

3.1 REACTIVITY CONTROL SYSTEMS

3.1.1 SHUTDOWN MARGIN (SDM)

LCO 3.1.1 SDM shall be :

- a. $\geq 0.38\% \Delta k/k$, with the highest worth control rod analytically determined; or
- b. $\geq 0.28\% \Delta k/k$, with the highest worth control rod determined by test.

APPLICABILITY: MODES 1, 2, 3, 4 and 5.

ACTIONS

| CONDITION | REQUIRED ACTION | COMPLETION TIME |
|---|--|-----------------|
| A. SDM not within limits in MODE 1 or 2. | A.1 Restore SDM to within limits. | 6 hours |
| B. Required Action and associated Completion Time of Condition A not met. | B.1 Be in MODE 3. | 12 hours |
| C. SDM not within limits in MODE 3. | C.1 Initiate action to fully insert all insertable control rods. | Immediately |

(continued)

ACTIONS

| CONDITION | REQUIRED ACTION | COMPLETION TIME |
|--|---|--------------------|
| <p>D. SDM not within limits in MODE 4.</p> | <p>D.1 Initiate action to fully insert all insertable control rods.</p> <p><u>AND</u></p> | <p>Immediately</p> |
| | <p>D.2 Initiate action to restore secondary containment to OPERABLE status.</p> <p><u>AND</u></p> | <p>1 hour</p> |
| | <p>D.3 Initiate action to restore one standby gas treatment system (SGTS) to OPERABLE status.</p> <p><u>AND</u></p> | <p>1 hour</p> |
| | <p>D.4 Initiate action to restore isolation capability in each required secondary containment penetration flow path not isolated.</p> | <p>1 hour</p> |

(continued)

ACTIONS

| CONDITION | REQUIRED ACTION | COMPLETION TIME |
|--|--|--------------------|
| <p>E. SDM not within limits in MODE 5.</p> | <p>E.1 Suspend CORE ALTERATIONS except for control rod insertion and fuel assembly removal.</p> <p><u>AND</u></p> | <p>Immediately</p> |
| | <p>E.2 Initiate action to fully insert all insertable control rods in core cells containing one or more fuel assemblies.</p> <p><u>AND</u></p> | <p>Immediately</p> |
| | <p>E.3 Initiate action to restore secondary containment to OPERABLE status.</p> <p><u>AND</u></p> | <p>1 hour</p> |
| | <p>E.4 Initiate action to restore one SGTS to OPERABLE status.</p> <p><u>AND</u></p> | <p>1 hour</p> |
| | <p>E.5 Initiate action to restore isolation capability in each required secondary containment penetration flow path not isolated.</p> | <p>1 hour</p> |

SURVEILLANCE REQUIREMENTS

| SURVEILLANCE | FREQUENCY |
|---|--|
| <p>SR 3.1.1.1 Verify SDM is:</p> <ul style="list-style-type: none"> a. $\geq 0.38\% \Delta k/k$ with the highest worth control rod analytically determined; or b. $\geq 0.28\% \Delta k/k$ with the highest worth control rod determined by test. | <p>Prior to each in vessel fuel movement during fuel loading sequence</p> <p><u>AND</u></p> <p>Once within 4 hours after criticality following fuel movement within the reactor pressure vessel or control rod replacement</p> |

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3.1.2 Reactivity Anomalies

LCO 3.1.2 The reactivity difference between the monitored core k_{eff} and the predicted core k_{eff} shall be within $\pm 1\% \Delta k/k$.

APPLICABILITY: MODES 1 and 2.

