

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.12 Low Temperature Overpressure Protection (LTOP) System

LCO 3.4.12 An LTOP System shall be OPERABLE with the accumulator isolation valves closed and deenergized and either a or b below:

- a. 1. Two power operated relief valves (PORVs) with nominal lift settings of 400 psig and allowable values of ≤ 418 psig (PORVs with lift settings, found between CHANNEL CALIBRATIONS, greater than the nominal lift setting but less than the allowable value are OPERABLE);
2. A maximum of one Safety Injection (SI) pump capable of injecting into the RCS when all cold leg temperatures are $\geq 175^{\circ}\text{F}$; and
3. No SI pumps capable of injecting into the RCS when any cold leg temperature is $< 175^{\circ}\text{F}$.

OR

- b. The RCS depressurized and an RCS vent of ≥ 4.4 square inches.

APPLICABILITY: MODES 4 and 5,
MODE 6 when the reactor vessel head is on.

-----NOTE-----
Accumulator isolation is only required when accumulator pressure is greater than or equal to the maximum RCS pressure for the existing RCS cold leg temperature allowed by the P/T limit curves provided in Figures 3.4.3-1 and 3.4.3-2.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>A. Two or more SI pumps capable of injecting into the RCS with all RCS cold leg temperatures $\geq 175^{\circ}\text{F}$.</p> <p><u>AND</u></p> <p>Requirements of LCO 3.4.12.b not met.</p>	<p>A.1 Initiate action to verify a maximum of one SI pump is capable of injecting into the RCS.</p>	<p>Immediately</p>
<p>B. One or more SI pumps capable of injecting into the RCS with any RCS cold leg temperature $< 175^{\circ}\text{F}$.</p> <p><u>AND</u></p> <p>Requirements of LCO 3.4.12.b not met.</p>	<p>B.1 Initiate action to verify no SI pumps capable of injecting into the RCS.</p>	<p>Immediately</p>
<p>C. An accumulator isolation valve not closed and deenergized when the accumulator pressure is greater than or equal to the maximum RCS pressure for existing cold leg temperature allowed in Figures 3.4.3-1 and 3.4.3-2.</p>	<p>C.1 Close and deenergize affected accumulator isolation valve.</p>	<p>1 hour</p>

(continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. Required Action and associated Completion Time of Condition C not met.	D.1 Increase RCS cold leg temperature to > 350°F. <u>OR</u> D.2 Depressurize affected accumulator to less than the maximum RCS pressure for existing cold leg temperature allowed in Figures 3.4.3-1 and 3.4.3-2.	12 hours 12 hours
E. One required PORV inoperable in MODE 4.	E.1 Restore required PORV to OPERABLE status.	7 days
F. One required PORV inoperable in MODE 5 or 6.	F.1 Restore required PORV to OPERABLE status.	24 hours

(continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>G. Two required PORVs inoperable.</p> <p><u>OR</u></p> <p>Required Action and associated Completion Time of Condition A, B, D, E, or F not met.</p> <p><u>OR</u></p> <p>LTOP System inoperable for any reason other than Condition A, B, C, D, E, or F.</p>	<p>G.1 Depressurize RCS and establish RCS vent of ≥ 4.4 square inches.</p>	<p>8 hours</p>

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
<p>SR 3.4.12.1 -----NOTE----- Only required to be met when all RCS cold leg temperatures $\geq 175^{\circ}\text{F}$ and requirements of LCO 3.4.12.b not met. -----</p> <p>Verify a maximum of one SI pump is capable of injecting into the RCS.</p>	<p>12 hours</p>

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE	FREQUENCY
<p>SR 3.4.12.2 -----NOTE----- Only required to be met when any RCS cold leg temperature < 175°F and requirements of LCO 3.4.12.b not met. ----- Verify no SI pumps capable of injecting into the RCS.</p>	<p>12 hours</p>
<p>SR 3.4.12.3 Verify each accumulator isolation valve is closed and deenergized.</p>	<p>12 hours</p>
<p>SR 3.4.12.4 -----NOTE----- Only required to be met when complying with LCO 3.4.12.b. ----- Verify RCS vent \geq 4.4 square inches open.</p>	<p>12 hours for unlocked open vent valve(s) <u>AND</u> 31 days for locked open vent valve(s)</p>
<p>SR 3.4.12.5 Verify PORV block valve is open for each required PORV.</p>	<p>72 hours</p>

