

## REACTOR COOLANT SYSTEM

### OPERATIONAL LEAKAGE

#### LIMITING CONDITION FOR OPERATION

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3.4.6.2 Reactor Coolant System leakage shall be limited to:

- a. No PRESSURE BOUNDARY LEAKAGE,
- b. 1 gpm UNIDENTIFIED LEAKAGE,
- c. 1 gpm total reactor-to-secondary leakage through all steam generators not isolated from the Reactor Coolant System and 500 gallons per day through any one steam generator not isolated from the Reactor Coolant System,
- d. 10 gpm IDENTIFIED LEAKAGE from the Reactor Coolant System,
- e. 40 gpm CONTROLLED LEAKAGE at a Reactor Coolant System pressure of  $2250 \pm 20$  psia, and
- f.\* 0.5 gpm leakage per nominal inch of valve size up to a maximum of 5 gpm at a Reactor Coolant System pressure of  $2250 \pm 20$  psia from any Reactor Coolant System Pressure Isolation Valve specified in Table 3.4-1.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTION:

- a. With any PRESSURE BOUNDARY LEAKAGE, be in at least HOT STANDBY within 6 hours and in COLD SHUTDOWN within the following 30 hours.
- b. With any Reactor Coolant System leakage greater than any one of the above limits, excluding PRESSURE BOUNDARY LEAKAGE and leakage from Reactor Coolant System Pressure Isolation Valves, reduce the leakage rate to within limits within 4 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.
- c. With any Reactor Coolant System Pressure Isolation Valve leakage greater than the above limit, isolate the high pressure portion of the affected system from the low pressure portion within 4 hours by use of at least two closed manual or deactivated automatic valves, or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

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\* This requirement does not apply to Pressure Isolation Valves in the Residual Heat Removal flow path when in, or during the transition to or from, the shutdown cooling mode of operation.

## REACTOR COOLANT SYSTEM

### OPERATIONAL LEAKAGE

#### SURVEILLANCE REQUIREMENTS

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4.4.6.2.1 Reactor Coolant System leakages shall be demonstrated to be within each of the above limits by:

- a. Deleted
- b. Deleted
- c. Measurement of the CONTROLLED LEAKAGE to the reactor coolant pump seals when the Reactor Coolant System pressure is  $2250 \pm 20$  psia at least once per 31 days with the modulating valve fully open. The provisions of Specification 4.0.4 are not applicable for entry into MODE 3 or 4;
- d. Performance of a Reactor Coolant System water inventory balance within 12 hours of achieving steady state operation, and at least once per 72 hours thereafter during steady state operation. The provisions of Specification 4.0.4 are not applicable for entry into MODE 3 or 4; and
- e. Monitoring the Reactor Head Flange Leakoff System at least once per 24 hours.

4.4.6.2.2<sup>(1)(2)</sup> Each Reactor Coolant System Pressure Isolation Valve specified in Table 3.4-1 shall be demonstrated OPERABLE by verifying leakage to be within its limit:

- a. At least once per 24 months,
- b. Prior to entering MODE 2 whenever the plant has been in COLD SHUTDOWN for 7 days or more and if leakage testing has not been performed in the previous 9 months,
- c. Deleted
- d. Within 24 hours following valve actuation due to automatic or manual action or flow through the valve, and
- e. When tested pursuant to Specification 4.0.5.

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<sup>(1)</sup> The provisions of Specification 4.0.4 are not applicable for entry into MODE 3 or 4.

<sup>(2)</sup> This surveillance is not required to be performed on Reactor Coolant System Pressure Isolation Valves located in the RHR flow path when in, or during the transition to or from, the shutdown cooling mode of operation.

## REACTOR COOLANT SYSTEM

### BASES

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#### 3/4.4.6.2 OPERATIONAL LEAKAGE (Continued)

The 10 gpm IDENTIFIED LEAKAGE limitation provides allowance for a limited amount of leakage from known sources whose presence will not interfere with the detection of UNIDENTIFIED LEAKAGE by the Leakage Detection Systems.

The CONTROLLED LEAKAGE limitation restricts operation when the total flow supplied to the reactor coolant pump seals exceeds 40 gpm with the modulating valve in the supply line fully open at a nominal RCS pressure of 2250 psia. This limitation ensures that in the event of a LOCA, the safety injection flow will not be less than assumed in the safety analyses.

A Limit of 40 gpm is placed on CONTROLLED LEAKAGE. CONTROLLED LEAKAGE is determined under a set of reference conditions, listed below:

- a. One Charging Pump in operation.
- b. RCS pressure at 2250 +/- 20 psia.

By limiting CONTROLLED leakage to 40 gpm during normal operation, we can be assured that during an SI with only one charging pump injecting, RCP seal injection flow will continue to remain less than 80 gpm as assumed in accident analysis. When the seal injection throttle valves are set with a normal charging line up, the throttle valve position bounds conditions where higher charging header pressures could exist. Therefore, conditions which create higher charging header pressures such as an isolated charging line, or two pumps in service are bounded by the single pump - normal system lineup surveillance configuration. Basic accident analysis assumptions are that 80 gpm flow is provided to the seals by a single pump in a runout condition.

The specified allowable leakage from any RCS pressure isolation valve is sufficiently low to ensure early detection of possible in-series valve failure. It is apparent that when pressure isolation is provided by two in-series valves and when failure of one valve in the pair can go undetected for a substantial length of time, verification of valve integrity is required. Since these valves are important in preventing overpressurization and rupture of the ECCS low pressure piping which could result in a LOCA, these valves should be tested periodically to ensure low probability of gross failure.

Steady state operation is required to perform a proper inventory balance since calculations during maneuvering are not useful. For RCS Operational Leakage determination by water inventory balance, steady state is defined as stable RCS pressure, temperature, power level, pressurizer and makeup tank levels, makeup and letdown, and reactor coolant pump seal injection and return flows.

The Surveillance Requirements for RCS pressure isolation valves provide assurance of valve integrity thereby reducing the probability of gross valve failure and consequent intersystem LOCA. Leakage from the RCS pressure isolation valve is IDENTIFIED LEAKAGE and will be considered as a portion of the allowed limit.

## REACTOR COOLANT SYSTEM

### BASES

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#### 3/4.4.6.2 OPERATIONAL LEAKAGE (Continued)

Entry into MODES 3 and 4 is allowed to establish the necessary differential pressures and stable conditions for performance of Surveillance Requirement 4.4.6.2.2 (including Surveillance Requirement 4.4.6.2.2.d) for RCS pressure isolation valves which can only be leak-tested at elevated RCS pressures. The requirements of Surveillance Requirement 4.4.6.2.2.d to verify that a pressure isolation valve is OPERABLE shall be performed within 24 hours after the required RCS pressure has been met.

In MODES 1 and 2, the plant is at normal operating pressure and Surveillance Requirement 4.4.6.2.2.d shall be performed within 24 hours of valve actuation due to automatic or manual action or flow through the valve. In MODES 3 and 4, Surveillance Requirement 4.4.6.2.2.d shall be performed within 24 hours of valve actuation due to automatic or manual action or flow through the valve if and when RCS pressure is sufficiently high for performance of this surveillance.

#### References:

1. Letter FSD/SS-NEU-3713, dated March 25, 1985.
2. Letter NEU-89-639, dated December 4, 1989.