ACTIONS

| CONDITION | REQUIRED ACTION | COMPLETION TIME |
|--|---|-----------------|
| A. Core reactivity difference not within limit. | A.1 Restore core reactivity difference to within limit. | 72 hours |
| B. Required Action and associated Completion Time not met. | B.1 Be in MODE 3. | 12 hours |

SURVEILLANCE REQUIREMENTS

| SURVEILLANCE | FREQUENCY |
|---|---|
| SR 3.1.2.1 Verify core reactivity difference between the monitored core k_{eff} and the predicted core k_{eff} is within $\pm 1\% \Delta k/k$. | Once within 24 hours after reaching equilibrium conditions following startup after fuel movement within the reactor pressure vessel or control rod replacement <u>AND</u> 1000 MWD/T thereafter during operations in MODE 1 |

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3.1.3 Control Rod OPERABILITY

LCO 3.1.3 Each control rod shall be OPERABLE.

APPLICABILITY: MODES 1 and 2.

ACTIONS

-----NOTE-----
Separate Condition entry is allowed for each control rod.

| CONDITION | REQUIRED ACTION | COMPLETION TIME |
|--|---|-----------------|
| <p>A. One withdrawn control rod stuck.</p> | <p>-----NOTE----- A stuck rod may be bypassed in the Rod Action Control System (RACS) in accordance with SR 3.3.2.1.8 if required to allow continued operation. -----</p> | |
| | <p>A1. Hydraulically disarm the associated control rod drive (CRD).</p> <p><u>AND</u></p> | 2 hours |
| | <p>A.2 -----NOTE----- Not applicable when less than or equal to the low power setpoint (LPSP) of the Rod Pattern Control System (RPCS). -----</p> <p>Perform SR 3.1.3.2 and SR 3.1.3.3 for each withdrawn OPERABLE control rod.</p> <p><u>AND</u></p> | 24 hours |
| | <p>A.3 Perform SR 3.1.1.1.</p> | 72 hours |

(continued)

ACTIONS

| CONDITION | REQUIRED ACTION | COMPLETION TIME |
|--|--|-----------------|
| B. Two or more withdrawn control rods stuck. | B.1 Hydraulically disarm the associated CRD. | 2 hours |
| | <u>AND</u> B.2 Be in MODE 3. | 12 hours |
| C. One or more control rods inoperable for reasons other than Condition A or B. | C.1 -----NOTE----- Inoperable control rods may be bypassed in RACS in accordance with SR.3.3.2.1.8, if required, to allow insertion of inoperable control rod and continued operation. ----- Fully insert inoperable control rod. | 3 hours |
| | <u>AND</u> | |
| | C.2 Disarm the associated CRD. | 4 hours |
| D. -----NOTE----- Not applicable when THERMAL POWER > 10% RTP ----- Two or more inoperable control rods not in compliance with rod pattern control system (RPCS) sequence and not separated by two or more OPERABLE control rods. | D.1 Restore compliance with RPCS | 4 hours |
| | <u>OR</u> D.2 Restore control rod to OPERABLE status. | 4 hours |

(continued)

ACTIONS

| CONDITION | REQUIRED ACTION | COMPLETION TIME |
|--|--------------------------|-----------------|
| <p>E. Required Action and associated Completion Time of Condition A, C or D not met.</p> <p><u>OR</u></p> <p>Nine or more control rods inoperable.</p> | <p>E.1 Be in MODE 3.</p> | <p>12 hours</p> |

SURVEILLANCE REQUIREMENTS

| SURVEILLANCE | FREQUENCY |
|---|-----------------|
| <p>SR 3.1.3.1 Determine the position of each control rod.</p> | <p>24 hours</p> |
| <p>SR 3.1.3.2 -----NOTE----- Not required to be performed until 7 days after the control rod is withdrawn and THERMAL POWER is greater than the LPSP of the RPCS. ----- Demonstrate by inserting each fully withdrawn control rod at least one notch.</p> | <p>7 days</p> |

(continued)

