

## Industry/TSTF Standard Technical Specification Change Traveler

### SR 3.5.1.2 Notation

Classification: 1) Technical Change

Priority: 3) Low

NUREGs Affected:  1430  1431  1432  1433  1434

#### Description:

The Note to SR 3.5.1.2 is being moved to be a Note to LCO 3.5.1 and the Note to SR 3.5.2.4 is being moved to be a Note to LCO 3.5.2. In addition, appropriate Bases changes are also being made.

#### Justification:

##### Background

SR 3.5.1.2 and SR 3.5.2.4, the verification of proper valve alignment Surveillance Requirements, have a Note that allows both LPCI subsystems (SR 3.5.1.2 Note) or one LPCI subsystem (SR 3.5.2.4 Note) to be considered Operable during alignment and operation for decay heat removal, if capable of being manually realigned and not otherwise inoperable. The Note to SR 3.5.1.2 also has a restriction that the Note is only applicable with reactor steam dome pressure less than the residual heat removal cut-in permissive pressure in Mode 3. These Notes were added to allow the LCPI subsystems to be considered Operable when the RHR System is being used for shutdown cooling.

The LCO Bases for LCO 3.5.1 and LCO 3.5.2 state that an LCPI subsystem is considered OPERABLE during alignment or during operation for decay heat removal.

##### Need For Change

The LCO Bases are clear that an LCPI subsystem is considered OPERABLE during alignment or during operation for decay heat removal. The Notes on SR 3.5.1.2 and SR 3.5.2.4 support this determination. However, a similar Note is not placed above other Surveillance Requirements that are not met when an RHR subsystem is aligned in the shutdown cooling mode; specifically SR 3.5.1.5 and SR 3.5.2.6, the automatic actuation tests, and SR 3.3.5.1.7, the ECCS Response Time test. The intent of the Notes, as described in the LCO section of the Bases, was to allow LPCI subsystems to be considered Operable during this condition. Without this change, it could be interpreted that, even though the Notes to SR 3.5.1.2 and SR 3.5.2.4 allow LPCI subsystems to be considered Operable during alignment, the other Surveillance Requirements do not have similar Notes, thus the affected LPCI subsystems would have to be declared inoperable due to failure to meet the other Surveillance Requirements.

##### Proposed Change

The Note to SR 3.5.1.2 is being moved to be a Note to LCO 3.5.1 and the Note to SR 3.5.2.4 is being moved to be a Note to LCO 3.5.2. In addition, appropriate Bases changes are also being made.

7/15/2001

**Justification**

The LCO Bases for LCO 3.5.1 and LCO 3.5.2 state that an LPCI subsystem is considered OPERABLE during alignment or during operation for decay heat removal. SR 3.5.1.2 and SR 3.5.2.4, the verification of proper valve alignment Surveillance Requirements, have a Note that allows both LPCI subsystems (SR 3.5.1.2 Note) or one LPCI subsystem (SR 3.5.2.4 Note) to be considered Operable during alignment and operation for decay heat removal, if capable of being manually realigned and not otherwise inoperable. The Note to SR 3.5.1.2 also has a restriction that the Note is only applicable with reactor steam dome pressure less than the residual heat removal cut-in permissive pressure in Mode 3. These Notes were added to allow the LPCI subsystems to be considered Operable when the RHR System is being used for shutdown cooling. A similar Note is not placed above other Surveillance Requirements that are not met when an RHR subsystem is aligned in the shutdown cooling mode; specifically SR 3.5.1.5 and SR 3.5.2.6, the automatic actuation tests, and SR 3.3.5.1.7, the ECCS Response Time test. The intent of the Notes (as described in the LCO section of the Bases) was to allow LPCI subsystems to be considered Operable during this condition. Therefore, the Notes are proposed to be moved to the LCO sections to ensure they apply to all Surveillance Requirements. This location is also consistent with similar Note allowances in the other RHR shutdown cooling Specifications (ISTS 3.4.8 and ISTS 3.4.9 (BWR/4) and ISTS 3.4.9 and ISTS 3.4.10 (BWR/6)). Without this change, it could be interpreted that, even though the Notes to SR 3.5.1.2 and SR 3.5.2.4 allow LPCI subsystems to be considered Operable during alignment, the other Surveillance Requirements do not have similar Notes, thus the affected LPCI subsystems would have to be declared inoperable due to failure to meet the other Surveillance Requirements.

7/15/2001

**Determination of No Significant Hazards Considerations**

In accordance with the criteria set forth in 10 CFR 50.92, the Industry has evaluated these proposed Improved Technical Specification changes and determined they do not represent a significant hazards consideration. The following is provided in support of this conclusion.

