurizer safety valve shall be operable whenever the reactor head is on the reactor pressure vessel, except for a hydro test of the RCS the pressurizer safety valves may be blanked provided the power operated relief valves are set for test pressure plus 35 psi and the charging pump has a safety valve to protect the system.

B. Both pressurizer safety valves shall be operable whenever the reactor is critical.

4. Pressure Isolation Valves

Applicability:

Operational defined as Operating, and Hot Standby.

Objective:

To increase the reliability of reactor coolant system pressure isolation valves thereby reducing the potential of an intersystem loss of coolant accident.

Specification:

A. All pressure isolation valves listed in Table TS 3.1-2 shall be functional as a pressure isolation device, except as specified in B. Valve leakage shall not exceed the amounts indicated.

B. In the event that integrity of any pressure isolation valve as specified in Table TS 3.1-2 cannot be demonstrated, reactor operation may continue, provided that at least two valves in each high pressure line having a non-functional valve are in and remain in, the mode corresponding to the isolated condition. (a)

C. If Specification A and B cannot be met, an orderly shutdown shall be initiated and the reactor shall be in the Hot Shutdown condition within the next 4 hours, the Intermediate Shutdown condition in the next 6 hours and the Cold Shutdown condition within the next 24 hours.

(a) Manual valves shall be locked in the closed position; motor operated valves shall be placed in the closed position and power supplies deenergized.

Basis

When the boron concentration of the Reactor Coolant System is to be reduced, the process must be uniform to prevent sudden reactivity changes in the reactor. Mixing of the reactor coolant will be sufficient to maintain a uniform boron concentration if at least one reactor coolant pump or one residual heat removal pump is running while the change is taking place. The residual heat removal pump will circulate the equivalent of the primary system volume in approximately one-half hour.

Part 1 of the specification requires that both reactor coolant pumps be operating when the reactor is in power operation to provide core cooling in the event that a loss of flow occurs. Planned power operation with one loop out of service is not allowed in the present design because the system does not meet the single failure (locked rotor) criteria requirement for this mode of operation. The flow provided in each case in Part 1 will keep DNBR well above 1.30. Therefore, cladding damage and release of fission products to the reactor coolant will not occur. One pump operation is not permitted for any length of time except for tests. Upon loss of one pump below 10% full power the core power shall be reduced to a level below the maximum power determined for zero power testing. Natural circulation will remove decay heat up to 10% power. Above 10% power, an automatic reactor trip will occur if flow from either pump is lost.(1)

Each of the pressurizer safety valves is designed to relieve 325,000 lbs per hour of saturated steam at set point. Below 350°F and 350 psig, the Residual Heat Removal System can remove decay heat and thereby control system temperature and pressure. If no residual heat were removed by any of the means available, the amount of steam which could be generated at safety valve relief pressure would be less than half the valves' capacity. One valve therefore provides adequate protection against over-pressurization.

The Basis for the Pressure Isolation Valves is contained with Reference 2.

References:

(1) FSAR Section 7.2.2

(2) Order for Modification of License dated 4/20/81.

TABLE T.S. 3.1-2

REACTOR COOLANT SYSTEM PRESSURE ISOLATION VALVES

System	Valve No.	Maximum Allowable Leakage [a] [b]
Reactor Vessel, Core Flooding Line (Upper Plenum Injection)		
	SI-304A	≤ 5.0 Gallons per Minute
	SI-303A	≤ 5.0 Gallons per Minute
	SI-304B	≤ 5.0 Gallons per Minute
	SI-303B	≤ 5.0 Gallons per Minute
Loop B 12" Accumulator Discharge Line		
	SI-22B	≤ 5.0 Gallons per Minute

FOOTNOTES:

[a] 1. Leakage rates less than or equal to 1.0 gpm are considered acceptable.

2. Leakage rates greater than 1.0 gpm but less than or equal to 5.0 gpm are considered acceptable if the latest measured rate has not exceeded the rate determined by the previous test by an amount that reduces the margin between measured leakage rate and the maximum permissible rate of 5.0 gpm by 50% or greater.

3. Leakage rates greater than 1.0 gpm but less than or equal to 5.0 gpm are considered unacceptable if the latest measured rate exceeded the rate determined by the previous test by an amount that reduces the margin between measured leakage rate and the maximum permissible rate of 5.0 gpm by 50% or greater.

4. Leakage rates greater than 5.0 gpm are considered unacceptable.

[b] Minimum test differential pressure shall not be less than 150 psid.

10. The Following Suurveillance Tests Be Undertaken:

a. Periodic leakage testing (1) on each valve listed in Table TS 3.1-2 shall be accomplished prior to entering the operating mode after every time the plant is placed in the cold shutdown condition for refueling, after each time the plant is placed in a cold shutdown condition for 72 hours if testing has not been accomplished in the preceding 9 months, and prior to returning the valve to service after maintenance, repair, or replacement work is performed.

b. Whenever integrity of a pressure isolation valve listed in Table TS 3.1-2 cannot be demonstrated the integrity of the remaining pressure isolation valve in each high pressure line having a leakage valve shall be determined and recorded daily. In addition, the position of the other closed valve located in the high pressure piping shall be recorded daily.

(1) To satisfy ALARA requirements, leakage may be measured indirectly (as from the performance of pressure indicators) if accomplished in accordance with approved procedures and supported by computations showing that the method is capable of demonstrating valve compliance with the leakage criteria.

The exclusion criteria of IS-121 have been applied to determine which parts of systems or components are subject to surface or volumetric examinations and which parts are subject to a visual examination for evidence of leakage during the system hydrostatic test. A description of the system boundaries, delineating those parts subject to volumetric examination, those parts subject to surface examination and those parts requiring visual inspection during hydro are given in the notes to FSAR Table 4.4-2, titled Tables 4.4-2A, 4.4-2B and 4.4-2C.

The plant was not specifically designed to meet the requirements of Section XI of the code; therefore, 100 percent compliance may not be feasible or practical. However, access for inservice inspection was considered during the design, and modifications have been made where practical to make provision for maximum access within the limits of the current plant design.

The Reactor Coolant System shall initially be free of gross defects, and the system has been designed such that gross faults or defects should not occur throughout the plant lifetime. The ten-year surveillance program will reveal possible fault areas before any leak develops, should such problems actually occur.

The basis for the surveillance testing at the Reactor Coolant System Pressure Isolation Valves identified in Table TS 3.1-2 is contained within "Order of Modification of License" dated April 20, 1981.

The Surveillance Requirements for inspection of the steam generator tubes ensure that the structural integrity of this portion of the RCS will be maintained. The program for inservice inspection of steam generator tubes is based on the general guidance of Regulatory Guide 1.83, Revision 1. Inservice inspection of steam generator tubing is essential in order to maintain surveillance of the conditions of the tubes in the event that there is evidence of mechanical damage or progressive degradation due to design, manufacturing errors, or inservice conditions that lead to corrosion. Inservice inspection of steam generator tubing also provides a means of characterizing the nature and cause of any tube degradation so that corrective measures can be taken.