SURVEILLANCE REQUIREMENTS

| SURVEILLANCE | FREQUENCY |
|---|--|
| <p>SR 3.1.3.3 -----NOTE----- Not required to be performed until 31 days after the control rod is withdrawn and THERMAL POWER is greater than the LPSP of the RPCS. ----- Demonstrate by inserting each partially withdrawn control rod at least one notch.</p> | <p>31 days</p> |
| <p>SR 3.1.3.4 Verify each control rod scram time from fully withdrawn to notch position 13 is ≤ 7 seconds.</p> | <p>In accordance with SR 3.1.4.1, SR 3.1.4.2, SR 3.1.4.3, and SR 3.1.4.4</p> |
| <p>SR 3.1.3.5 Verify each control rod does not go to the withdrawn overtravel position.</p> | <p>Each time the control rod is withdrawn to “full out” position <u>AND</u> Prior to declaring control rod OPERABLE after work on control rod or CRD System that could affect coupling</p> |

3.1 REACTIVITY CONTROL SYSTEMS

3.1.4 Control Rod Scram Times

- LCO 3.1.4 a. No more than 10 OPERABLE control rods shall be “slow,” in accordance with Table 3.1.4-1; and
- b. No more than 2 OPERABLE control rods that are “slow” shall occupy adjacent locations.

APPLICABILITY: MODES 1 and 2.

ACTIONS

| CONDITION | REQUIRED ACTION | COMPLETION TIME |
|-------------------------------------|-------------------|-----------------|
| A. Requirements of the LCO not met. | A.1 Be in MODE 3. | 12 hours |

SURVEILLANCE REQUIREMENTS

-----NOTE-----

During single control rod scram time Surveillances, the control rod drive (CRD) pumps shall be isolated from the associated scram accumulator.

| SURVEILLANCE | FREQUENCY |
|---|---|
| SR 3.1.4.1 Verify each control rod scram time is within the limits of Table 3.1.4-1 with reactor steam dome pressure \geq 950 psig. | Prior to exceeding 40% RTP after fuel movement within the reactor pressure vessel <u>AND</u> Prior to exceeding 40% RTP after each reactor shutdown \geq 120 days |

(continued)

SURVEILLANCE REQUIREMENTS

| SURVEILLANCE | FREQUENCY |
|--|---|
| <p>SR 3.1.4.2 Verify, for a representative sample, each tested control rod scram time is within the limits of Table 3.1.4-1 with reactor steam dome pressure \geq 950 psig.</p> | <p>120 days cumulative operation in MODE 1</p> |
| <p>SR 3.1.4.3 Verify each affected control rod scram time is within the limits of Table 3.1.4-1 with any reactor steam dome pressure.</p> | <p>Prior to declaring control rod OPERABLE after work on control rod or CRD System that could affect scram time</p> |
| <p>SR 3.1.4.4 Verify each affected control rod scram time is within the limits of Table 3.1.4-1 with reactor steam dome pressure \geq 950 psig.</p> | <p>Prior to exceeding 40% RTP after work on control rod or CRD System that could affect scram time</p> |

Table 3.1.4-1
Control Rod Scram Times

-----NOTES-----

1. OPERABLE control rods with scram times not within the limits of this Table are considered "slow."
 2. Enter applicable Conditions and Required Actions of LCO 3.1.3, "Control Rod OPERABILITY," for control rods with scram times > 7 seconds to notch position 13. These control rods are inoperable, in accordance with SR 3.1.3.4, and are not considered "slow."
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| NOTCH POSITION | SCRAM TIMES ^{(a)(b)} (seconds) | |
|----------------|--|---|
| | REACTOR STEAM DOME PRESSURE ^(c) 950 psig | REACTOR STEAM DOME PRESSURE ^(c) 1050 psig |
| 43 | 0.30 | 0.31 |
| 29 | 0.78 | 0.84 |
| 13 | 1.40 | 1.53 |

- (a) Maximum scram time from fully withdrawn position, based on de-energization of scram pilot valve solenoids as time zero.
- (b) Scram times as a function of reactor steam dome pressure, when < 950 psig, are within established limits.
- (c) For intermediate reactor steam dome pressures, the scram time criteria are determined by linear interpolation.

