

3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS) AND REACTOR CORE ISOLATION COOLING (RCIC) SYSTEM

3.5.1 ECCS - Operating

LCO 3.5.1 Each ECCS injection/spray subsystem and the Automatic Depressurization System (ADS) function of seven safety/relief valves shall be OPERABLE.

APPLICABILITY: MODE 1,
MODES 2 and 3, except ADS valves are not required to be OPERABLE with reactor steam dome pressure \leq 10.55 kg/cm² (150 psig).

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ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One low pressure ECCS injection/spray subsystem inoperable.	A.1 Restore low pressure ECCS injection/spray subsystem to OPERABLE status.	7 days
B. High Pressure Core Spray (HPCS) System inoperable.	B.1 Verify by administrative means RCIC System is OPERABLE when RCIC is required to be OPERABLE. <u>AND</u> B.2 Restore HPCS System to OPERABLE status.	1 hour 14 days
C. Two ECCS injection subsystems inoperable. <u>OR</u> One ECCS injection and one ECCS spray subsystem inoperable.	C.1 Restore one ECCS injection/spray subsystem to OPERABLE status.	72 hours

(continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>D. Required Action and associated Completion Time of Condition A, B, or C not met.</p>	<p>D.1 Be in MODE 3. <u>AND</u> D.2 Be in MODE 4.</p>	<p>12 hours 36 hours</p>
<p>E. One ADS valve inoperable.</p>	<p>E.1 Restore ADS valve to OPERABLE status.</p>	<p>14 days</p>
<p>F. One ADS valve inoperable. <u>AND</u> One low pressure ECCS injection/spray subsystem inoperable.</p>	<p>F.1 Restore ADS valve to OPERABLE status. <u>OR</u> F.2 Restore low pressure ECCS injection/spray subsystem to OPERABLE status.</p>	<p>72 hours 72 hours</p>
<p>G. Two or more ADS valves inoperable. <u>OR</u> Required Action and associated Completion Time of Condition E or F not met.</p>	<p>G.1 Be in MODE 3. <u>AND</u> G.2 Reduce reactor steam dome pressure to $\leq 10.55 \text{ kg/cm}^2$ (150 psig).</p>	<p>12 hours 36 hours</p>

(continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>H. HPCS and low pressure core spray (LPCS) inoperable.</p> <p><u>OR</u></p> <p>Three or more ECCS injection/spray subsystems inoperable.</p> <p><u>OR</u></p> <p>HPCS System and one or more ADS valves inoperable.</p> <p><u>OR</u></p> <p>Two or more ECCS injection/spray subsystems and one or more ADS valves inoperable.</p>	<p>H.1 Enter LCO 3.0.3.</p>	<p>Immediately</p>

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY															
SR 3.5.1.1	Verify, for each ECCS injection/spray subsystem, the piping is filled with water from the pump discharge valve to the injection valve.	31 days															
SR 3.5.1.2	<p>-----NOTE-----</p> <p>Low pressure coolant injection (LPCI) subsystems may be considered OPERABLE during alignment and operation for decay heat removal with reactor steam dome pressure less than the residual heat removal cut in permissive pressure in MODE 3, if capable of being manually realigned and not otherwise inoperable.</p> <p>-----</p> <p>Verify each ECCS injection/spray 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.</p>	31 days															
SR 3.5.1.3	Verify ADS accumulator header pressure is $\geq 9.76 \text{ kg/cm}^2$ (138.9 psig).	31 days															
SR 3.5.1.4	<p>Verify each ECCS pump develops the specified flow rate operating with a discharge to suction differential pressure of.</p> <table border="0" style="margin-left: auto; margin-right: auto;"> <tr> <td></td> <td style="text-align: center;">OPERATING WITH A DISCHARGE TO SUCTION DIFFERENTIAL PRESSURE OF</td> <td></td> </tr> <tr> <td style="text-align: center;"><u>SYSTEM</u></td> <td style="text-align: center;"><u>FLOW RATE</u></td> <td style="text-align: center;"><u>PRESSURE OF</u></td> </tr> <tr> <td>LPCS</td> <td>$\geq 5010 \text{ gpm}$</td> <td>$\geq 284 \text{ psi}$</td> </tr> <tr> <td>LPCI</td> <td>$\geq 5050 \text{ gpm}$</td> <td>$\geq 110 \text{ psi}$</td> </tr> <tr> <td>HPCS</td> <td>$\geq 5010 \text{ gpm}$</td> <td>$\geq 375 \text{ psi}$</td> </tr> </table>		OPERATING WITH A DISCHARGE TO SUCTION DIFFERENTIAL PRESSURE OF		<u>SYSTEM</u>	<u>FLOW RATE</u>	<u>PRESSURE OF</u>	LPCS	$\geq 5010 \text{ gpm}$	$\geq 284 \text{ psi}$	LPCI	$\geq 5050 \text{ gpm}$	$\geq 110 \text{ psi}$	HPCS	$\geq 5010 \text{ gpm}$	$\geq 375 \text{ psi}$	In accordance with the Inservice Testing Program or 92 days
	OPERATING WITH A DISCHARGE TO SUCTION DIFFERENTIAL PRESSURE OF																
<u>SYSTEM</u>	<u>FLOW RATE</u>	<u>PRESSURE OF</u>															
LPCS	$\geq 5010 \text{ gpm}$	$\geq 284 \text{ psi}$															
LPCI	$\geq 5050 \text{ gpm}$	$\geq 110 \text{ psi}$															
HPCS	$\geq 5010 \text{ gpm}$	$\geq 375 \text{ psi}$															