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE	FREQUENCY
SR 3.4.12.6 Perform a COT on each required PORV, excluding actuation.	Once within 31 days prior to entering MODE 4, 5, or 6 when reactor vessel head is on <u>AND</u> 31 days thereafter
SR 3.4.12.7 Perform CHANNEL CALIBRATION for each required PORV actuation channel.	18 months

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.13 RCS Operational LEAKAGE

LCO 3.4.13 RCS operational LEAKAGE shall be limited to:

- a. No pressure boundary LEAKAGE;
- b. 1 gpm unidentified LEAKAGE;
- c. 10 gpm identified LEAKAGE;
- d. 1 gpm total primary to secondary LEAKAGE through all steam generators (SGs); and
- e. 500 gallons per day primary to secondary LEAKAGE through any one SG.

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

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. RCS LEAKAGE not within limits for reasons other than pressure boundary LEAKAGE.	A.1 Reduce LEAKAGE to within limits.	4 hours
B. Required Action and associated Completion Time of Condition A not met. <u>OR</u> Pressure boundary LEAKAGE exists.	B.1 Be in MODE 3. <u>AND</u> B.2 Be in MODE 5.	6 hours 36 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
<p>SR 3.4.13.1 Verify RCS operational LEAKAGE is within limits by performance of RCS water inventory balance.</p>	<p>Once within 12 hours after reaching steady state operation conditions</p> <p><u>AND</u></p> <p>72 hours thereafter during steady state operation</p>
<p>SR 3.4.13.2 Verify steam generator tube integrity is in accordance with the Steam Generator Tube Surveillance Program.</p>	<p>In accordance with the Steam Generator Tube Surveillance Program</p>

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.14 RCS Pressure Isolation Valves (PIVs)

LCO 3.4.14 Each RCS PIV shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3,
MODE 4, except valves in the residual heat removal (RHR)
flow path when in, or during the transition to or from,
the RHR mode of operation.

ACTIONS

- NOTES-----
1. Separate Condition entry is allowed for each flow path.
 2. Enter applicable Conditions and Required Actions for systems made inoperable by an inoperable PIV.
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CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>A. One or more flow paths with leakage from one or more RCS PIVs not within limit.</p>	<p>-----NOTE----- Each valve used to satisfy Required Action A.1 and Required Action A.2 must have been verified to meet SR 3.4.14.1 and be in the reactor coolant pressure boundary or the high pressure portion of the system. -----</p>	<p>(continued)</p>

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. (continued)	A.1 Isolate the high pressure portion of the affected system from the low pressure portion by use of one closed manual, deactivated automatic, or check valve.	4 hours
	<p><u>AND</u></p> A.2 Isolate the high pressure portion of the affected system from the low pressure portion by use of a second closed manual, deactivated automatic, or check valve.	72 hours
B. RHR System interlock function inoperable.	B.1 Isolate the affected penetration by use of one closed manual or deactivated automatic valve.	4 hours
C. Required Action and associated Completion Times for Condition A or B not met.	C.1 Be in MODE 3.	6 hours
	<p><u>AND</u></p> C.2 Be in MODE 5.	36 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
<p>SR 3.4.14.1 -----NOTES-----</p> <ol style="list-style-type: none"> 1. Not required to be performed in MODES 3 and 4. 2. Not required to be performed on the RCS PIVs located in the RHR flow path when in the shutdown cooling mode of operation. 3. RCS PIVs actuated during the performance of this Surveillance are not required to be tested more than once if a repetitive testing loop cannot be avoided. <p>-----</p> <p>Verify leakage from each RCS PIV is less than or equal to an equivalent of 5 gpm at an RCS pressure \geq 2235 psig, and verify the margin between the results of the previous leak rate test and the 5 gpm limit has not been reduced by \geq 50% for valves with leakage rates > 1.0 gpm.</p>	<p>In accordance with the Inservice Testing Program and 18 months</p> <p><u>AND</u></p> <p>Prior to entering MODE 2 whenever the unit has been in MODE 5 for 7 days or more, if leakage testing has not been performed in the previous 9 months</p> <p><u>AND</u></p> <p>(continued)</p>

