

**Enclosure 2**

**MFN 09-053**

**DCD Markups for**

**RAI Numbers 16.2-169, 16.2-176, 16.2-179,  
16.2-180, and 16.2-182**

3.1 REACTIVITY CONTROL SYSTEMS

3.1.7 Standby Liquid Control (SLC) System

LCO 3.1.7 The SLC System shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, and 4

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>COL 16.0-1-A 3.1.7-1</p> <p>A. [Concentration of sodium pentaborate in solution in one or more accumulators is not within limits.</p>	<p>A.1 Restore concentration of sodium pentaborate in solution to within limits in each accumulator.</p>	<p>72 hours]</p>
<p>[B]. One injection squib valve flow path inoperable in one or more trains.</p>	<p>[B].1 Restore injection squib valve flow path(s) to OPERABLE status.</p>	<p>7 days</p>
<p>[C]. One accumulator isolation valve inoperable for closing in one or more trains.</p>	<p>[C].1 Restore accumulator isolation valve(s) to OPERABLE status.</p>	<p>7 days</p>
<p>COL 16.0-1-A 3.1.7-1</p> <p>[D]. SLC system inoperable for reasons other than Condition [A,] B, or C].</p> <p><u>OR</u></p> <p><del>E.</del> Required Action and associated Completion Time of Condition A, B, or C] not met.</p>	<p><del>D.1 — Restore SLC System to OPERABLE status.</del></p> <p>[D]E.1 Be in MODE 3.</p> <p><u>AND</u></p> <p>[D]E.2 Be in MODE 5.</p>	<p><del>8 hours</del></p> <p>12 hours</p> <p>36 hours</p>

## BASES

**APPLICABILITY** In MODES 1 and 2, the SLC System is needed for its reactor shutdown capability. Reactor shutdown capability is not required in MODES 3, 4 and 5 because the reactor mode switch is in shutdown and control rods cannot be withdrawn because a control rod block is applied. When a control rod block is not applied, LCO 3.10.3, "Control Rod Withdrawal – Shutdown," and LCO 3.10.4, "Control Rod Withdrawal - Cold Shutdown," in conjunction with LCO 3.1.1, "SHUTDOWN MARGIN," provide adequate controls to ensure the reactor remains subcritical.

In MODES 1, 2, 3, and 4, the ECCS function of SLC System is required to provide additional inventory for RPV water makeup and core cooling.

## ACTIONS

[A.1

If the concentration of sodium pentaborate in solution in one or more accumulators is not within limits, the concentration must be restored to within limits in 72 hours. For ATWS mitigation the plant design also includes, alternate rod insertion (ARI), fine motion control rod drive run-in, and a feedwater runback features as described in Reference 35. These additional features provide ATWS mitigation capability when the concentration of sodium pentaborate in solution is not within limits. Because of the low probability of an ATWS event, the additional ATWS mitigation features, and the fact that SLC System capability still exists for vessel injection under these conditions, the allowed Completion Time of 72 hours is acceptable and provides adequate time to restore concentration to within limits.]

COL 16.0-1-A  
3.1.7-1

**[B.1**

With one injection squib valve flow path in one or more trains inoperable, the squib valve flow path(s) must be restored to OPERABLE status within 7 days. In this condition, the remaining OPERABLE squib valve flow paths are adequate to perform the shutdown function. However, the overall reliability is reduced because a single failure in the remaining OPERABLE squib valve flow paths could result in reduced SLC System capability. The 7 day Completion Time is based on engineering judgment considering the availability of one OPERABLE flow path in each train that is capable of performing the intended SLC System function and the low probability of a Design Basis Accident (DBA) or transient occurring during this period.

BASES

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ACTIONS (continued)

COL 16.0-1-A 3.1.7-1	<a href="#">[C].1</a>
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With one accumulator isolation valve inoperable for closing in one or more trains, the accumulator isolation valve(s) must be restored to OPERABLE status within 7 days. In this condition, the remaining OPERABLE accumulator isolation valve is capable of performing the required safety function. However, the overall reliability is reduced because a single failure in the remaining OPERABLE isolation valve could result in injection of nitrogen into the RPV. The 7 day Completion Time is based on engineering judgment considering the availability of one OPERABLE flow path in each train that is capable of performing the intended SLC System function and the low probability of a Design Basis Accident (DBA) or transient occurring during this period.