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3.1.5 Control Rod Scram Accumulators

LCO 3.1.5 Each control rod scram accumulator shall be OPERABLE.

APPLICABILITY: MODES 1 and 2.

ACTIONS

-----NOTE-----
Separate Condition entry is allowed for each control rod scram accumulator.

| CONDITION | REQUIRED ACTION | COMPLETION TIME |
|---|--|---|
| <p>A. One control rod scram accumulator inoperable with reactor steam dome pressure \geq 900 psig.</p> | <p>A.1 -----NOTE----- Only applicable if the associated control rod scram time was within the limits of Table 3.1.4-1 during the last scram time Surveillance. ----- Declare the associated control rod scram time "slow." <u>OR</u> A.2 Declare the associated control rod inoperable.</p> | <p>8 hours 8 hours</p> |

(continued)

ACTIONS

| CONDITION | REQUIRED ACTION | COMPLETION TIME |
|--|--|---|
| <p>B. Two or more control rod scram accumulators inoperable with reactor steam dome pressure \geq 900 psig.</p> | <p>B.1 Restore charging water header pressure to \geq 1520 psig.</p> <p><u>AND</u></p> <p>B.2.1 -----NOTE----- Only applicable if the associated control rod scram time was within the limits of Table 3.1.4-1 during the last scram time Surveillance. -----</p> <p>Declare the associated control rod scram time "slow."</p> <p><u>OR</u></p> <p>B.2.2 Declare the associated control rod inoperable.</p> | <p>20 minutes from discovery of Condition B concurrent with charging water header pressure $<$ 1520 psig.</p> <p>1 hour</p> <p>1 hour</p> |
| <p>C. One or more control rod scram accumulators inoperable with reactor steam dome pressure $<$ 900 psig.</p> | <p>C.1 Verify all control rods associated with inoperable accumulators are fully inserted.</p> <p><u>AND</u></p> <p>C.2 Declare the associated control rod inoperable.</p> | <p>Immediately upon discovery of charging water header pressure $<$ 1520 psig.</p> <p>1 hour</p> |

(continued)

ACTIONS

| CONDITION | REQUIRED ACTION | COMPLETION TIME |
|--|--|-----------------|
| D. Required Action and associated Completion Time of Required Action B.1 or C.1 not met. | D.1 -----NOTE----- Not applicable if all inoperable control rod scram accumulators are associated with fully inserted control rods. ----- Scram the reactor manually and place the reactor mode switch in the SHUTDOWN position during scram recovery | Immediately |

SURVEILLANCE REQUIREMENTS

| SURVEILLANCE | FREQUENCY |
|--|-----------|
| SR 3.1.5.1 Verify each control rod scram accumulator pressure is ≥ 1520 psig. | 7 days |

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3.1.6 Rod Pattern Control

LCO 3.1.6 OPERABLE control rods shall comply with the requirements of the rod pattern control system (RPCS) sequence.

APPLICABILITY: MODES 1 and 2 with THERMAL POWER \leq 10% RTP

ACTIONS

| CONDITION | REQUIRED ACTION | COMPLETION TIME |
|---|--|---|
| <p>A. One or more OPERABLE control rods not in compliance with RPCS sequence.</p> | <p>A.1 -----NOTE----- Affected control rods may be bypassed in Rod Action Control System (RACS) in accordance with SR 3.3.2.1.8 ----- Move associated control rod(s) to correct position. <u>OR</u> A.2 Declare associated control rod(s) inoperable.</p> | <p>8 hours 8 hours</p> |

(continued)

ACTIONS

| CONDITION | REQUIRED ACTION | COMPLETION TIME |
|--|---|----------------------------------|
| <p>B. Nine or more OPERABLE control rods not in compliance with RPCS sequence.</p> | <p>B.1 -----NOTE----- Affected control rods may be bypassed in RACS in accordance with SR 3.3.2.1.8 for insertion only. ----- Suspend withdrawal of control rods.</p> <p><u>AND</u></p> <p>B.2 Scram the reactor manually and place the reactor mode switch in the SHUTDOWN position during scram recovery</p> | <p>Immediately</p> <p>1 hour</p> |