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.4.14.1 (continued)	Within 24 hours following valve actuation due to automatic or manual action or flow through the valve
SR 3.4.14.2 Verify RHR System interlock prevents the valves from being opened with a simulated or actual RCS pressure signal > 474 psig.	18 months

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.15 RCS Leakage Detection Instrumentation

LCO 3.4.15 The following RCS leakage detection instrumentation shall be OPERABLE:

- a. One containment sump level monitor;
- b. One containment atmosphere radioactivity monitor (gaseous or particulate); and
- c. One containment fan cooler condensate flow rate monitor.

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

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>A. Required containment sump monitor inoperable.</p>	<p>-----NOTE----- LCO 3.0.4 is not applicable. -----</p> <p>A.1 Perform SR 3.4.13.1.</p> <p><u>AND</u></p> <p>A.2 Restore required containment sump monitor to OPERABLE status.</p>	<p>Once per 24 hours</p> <p>30 days</p>

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>B. Required containment atmosphere radioactivity monitor inoperable.</p>	<p>-----NOTE----- LCO 3.0.4 is not applicable. -----</p> <p>B.1.1 Analyze grab samples of the containment atmosphere.</p> <p style="text-align: center;"><u>OR</u></p> <p>B.1.2 Perform SR 3.4.13.1.</p> <p style="text-align: center;"><u>AND</u></p> <p>B.2.1 Restore required containment atmosphere radioactivity monitor to OPERABLE status.</p> <p style="text-align: center;"><u>OR</u></p> <p>B.2.2 Verify required containment fan cooler condensate flow rate monitor is OPERABLE.</p>	<p>Once per 24 hours</p> <p>Once per 24 hours</p> <p>30 days</p> <p>30 days</p>
<p>C. Required containment fan cooler condensate flow rate monitor inoperable.</p>	<p>C.1 Perform SR 3.4.15.1.</p> <p style="text-align: center;"><u>OR</u></p> <p>C.2 Perform SR 3.4.13.1.</p>	<p>Once per 8 hours</p> <p>Once per 24 hours</p>

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. Required containment atmosphere radioactivity monitor inoperable. <u>AND</u> Required containment fan cooler condensate flow rate monitor inoperable.	D.1 Restore required containment atmosphere radioactivity monitor to OPERABLE status.	30 days
	<u>OR</u> D.2 Restore required containment fan cooler condensate flow rate monitor to OPERABLE status.	30 days
E. Required Action and associated Completion Time not met.	E.1 Be in MODE 3.	6 hours
	<u>AND</u> E.2 Be in MODE 5.	36 hours
F. All required monitors inoperable.	F.1 Enter LCO 3.0.3.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.4.15.1 Perform CHANNEL CHECK of the required containment atmosphere radioactivity monitor.	12 hours

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.4.15.2	Perform COT of the required containment atmosphere radioactivity monitor.	92 days
SR 3.4.15.3	Perform CHANNEL CALIBRATION of the required containment sump monitor.	18 months
SR 3.4.15.4	Perform CHANNEL CALIBRATION of the required containment atmosphere radioactivity monitor.	18 months
SR 3.4.15.5	Perform CHANNEL CALIBRATION of the required containment fan cooler condensate flow rate monitor.	18 months

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.16 RCS Specific Activity

LCO 3.4.16 The specific activity of the reactor coolant shall be within limits.