COL 16.0-1-A 3.1.7-1	<p><a href="#">[D].1 and [D].2</a></p> <p>If one or more SLC trains are inoperable for reasons other than Condition <del>[A.]</del><a href="#">[A]</a>, B, or C] (e.g., one or both accumulator isolation valve in the closed position), <del>the SLC trains must be restored to OPERABLE status within 8 hours. The Completion Time is based on engineering judgment considering the low probability of a DBA or transient occurring during this period.</del></p> <p><del>E.1</del></p> <p><del>If or if</del> any Required Action and associated Completion Time <a href="#">of Condition [A], B, or C]</a> are not met, the plant must be brought to a MODE in which the LCO does not apply. To achieve this status, the plant must be brought to MODE 3 within 12 hours and MODE 5 within 36 hours. The allowed Completion Times are reasonable, based on plant design, to reach MODE 5 from full power conditions in an orderly manner and without challenging plant systems.</p>
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SURVEILLANCE REQUIREMENTS

SR 3.1.7.1, SR 3.1.7.2, and SR 3.1.7.3

SR 3.1.7.1 through SR 3.1.7.3 are 24 hour Surveillances verifying certain characteristics of the SLC System (e.g., the volume of sodium pentaborate solution in the accumulator, temperature of the room with piping and valves containing boron solution, and nitrogen volume and pressure in each accumulator), thereby ensuring the SLC System OPERABILITY without disturbing normal plant operation. These Surveillances ensure the proper SPBS volume and temperature and

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RAI 16.2-176**

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>B. One or more penetration flow paths with one CIV inoperable for reasons other than Condition A or D.</p>	<p>B.1 Isolate the affected penetration flow path by use of at least one closed and deactivated automatic valve, closed manual valve, check valve with flow secured, or blind flange.</p> <p><u>AND</u></p> <p>B.2 Verify the affected penetration flow path is isolated.</p>	<div style="border: 1px solid black; padding: 5px;"> <p>4 hours except for main steam line <del>and</del> feedwater line</p> <p><u>AND</u></p> <p>8 hours for main steam line <del>or</del> feedwater line</p> </div> <p>Once per 31 days for isolation devices outside containment</p> <p><u>AND</u></p> <p>Prior to entering MODE 2 or 4 from MODE 5, if containment was de-energized while in MODE 5, if not performed within the previous 92 days, for isolation devices inside containment</p>
<p>C. One or more penetration flow paths with two or more CIVs inoperable for reasons other than Condition A or D.</p>	<p>C.1 Isolate the affected penetration flow path by use of at least one closed and deactivated automatic valve, closed manual valve, or blind flange.</p>	<p>1 hour</p>
<p>D. MSIV leakage rate or feedwater line leakage rate not within limit.</p>	<p>D.1 Restore leakage rate to within limit.</p>	<p>8 hours</p>

## BASES

## ACTIONS (continued)

A.1

This Condition applies when one or more RWCU/SDC CIVs have an inoperable DPS actuator (i.e., solenoid). In this Condition, required SSLC/ESF actuators will actuate the minimum number of CIVs assumed in the design basis analysis concurrent with any additional single failure. However, design features intended to mitigate the possibility of digital protection system common mode failures may not be available.

In this Condition, the inoperable DPS actuator must be restored to OPERABLE status prior to plant startup from MODE 5 (i.e., prior to entering MODE 2 or MODE 4 from MODE 5). This Completion Time is acceptable because the required safety-related actuators will actuate the minimum number of CIVs required to respond to the design basis LOCA concurrent with any additional single failure.

B.1 and B.2

If one of the CIVs in one or more penetration flow paths is inoperable for reasons other than Condition A or D, the penetration still has isolation capability but the ability to tolerate a single failure is lost. Therefore, Required Action B.1 requires that the affected penetrations must be

isolated within 4 hours for penetrations other than the main steam line ~~or feedwater line,~~ and within 8 hours for main steam lines ~~and feedwater line.~~

For penetrations isolated in accordance with Required Action B.1, the valve or device used to isolate the penetration should be the closest to the containment that is available. The method of isolation must include the use of at least one isolation barrier that cannot be adversely affected by a single active failure. Isolation barriers that meet this criterion are a closed and deactivated automatic valve, a closed manual valve, a check valve with flow through the valve secured, or a blind flange.

The Completion Time of 4 hours to isolate penetrations (other than a main steam line ~~and feedwater line~~) provides sufficient time to complete the action and is acceptable because the penetration still has isolation capability although the ability to tolerate a single failure is lost.