1. Does the change involve a significant increase in the probability or consequences of an accident previously evaluated?

The proposed change makes the STS and STS Bases consistent in their consideration of an LPCI subsystem aligned for decay heat removal being considered OPERABLE for ECCS. The LCO 3.5.1 and LCO 3.5.2 Bases state that an LPCI subsystem may be considered OPERABLE during alignment and operation for decay heat removal. As a result, no initiators to accidents previously evaluated are affected and no mitigating equipment assumed in accidents previously evaluated are affected. Consequently, the probability or consequences of an accident previously evaluated is not significantly increased.

2. Does the change create the possibility of a new or different kind of accident from any accident previously evaluated?

The proposed change makes the STS and STS Bases consistent in their consideration of an LPCI subsystem aligned for decay heat removal being considered OPERABLE for ECCS. The proposed change does not involve a physical alteration of the plant (no new or different type of equipment will be installed) or a change in the methods governing normal plant operation. Thus, this change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

3. Does this change involve a significant reduction in a margin of safety?

The proposed change makes the STS and STS Bases consistent in their consideration of an LPCI subsystem aligned for decay heat removal being considered OPERABLE for ECCS. As stated in the LCO 3.5.1 and LCO 3.5.2 Bases, an LPCI subsystem is considered to be OPERABLE when aligned for decay heat removal. As the OPERABILITY requirements of the LPCI subsystem are unaffected, the margin of safety is unaffected. Therefore, this change does not involve a significant reduction in a margin of safety.

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**Revision History****OG Revision 0****Revision Status: Active****Next Action: NRC**

Revision Proposed by: EXELON

Revision Description:

Original Issue

7/15/2001

**OG Revision 0**

**Revision Status: Active**

**Next Action: NRC**

**Owners Group Review Information**

Date Originated by OG: 08-Mar-01

Owners Group Comments:  
(No Comments)

Owners Group Resolution: Approved Date: 08-Mar-01

**TSTF Review Information**

TSTF Received Date: 28-Mar-01 Date Distributed for Review: 28-Mar-01

OG Review Completed:  BWOG  WOG  CEOG  BWROG

TSTF Comments:  
(No Comments)

TSTF Resolution: Approved Date: 29-Jun-01

**NRC Review Information**

NRC Received Date: 23-Jul-01

NRC Comments:  
(No Comments)

Final Resolution: NRC Action Pending

Final Resolution Date:

**Incorporation Into the NUREGs**

File to BBS/LAN Date:

TSTF Informed Date:

TSTF Approved Date:

NUREG Rev Incorporated:

**Affected Technical Specifications**

LCO 3.5.1 ECCS - Operating

LCO 3.5.1 Bases ECCS - Operating

SR 3.5.1.2 ECCS - Operating

SR 3.5.1.2 Bases ECCS - Operating

LCO 3.5.2 ECCS - Shutdown

LCO 3.5.2 Bases ECCS - Shutdown

SR 3.5.2.4 ECCS - Shutdown

SR 3.5.2.4 Bases ECCS - Shutdown

7/15/2001

INSERT 1

Alignment and operation for decay heat removal includes when the required RHR pump is not operating or when the system is realigned from or to the RHR shutdown cooling mode. This allowance is necessary since the RHR System may be required to operate in the shutdown cooling mode to remove decay heat and sensible heat from the reactor.

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

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.

← Insert from SP 3.5.1.2

APPLICABILITY: MODE 1, MODES 2 and 3, except high pressure coolant injection (HPCI) and ADS valves are not required to be OPERABLE with reactor steam dome pressure  $\leq$  [150] psig.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One low pressure ECCS injection/spray subsystem inoperable.  <u>OR</u>  One LPCI pump in both LPCI subsystems inoperable.	A.1 Restore low pressure ECCS injection/spray subsystem(s) to OPERABLE status.	7 days
B. Required Action and associated Completion Time of Condition A not met.	B.1 Be in MODE 3.  <u>AND</u>  B.2 Be in MODE 4.	12 hours  36 hours
C. HPCI System inoperable.	C.1 Verify by administrative means RCIC System is OPERABLE.  <u>AND</u>  C.2 Restore HPCI System to OPERABLE status.	Immediately  14 days

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
H. Two or more low pressure ECCS injection/spray subsystems inoperable for reasons other than Condition A.  <u>OR</u>  HPCI System and one or more ADS valves inoperable.	H.1 Enter LCO 3.0.3.	Immediately