(continued)

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
<p>SR 3.5.1.5 -----NOTE----- Vessel injection/spray may be excluded. -----</p> <p>Verify each ECCS injection/spray subsystem actuates on an actual or simulated automatic initiation signal.</p>	<p>18 months</p>
<p>SR 3.5.1.6 -----NOTE----- Valve actuation may be excluded. -----</p> <p>Verify the ADS actuates on an actual or simulated automatic initiation signal.</p>	<p>18 months</p>
<p>SR 3.5.1.7 -----NOTE----- Not required to be performed until 12 hours after reactor steam pressure and flow are adequate to perform the test. -----</p> <p>Verify each ADS valve opens when manually actuated.</p>	<p>18 months on a STAGGERED TEST BASIS for each valve solenoid</p>
<p>SR 3.5.1.8 -----NOTE----- ECCS actuation instrumentation is excluded. -----</p> <p>Verify the ECCS RESPONSE TIME for each ECCS injection/spray subsystem is within limits.</p>	<p>18 months</p>

3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS) AND REACTOR CORE ISOLATION COOLING (RCIC) SYSTEM

3.5.2 ECCS - Shutdown

LCO 3.5.2 Two ECCS injection/spray subsystems shall be OPERABLE.

APPLICABILITY: MODE 4,
MODE 5 except with the upper containment fuel pool gates removed and water level ≥ 6.91 meter (22 ft 8 inches) over the top of the reactor pressure vessel flange.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One required ECCS injection/spray subsystem inoperable.	A.1 Restore required ECCS injection/spray subsystem to OPERABLE status.	4 hours
B. Required Action and associated Completion Time of Condition A not met.	B.1 Initiate action to suspend operations with a potential for draining the reactor vessel (OPDRVs).	Immediately
C. Two required ECCS injection/spray subsystems inoperable.	C.1 Initiate action to suspend OPDRVs.	Immediately
	<u>AND</u> C.2 Restore one ECCS injection/spray subsystem to OPERABLE status.	4 hours

(continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. Required Action C.2 and associated Completion Time not met.	D.1 Initiate action to restore secondary containment to OPERABLE status. <u>AND</u>	Immediately
	D.2 Initiate action to restore one standby gas treatment subsystem to OPERABLE status. <u>AND</u>	Immediately
	D.3 Initiate action to restore isolation capability in each required secondary containment penetration flow path not isolated.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.5.2.1 Verify, for each required low pressure ECCS injection/spray subsystem, the suppression pool water level is ≥ 4.60 meter (15'-1")	12 hours

(continued)

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.5.2.2	<p>Verify, for the required High Pressure Core Spray (HPCS) System, the:</p> <p>a. Suppression pool water level is \geq 4.60 meter (15'-1")</p> <p>b. Condensate storage tank water level is \geq 10.92 meter (125000gal).</p>	12 hours
SR 3.5.2.3	<p>Verify, for each required ECCS injection/spray subsystem, the piping is filled with water from the pump discharge valve to the injection valve.</p>	31 days
SR 3.5.2.4	<p>-----NOTE-----</p> <p>One low pressure coolant injection (LPCI) subsystem may be considered OPERABLE during alignment and operation for decay heat removal, if capable of being manually realigned and not otherwise inoperable.</p> <p>-----</p> <p>Verify each required ECCS injection/spray 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.</p>	31 days