APPLICABILITY: MODES 1 and 2,
MODE 3 with RCS average temperature (T_{avg}) \geq 500°F.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. DOSE EQUIVALENT I-131 > 1.0 μ Ci/gm.	-----Note----- LCO 3.0.4 is not applicable. -----	Once per 4 hours
	A.1 Verify DOSE EQUIVALENT I-131 within the acceptable region of Figure 3.4.16-1.	
	<u>AND</u>	
	A.2 Restore DOSE EQUIVALENT I-131 to within limit.	48 hours
B. Gross specific activity of the reactor coolant not within limit.	B.1 Be in MODE 3 with $T_{avg} < 500^\circ\text{F}$.	6 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>C. Required Action and associated Completion Time of Condition A not met.</p> <p><u>OR</u></p> <p>DOSE EQUIVALENT I-131 in the unacceptable region of Figure 3.4.16-1.</p>	<p>C.1 Be in MODE 3 with $T_{avg} < 500^{\circ}F.$</p>	<p>6 hours</p>

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
<p>SR 3.4.16.1 Verify reactor coolant gross specific activity $\leq 100/E \mu Ci/gm.$</p>	<p>7 days</p>
<p>SR 3.4.16.2NOTE..... Only required to be performed in MODE 1.</p> <p>Verify reactor coolant DOSE EQUIVALENT I-131 specific activity $\leq 1.0 \mu Ci/gm.$</p>	<p>14 days</p> <p><u>AND</u></p> <p>Between 2 and 6 hours after a THERMAL POWER change of $\geq 15\%$ RTP within a 1 hour period</p>

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE	FREQUENCY
<p>SR 3.4.16.3 -----NOTE----- Not required to be performed until 31 days after a minimum of 2 effective full power days and 20 days of MODE 1 operation have elapsed since the reactor was last subcritical for ≥ 48 hours. ----- Determine \bar{E} from a sample taken in MODE 1 after a minimum of 2 effective full power days and 20 days of MODE 1 operation have elapsed since the reactor was last subcritical for ≥ 48 hours.</p>	<p>184 days</p>