BASES

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## ACTIONS (continued)

The Completion Time of 8 hours to isolate a main steam line ~~or feedwater line~~ provides additional time to attempt restoration before initiating the transient associated with main steam line ~~or feedwater line~~ isolation. This is acceptable because the penetration still has isolation capability although the ability to tolerate a single failure is lost.

Required Action B.2 requires periodic verification that isolated penetrations remain isolated. This is necessary to ensure that containment penetrations required to be isolated following an accident, and which are no longer capable of being automatically isolated, will be in the isolation position should an event occur. This Required Action does not require any testing or valve manipulation. Rather, it involves verification that those valves outside containment and capable of potentially being mispositioned are in the correct position. The Completion Time of once per 31 days for verifying each affected penetration is isolated is acceptable because the valves are operated under administrative control and the probability of their misalignment is low.

The Completion Time for verification of isolation valves inside containment is that verification must be completed prior to entering MODE 2 or 4 from MODE 5 if containment was de-inerted while in MODE 5 unless the verification was performed within the previous 92 days. This Completion Time is based on engineering judgment and is acceptable because of the inaccessibility of the valves and other administrative controls that ensure that valve misalignment is unlikely.

C.1

If two or more CIVs are inoperable in one or more penetration flow paths for reasons other than Condition A or D, isolation capability for the penetration may be lost. Therefore, at least one of the CIVs in each flow path must be restored to OPERABLE or Required Action C.1 requires that the penetration be isolated within one hour.



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RAI 16.2-179**

3.6 CONTAINMENT SYSTEMS

3.6.1.4 Drywell Pressure

LCO 3.6.1.4 Drywell pressure shall be  $\leq$  110.3 kPa (16.0 psia) ~~9.000 kPaG (-1.305 psig)~~ |

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

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Drywell pressure not within limit.	A.1 Restore drywell pressure to within limit.	1 hour
B. Required Action and associated Completion Time not met.	B.1 Be in MODE 3.	12 hours
	<u>AND</u> B.2 Be in MODE 5.	36 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.6.1.4.1 Verify drywell pressure is within limit.	12 hours

B 3.6 CONTAINMENT SYSTEMS

B 3.6.1.4 Drywell Pressure

BASES

**BACKGROUND** The upper limit for containment drywell pressure is an input to the analyses for containment performance during postulated loss-of-coolant accidents (LOCAs). The limit was selected based on plant operating experience as a reasonable upper bound during normal operation. This limitation on drywell pressure provides added assurance that the peak containment pressure does not exceed the design value of 310 kPaG (45.0 psig).

**APPLICABLE SAFETY ANALYSES** Containment performance is evaluated for the entire spectrum of break sizes for postulated LOCAs. The upper limit for containment drywell pressure is an initial condition in the analyses (Ref. 1) that ensures that the peak drywell internal pressure will be maintained below the drywell design pressure in the event of a LOCA. The calculated peak drywell pressure for the limiting event is provided in Reference 1.

Drywell pressure satisfies Criterion 2 of 10 CFR 50.36(d)(2)(ii).

LCO

This LCO requires that containment drywell pressure be maintained  $\leq 110.3 \text{ kPa (16.0 psia)}$  ~~less than or equal to 9.000 kPaG (1.305 psig)~~ during normal operation.

Maintaining containment drywell pressure within the specified limit ensures that an initial condition assumed in the safety analysis remains valid. This ensures that the peak LOCA drywell internal pressure will be maintained below the drywell design pressure in the event of a LOCA.

**APPLICABILITY** Containment drywell pressure must be maintained within the specified limit in MODES 1, 2, 3, and 4 when a LOCA could cause a significant increase in containment pressure and the release of radioactive material to containment.

In MODES 5 and 6, the probability and consequences of LOCA are reduced because RPV pressure and temperature are lower. Therefore, maintaining drywell pressure within limits is not required when in MODE 5 or 6.

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RAI 16.2-180**

BASES

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## LCO

Only two of the three vacuum breaker flow paths must be OPERABLE for opening, with the associated vacuum breaker isolation valves in the open position. All wetwell-to-drywell vacuum breakers, however, are required to be closed (except during testing or when the vacuum breakers are performing their intended design function). Additionally, all vacuum breaker isolation valves must be OPERABLE for automatic closure. Vacuum breaker flow path OPERABILITY provides assurance that the drywell-to-wetwell negative pressure differential remains below the design value. Vacuum breaker flow path OPERABILITY also ensures that there is no excessive bypass leakage should a LOCA occur to maintain the pressure suppression capability of the containment.