SURVEILLANCE REQUIREMENTS

| SURVEILLANCE | FREQUENCY |
|---|-----------------|
| <p>SR 3.1.6.1 Verify all OPERABLE control rods comply with RPCS sequence.</p> | <p>24 hours</p> |

3.1 REACTIVITY CONTROL SYSTEMS

3.1.7 Standby Liquid Control (SBLC) System

LCO 3.1.7 Two SBLC subsystems shall be OPERABLE.

APPLICABILITY: MODES 1 and 2.

ACTIONS

| CONDITION | REQUIRED ACTION | COMPLETION TIME |
|--|--|---|
| A. Concentration of boron in solution not within the combination region of figure 3.1.7-1. | A.1 Restore concentration of boron in solution to within limits. | 72 hours <u>AND</u> 10 days from discovery of failure to meet the LCO |
| B. One SBLC subsystem inoperable for reasons other than Condition A. | B.1 Restore SBLC subsystem to OPERABLE status. | 7 days <u>AND</u> 10 days from discovery of failure to meet the LCO |
| C. Two SBLC subsystems inoperable for reasons other than Condition A. | C.1 Restore one SBLC subsystem to OPERABLE status. | 8 hours |
| D. Required Action and associated Completion Time not met. | D.1 Be in MODE 3. | 12 hours |

SURVEILLANCE REQUIREMENTS

| SURVEILLANCE | FREQUENCY |
|--|---|
| SR 3.1.7.1 Verify the volume of sodium pentaborate solution is within the combination region of figure 3.1.7-1. | 24 hours |
| SR 3.1.7.2 Verify continuity of explosive charge. | 31 days |
| SR 3.1.7.3 Verify the concentration of boron in solution is within the combination region of Figure 3.1.7-1. | 31 days <u>AND</u> Once within 24 hours after water or boron is added to solution |
| SR 3.1.7.4 Verify each SBLC subsystem manual, power operated, and automatic valve in the flow path that is not locked, sealed, or otherwise secured in position is in the correct position, or can be aligned to the correct position. | 31 days |
| SR 3.1.7.5 Verify each pump develops a flow rate \geq 41.2 gpm at a discharge pressure \geq 1220 psig. | In accordance with the Inservice Testing Program or 92 days |

(continued)

SURVEILLANCE REQUIREMENTS

| SURVEILLANCE | FREQUENCY |
|---|--------------------------------------|
| SR 3.1.7.6 Verify flow through one SBLC subsystem from pump into reactor pressure vessel. | 18 months on a STAGGERED TEST BASIS. |
| SR 3.1.7.7 Verify sodium pentaborate enrichment is ≥ 54.2 atom percent B-10. | Prior to addition to SBLC tank. |