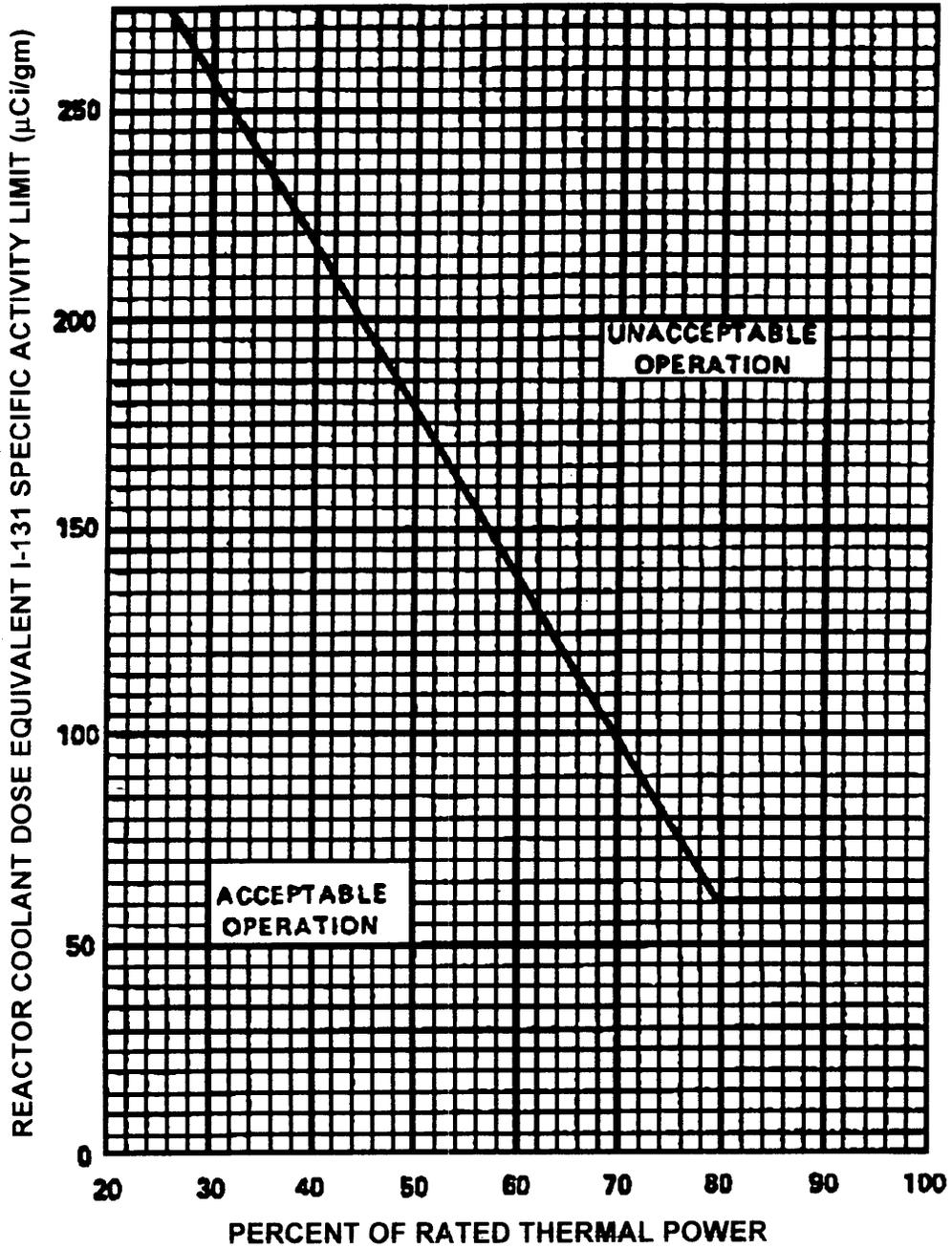


Figure 3.4.16-1
Reactor Coolant DOSE EQUIVALENT I-131 Specific Activity
Limit Versus Percent of RATED THERMAL POWER

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.17 Chemical and Volume Control System (CVCS)

- LCO 3.4.17 Reactor Coolant Pump (RCP) seal injection shall be OPERABLE, with:
- a. Two charging pumps shall be OPERABLE; and
 - b. Two Makeup Water Pathways from the Refueling Water Storage Tank (RWST) shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, and 4

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One required charging pump inoperable.	A.1 Restore required charging pump to OPERABLE status.	24 hours
B. One Makeup Water Pathway from the RWST inoperable.	B.1 Restore Makeup Water Pathway from the RWST to OPERABLE status.	24 hours
C. Required Action and associated Completion Time of Condition A or B not met.	C.1 Be in MODE 3.	6 hours
	<u>AND</u> C.2 Be in MODE 5.	36 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>D. Seal injection to any RCP not within limit.</p> <p><u>AND</u></p> <p>Both required charging pumps inoperable.</p>	<p>D.1 Initiate action to restore seal injection to affected RCP(s).</p> <p><u>AND</u></p> <p>D.2 Be in MODE 3.</p> <p><u>AND</u></p> <p>D.3 Cool down and depressurize the RCS to a pressure of < 1400 psig.</p>	<p>Immediately</p> <p>6 hours</p> <p>12 hours</p>
<p>E. Seal injection to any RCP not within limit.</p> <p><u>AND</u></p> <p>At least one charging pump OPERABLE.</p>	<p>E.1 Initiate action to restore seal injection to affected RCP(s)</p> <p><u>AND</u></p> <p>E.2 Be in MODE 3.</p> <p><u>AND</u></p> <p>E.3 Be in MODE 5.</p>	<p>Immediately</p> <p>6 hours</p> <p>36 hours</p>
<p>F. Both Makeup Water Pathways from the RWST inoperable.</p>	<p>F.1 Be in MODE 3.</p> <p><u>AND</u></p> <p>F.2 Be in MODE 5.</p>	<p>6 hours</p> <p>36 hours</p>

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.4.17.1 Verify seal injection flow of ≥ 6 gpm to each RCP.	12 hours
SR 3.4.17.2 Verify seal injection flow of ≥ 6 gpm to each RCP from each Makeup Water Pathway from the RWST.	18 months
SR 3.4.17.3 For Makeup Water Pathways from the RWST to be OPERABLE, SR 3.5.4.2 is applicable.	In accordance with SR 3.5.4.2