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## APPLICABILITY

Vacuum breaker flow path OPERABILITY must be maintained in MODES 1, 2, 3, and 4 when containment OPERABILITY is required to mitigate the effects of a LOCA.

In MODES 5 and 6, the probability and consequences of a LOCA are reduced because RPV pressure and temperature are lower. Therefore, maintaining wetwell-to-drywell vacuum breaker flow paths OPERABLE is not required in MODE 5 or 6 to ensure containment integrity.

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## ACTIONS

A.1

If one required wetwell-to-drywell vacuum breaker flow path is inoperable because its vacuum breaker will not open or the associated isolation valve is not open, the remaining OPERABLE vacuum breaker flow path is capable of providing the vacuum relief function. However, overall system reliability is reduced because a single failure in the remaining vacuum breaker flow path could result in an excessive wetwell-to-drywell differential pressure during a LOCA. Therefore, 7 days is allowed to restore the inoperable wetwell-to-drywell vacuum breaker flow path to OPERABLE for opening status so that plant conditions are consistent with those assumed for the design basis analysis.

The Completion Time of 7 days is acceptable because the remaining OPERABLE required wetwell-to-drywell vacuum breaker flow path is capable of providing the vacuum relief function and the low likelihood of a LOCA with a single failure of a vacuum breaker during this period.

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**DCD Markups for  
RAI 16.2-182**

3.7 PLANT SYSTEMS

3.7.1 Isolation Condenser (IC)/Passive Containment Cooling (PCC) Pools

LCO 3.7.1 The IC/PCC pools shall be OPERABLE.

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

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more IC/PCC expansion pool-to-equipment pool isolation valves with Diverse Protection System (DPS) actuator inoperable.	A.1 Restore DPS actuator(s) to OPERABLE status.	Prior to entering MODE 2 or 4 from MODE 5
B. One IC/PCC expansion pool-to-equipment pool connection line on one or more expansion pools inoperable for reasons other than Condition A.	B.1 Restore IC/PCC expansion pool-to-equipment pool line(s) to OPERABLE status.	30 days
<del>C. Both IC/PCC expansion pool-to-equipment pool connection lines on one or more expansion pools inoperable for reasons other than Condition A.</del>	<del>C.1 Restore IC/PCC expansion pool-to-equipment pool line(s) to OPERABLE status.</del>	<del>7 days</del>
<u>CD</u> . IC/PCC pool inoperable for reasons other than Condition A, <del>B</del> , or <u>BG</u> .	<u>CD</u> .1 Restore IC/PCC pools to OPERABLE status.	8 hours

CONDITION	REQUIRED ACTION	COMPLETION TIME
<u>DE</u> . Required Action and associated Completion Time not met.	<u>DE</u> .1 Be in MODE 3.	12 hours
	AND <u>DE</u> .2 Be in MODE 5.	36 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.7.1.1	Verify water levels in the IC/PCC expansion pools are $\geq 4.8$ meters (15.75 feet).	24 hours
SR 3.7.1.2	----- <p style="text-align: center;"><b>- NOTE -</b></p> Not required to be met in MODES 3 and 4. -----  Verify water levels in the equipment pool and reactor well are $\geq 6.7$ meters (22.0 feet).	24 hours
SR 3.7.1.3	Verify average water temperature in <span style="border: 1px solid black; padding: 2px;">available</span> IC/PCC pools is $\leq 43.3^\circ\text{C}$ (110°F).	24 hours
SR 3.7.1.4	Verify supply pressure to each IC/PCC expansion pool-to-equipment pool valve accumulator is $\geq 0.62$ MPaG (90 psig).	31 days



## BASES

## ACTIONS (continued)

B.1

This Condition applies when one IC/PCC expansion pool-to-equipment pool connection line on one or more expansion pools is inoperable for reasons other than Condition A. In this Condition, failure of an additional expansion pool-to-equipment pool isolation line could result in the need for operator action to re-fill the IC/PCC pool in less than 72 hours following any event that requires either PCCS or ICS for decay heat removal.

In this Condition, the expansion pool-to-equipment pool connection line(s) must be restored to OPERABLE status within 30 days. This Completion Time is acceptable based on engineering judgment considering that substantial decay heat removal capacity would remain available even if an additional expansion pool-to-equipment pool connection line failed and the low probability of a failure of an additional expansion pool-to-equipment pool connection line failure in conjunction with an event that requires either PCCS or ICS for decay heat removal.