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(continued)

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY											
<p>SR 3.5.2.5</p> <p>Verify each required ECCS pump develops the specified flow rate operating with a discharge to suction differential pressure of.</p> <p style="text-align: center;">OPERATING WITH A DISCHARGE TO SUCTION DIFFERENTIAL PRESSURE OF</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th><u>SYSTEM</u></th> <th><u>FLOW RATE</u></th> <th><u>PRESSURE OF</u></th> </tr> </thead> <tbody> <tr> <td>LPCS</td> <td>≥ 5010 gpm</td> <td>≥ 284 psi</td> </tr> <tr> <td>LPCI</td> <td>≥ 5050 gpm</td> <td>≥ 110 psi</td> </tr> <tr> <td>HPCS</td> <td>≥ 5010 gpm</td> <td>≥ 375 psi</td> </tr> </tbody> </table>	<u>SYSTEM</u>	<u>FLOW RATE</u>	<u>PRESSURE OF</u>	LPCS	≥ 5010 gpm	≥ 284 psi	LPCI	≥ 5050 gpm	≥ 110 psi	HPCS	≥ 5010 gpm	≥ 375 psi	<p>In accordance with the Inservice Testing Program or 92 days</p>
<u>SYSTEM</u>	<u>FLOW RATE</u>	<u>PRESSURE OF</u>											
LPCS	≥ 5010 gpm	≥ 284 psi											
LPCI	≥ 5050 gpm	≥ 110 psi											
HPCS	≥ 5010 gpm	≥ 375 psi											
<p>SR 3.5.2.6</p> <p>-----NOTE----- Vessel injection/spray may be excluded. -----</p> <p>Verify each required ECCS injection/spray subsystem actuates on an actual or simulated automatic initiation signal.</p>	<p>18 months</p>												

3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS) AND REACTOR CORE ISOLATION COOLING (RCIC) SYSTEM

3.5.3 RCIC System

LCO 3.5.3 The RCIC System shall be OPERABLE.

APPLICABILITY: MODE 1,
MODES 2 and 3 with reactor steam dome pressure >
10.55kg/cm² (150 psig).

| 2

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. RCIC System inoperable.	A.1 Verify by administrative means High Pressure Core Spray System is OPERABLE.	1 hour
	<u>AND</u> A.2 Restore RCIC System to OPERABLE status.	14 days
B. Required Action and associated Completion Time not met.	B.1 Be in MODE 3.	12 hours
	<u>AND</u> B.2 Reduce reactor steam dome pressure to ≤ 10.55 kg/cm ² (150 psig).	36 hours

| 2

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.5.3.1	Verify the RCIC System piping is filled with water from the pump discharge valve to the injection valve.	31 days
SR 3.5.3.2	Verify each RCIC System 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.	31 days
SR 3.5.3.3	<p>-----NOTE----- Not required to be performed until 12 hours after reactor steam pressure ($\geq 70.31 \text{ kg/cm}^2$ (1000psig)) is adequate to perform the test. -----</p> <p>Verify, with RCIC steam supply pressure $\leq 81.52 \text{ kg/cm}^2$ (1160psig) and $\geq 70.31 \text{ kg/cm}^2$ (1000psig), the RCIC pump can develop a flow rate $\geq 37.85 \text{ l/s}$ (600gpm) against a system head corresponding to reactor pressure.</p>	<p>2</p> <p>92 days</p> <p>2</p>
SR 3.5.3.4	<p>-----NOTE----- Not required to be performed until 12 hours after reactor steam pressure $> 10.55 \text{ kg/cm}^2$ (150psig) is adequate to perform the test. -----</p> <p>Verify, with RCIC steam supply pressure $\leq 11.60 \text{ kg/cm}^2$ (165 psig), the RCIC pump can develop a flow rate $\geq 37.85 \text{ l/s}$ (600 gpm) against a system head corresponding to reactor pressure.</p>	<p>2</p> <p>18 months</p>

(continued)

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
<p>SR 3.5.3.5 -----NOTE----- Vessel injection may be excluded. ----- Verify the RCIC System actuates on an actual or simulated automatic initiation signal.</p>	<p>18 months</p>