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	<div style="border: 1px solid black; border-radius: 15px; padding: 10px; margin: 10px 0;"> <p style="text-align: center;">-----  <b>- NOTE -</b>            -----</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 (RHR) cut in permissive pressure] in MODE 3, if capable of being manually realigned and not otherwise inoperable.</p> </div> <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 [air supply header] pressure is $\geq$ [90] psig.	31 days

Move to LCO

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

3.5.2 ECCS - Shutdown

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

← Insert from SR 3.5.2.4

APPLICABILITY: MODE 4,  
 MODE 5, except with the spent fuel storage pool gates removed and water level  $\geq$  [23 ft] 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
D. Required Action C.2 and associated Completion Time not met.	D.1 Initiate action to restore [secondary] containment to OPERABLE status.	Immediately
	<u>AND</u>	

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE	FREQUENCY																
<p>SR 3.5.2.4</p> <p><i>Move to LCO</i> →</p> <p style="text-align: center;">-----  <b>- NOTE -</b>            -----</p> <p>One 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>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>	<p>31 days</p>																
<p>SR 3.5.2.5</p> <p>Verify each required ECCS pump develops the specified flow rate [against a system head corresponding to the specified reactor pressure].</p> <table border="1" data-bbox="408 829 1013 1050"> <thead> <tr> <th></th> <th></th> <th>No. Of Pumps</th> <th>[System Head Corresponding to a Reactor Pressure Of]</th> </tr> <tr> <th>System</th> <th>Flow Rate</th> <th></th> <th></th> </tr> </thead> <tbody> <tr> <td>CS</td> <td>≥ [4250] gpm</td> <td>[1]</td> <td>≥ [113] psig</td> </tr> <tr> <td>LPCI</td> <td>≥ [7700] gpm</td> <td>[1]</td> <td>≥ [20] psig</td> </tr> </tbody> </table>			No. Of Pumps	[System Head Corresponding to a Reactor Pressure Of]	System	Flow Rate			CS	≥ [4250] gpm	[1]	≥ [113] psig	LPCI	≥ [7700] gpm	[1]	≥ [20] psig	<p>[In accordance with the Inservice Testing Program or 92 days]</p>
		No. Of Pumps	[System Head Corresponding to a Reactor Pressure Of]														
System	Flow Rate																
CS	≥ [4250] gpm	[1]	≥ [113] psig														
LPCI	≥ [7700] gpm	[1]	≥ [20] psig														
<p>SR 3.5.2.6</p> <p style="text-align: center;">-----  <b>- NOTE -</b>            -----</p> <p>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>																

BASES

LCO (continued)

HPCI System. The low pressure ECCS injection/spray subsystems are defined as the two CS subsystems and the two LPCI subsystems.

With less than the required number of ECCS subsystems OPERABLE, the potential exists that during a limiting design basis LOCA concurrent with the worst case single failure, the limits specified in Reference 10 could be exceeded. All ECCS subsystems must therefore be OPERABLE to satisfy the single failure criterion required by Reference 10.

As noted,

LPCI subsystems may be considered OPERABLE during alignment and operation for decay heat removal when below the actual RHR cut in permissive pressure in MODE 3, if capable of being manually realigned (remote or local) to the LPCI mode and not otherwise inoperable. At these low pressures and decay heat levels, a reduced complement of ECCS subsystems should provide the required core cooling, thereby allowing operation of RHR shutdown cooling when necessary.

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APPLICABILITY

All ECCS subsystems are required to be OPERABLE during MODES 1, 2, and 3, when there is considerable energy in the reactor core and core cooling would be required to prevent fuel damage in the event of a break in the primary system piping. In MODES 2 and 3, when reactor steam dome pressure is  $\leq 150$  psig, ADS and HPCI are not required to be OPERABLE because the low pressure ECCS subsystems can provide sufficient flow below this pressure. ECCS requirements for MODES 4 and 5 are specified in LCO 3.5.2, "ECCS - Shutdown."

ACTIONS

A.1

If any one low pressure ECCS injection/spray subsystem is inoperable, or if one LPCI pump in both LPCI subsystems is inoperable, the inoperable subsystem(s) must be restored to OPERABLE status within 7 days. In this Condition, the remaining OPERABLE subsystems provide adequate core cooling during a LOCA. However, overall ECCS reliability is reduced, because a single failure in one of the remaining OPERABLE subsystems, concurrent with a LOCA, may result in the ECCS not being able to perform its intended safety function. The 7 day Completion Time is based on a reliability study (Ref. 12) that evaluated the impact on ECCS availability, assuming various components and subsystems were taken out of service. The results were used to calculate the average availability of ECCS equipment needed to mitigate the consequences of a LOCA as a function of allowed outage times (i.e., Completion Times).