~~C.1~~

~~This Condition applies when both IC/PCC expansion pool-to-equipment pool connection lines on one or more expansion pools are inoperable for reasons other than Condition A. This Condition also applies when one or more required safety-related expansion pool level instrument channels (i.e., excluding DPS actuators) are inoperable. In this Condition, the total IC/PCC pool water volume may not be available and operator action to re-fill the IC/PCC pool may be required in less than 72 hours following any event that requires either PCCS or ICS for decay heat removal.~~

~~In this Condition, at least one of the two expansion pool to-equipment pool connection line(s) for each expansion pool must be restored to OPERABLE status within 7 days. This Completion Time is acceptable based on engineering judgment considering that substantial decay heat removal capacity remains available and the low probability of an event that requires either PCCS or ICS for decay heat removal.~~

## BASES

CD.1

If the IC/PCC pool is inoperable for reasons other than Condition A, ~~B~~, or ~~BC~~, the ICS and PCCS may not be capable of performing their required safety function and the initial conditions used in the analyses in References 2 and 3 may not be met. Required Action CD.1 requires that the IC/PCC pools be restored within 8 hours. The Completion Time of 8 hours is acceptable ~~because~~ based on the remaining heat removal capability of the IC/PCC pools ~~still provide substantial heat sink capacity~~ and ~~the there are~~ alternate methods for providing makeup to the IC/PCC pools.

DE.1 and DE.2

If the Required Action and associated Completion Time of Condition A, B, ~~C~~, or CD is not met, the plant must be placed in a MODE in which the LCO does not apply. To achieve this status, the plant must be brought to at least MODE 3 within 12 hours and to MODE 5 within 36 hours. The Completion Times are reasonable, based on plant design, to reach required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

SURVEILLANCE  
REQUIREMENTSSR 3.7.1.1 and SR 3.7.1.2

This SR requires verification every 24 hours that the water levels in each expansion pool and the water level in the equipment pool or reactor well are within specified limits. These levels are necessary to ensure that the volume of water in the IC/PCC pools is sufficient to support decay heat removal via the ICS and/or the PCCS for 72 hours without the need to replenish the water in the expansion pools. The 24 hour frequency is acceptable because abnormal water levels are identified by alarms and indication in the control room.

SR 3.7.1.2 is modified by a Note that specifies that this SR is not required to be met in MODES 3 and 4. Considering the reduced decay heat loads following events initiated after the reactor is shutdown, isolation of these pools from the IC/PCC expansion pools when in Modes 3 and 4 will not result in a significant reduction in the 72 hours assumed available to provide makeup to the IC/PCC pools.

BASES

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SR 3.7.1.3

This SR requires verification every 24 hours that the bulk average temperature of the [available](#) IC/PCC pools is  $\leq 43.3^{\circ}\text{C}$  ( $110^{\circ}\text{F}$ ). The bulk average temperature is calculated based on the volume and temperature of the water in the expansion pools, the [connected](#) IC and PCC subcompartments ([isolated subcompartments are addressed in LCO 3.5.4, "Isolation Condenser System \(ICS\) - Operating" and LCO 3.6.1.7, "Passive Containment Cooling System \(PCCS\)," respectively](#)), the equipment pool, and the reactor well. [The water volume in any isolated subcompartments, or the equipment pool when inoperabilities render it unavailable, are not averaged to meet the requirements of SR 3.7.1.3.](#) This value for the average temperature of the IC/PCC pools is an assumption in the analyses described in References 2 and 3 that determined that the heat sink capacity of the IC/PCC pools is sufficient to support decay heat removal for 72 hours without the need to replenish the water in the expansion pools. The 24 hour frequency is acceptable because operators will be promptly alerted to abnormal water temperatures by alarms and indication in the control room.

## SURVEILLANCE REQUIREMENTS (continued)

SR 3.7.1.4

This SR requires periodic verification that the supply pressure to the expansion pool-to-equipment pool pneumatic isolation valve accumulators (i.e., Instrument Air System (IAS)) is greater than or equal to the specified limit. An accumulator on each expansion pool-to-equipment pool pneumatic isolation valve provides pneumatic pressure for valve actuation. The 31 day Frequency is acceptable because IAS low pressure alarms provide prompt notification of an abnormal pressure in the IAS.

SR 3.7.1.5

This SR requires a periodic verification of the continuity of the DPS actuator and one safety-related actuator associated with DC and Uninterruptible AC Electrical Power Distribution Divisions required by LCO 3.8.6, "Distribution Systems - Operating," for each expansion pool-to-equipment pool isolation valve.