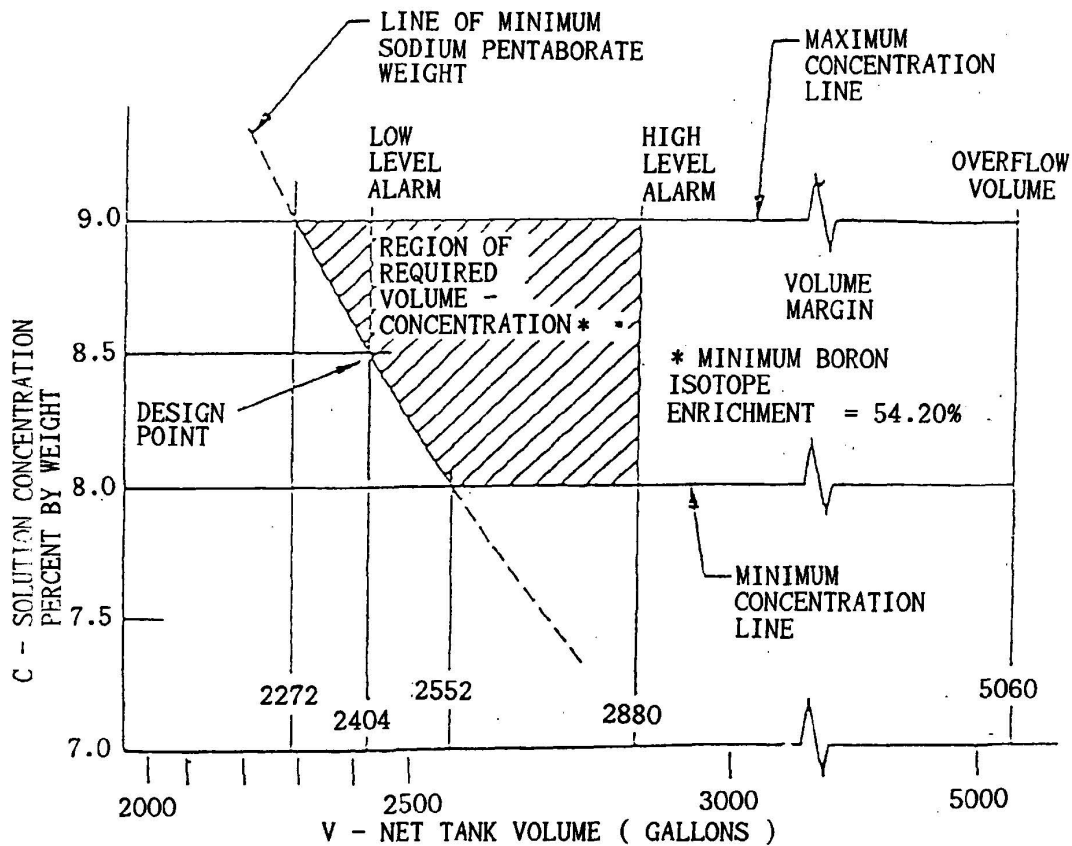


Figure 3.1.7-1(page 1of 1)
Sodium Pentaborate Solution Volume Versus Concentration Requirements

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3.1.8 Scram Discharge Volume (SDV) Vent and Drain Valves

LCO 3.1.8 Each SDV vent and drain valve shall be OPERABLE.

APPLICABILITY: MODES 1 and 2.

ACTIONS

-----NOTE-----
Separate Condition entry is allowed for each SDV vent and drain line.

| CONDITION | REQUIRED ACTION | COMPLETION TIME |
|---|--|-----------------|
| A. One or more SDV vent or drain lines with one valve inoperable. | A.1 -----NOTE----- An isolated line may be unisolated under administrative control to allow draining and venting of the SDV. ----- Isolate the associated line. | 7 days |
| B. One or more SDV vent or drain lines with both valves inoperable. | B.1 -----NOTE----- An isolated line may be unisolated under administrative control to allow draining and venting of the SDV. ----- Isolate the associated line. | 8 hours |
| C. Required Action and associated Completion Time not met. | C.1 Be in MODE 3. | 12 hours |

SURVEILLANCE REQUIREMENTS

| SURVEILLANCE | FREQUENCY |
|---|-----------|
| <p>SR 3.1.8.1 -----NOTE----- Not required to be met on vent and drain valves closed during performance of SR 3.1.8.2. ----- Verify each SDV vent and drain valve is open.</p> | 31 days |
| <p>SR 3.1.8.2 Cycle each SDV vent and drain valve to the fully closed and fully open position.</p> | 92 days |
| <p>SR 3.1.8.3 Verify each SDV vent and drain valve:</p> <ul style="list-style-type: none"> a. Closes in \leq 30 seconds after receipt of an actual or simulated scram signal; and b. Opens when the actual or simulated scram signal is reset. | 18 months |