BASES

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SURVEILLANCE REQUIREMENTS (continued)

valves are operated under procedural control and because improper valve position would only affect a single subsystem. This Frequency has been shown to be acceptable through operating experience.

This SR is modified by a Note that allows LPCI subsystems to be considered OPERABLE during alignment and operation for decay heat removal with reactor steam dome pressure less than the RHR cut in permissive pressure in MODE 3, if capable of being manually realigned (remote or local) to the LPCI mode and not otherwise inoperable. This allows operation in the RHR shutdown cooling mode during MODE 3, if necessary.

SR 3.5.1.3

Verification every 31 days that ADS air supply header pressure is  $\geq$  [90] psig ensures adequate air pressure for reliable ADS operation. The accumulator on each ADS valve provides pneumatic pressure for valve actuation. The design pneumatic supply pressure requirements for the accumulator are such that, following a failure of the pneumatic supply to the accumulator, at least two valve actuations can occur with the drywell at 70% of design pressure (Ref. 11). The ECCS safety analysis assumes only one actuation to achieve the depressurization required for operation of the low pressure ECCS. This minimum required pressure of  $\geq$  [90] psig is provided by the ADS instrument air supply. The 31 day Frequency takes into consideration administrative controls over operation of the air system and alarms for low air pressure.

SR 3.5.1.4

Verification every 31 days that the RHR System cross tie valve is closed and power to its operator is disconnected ensures that each LPCI subsystem remains independent and a failure of the flow path in one subsystem will not affect the flow path of the other LPCI subsystem. Acceptable methods of removing power to the operator include de-energizing breaker control power or racking out or removing the breaker. If the RHR System cross tie valve is open or power has not been removed from the valve operator, both LPCI subsystems must be considered inoperable. The 31 day Frequency has been found acceptable, considering that these valves are under strict administrative controls that will ensure the valves continue to remain closed with either control or motive power removed.

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

### B 3.5.2 ECCS - Shutdown

#### BASES

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**BACKGROUND** A description of the Core Spray (CS) System and the low pressure coolant injection (LPCI) mode of the Residual Heat Removal (RHR) System is provided in the Bases for LCO 3.5.1, "ECCS - Operating."

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**APPLICABLE SAFETY ANALYSES** The ECCS performance is evaluated for the entire spectrum of break sizes for a postulated loss of coolant accident (LOCA). The long term cooling analysis following a design basis LOCA (Ref. 1) demonstrates that only one low pressure ECCS injection/spray subsystem is required, post LOCA, to maintain adequate reactor vessel water level in the event of an inadvertent vessel draindown. It is reasonable to assume, based on engineering judgement, that while in MODES 4 and 5, one low pressure ECCS injection/spray subsystem can maintain adequate reactor vessel water level. To provide redundancy, a minimum of two low pressure ECCS injection/spray subsystems are required to be OPERABLE in MODES 4 and 5.

The low pressure ECCS subsystems satisfy Criterion 3 of 10 CFR 50.36(c)(2)(ii).

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**LCO** Two low pressure ECCS injection/spray subsystems are required to be OPERABLE. The low pressure ECCS injection/spray subsystems consist of two CS subsystems and two LPCI subsystems. Each CS subsystem consists of one motor driven pump, piping, and valves to transfer water from the suppression pool or condensate storage tank (CST) to the reactor pressure vessel (RPV). Each LPCI subsystem consists of one motor driven pump, piping, and valves to transfer water from the suppression pool to the RPV. Only a single LPCI pump is required per subsystem because of the larger injection capacity in relation to a CS subsystem. In MODES 4 and 5, the RHR System cross tie valve is not required to be closed.

As noted,

during alignment and operation for decay heat removal

One LPCI subsystem may be aligned for decay heat removal and considered OPERABLE for the ECCS function if it can be manually

capable of being

Insert 1

realigned (remote or local) to the LPCI mode and is not otherwise inoperable. Because of low pressure and low temperature conditions in MODES 4 and 5, sufficient time will be available to manually align and initiate LPCI subsystem operation to provide core cooling prior to postulated fuel uncover.

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BASES

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SURVEILLANCE REQUIREMENTS (continued)

This SR does not apply to valves that cannot be inadvertently misaligned, such as check valves. The 31 day Frequency is appropriate because the valves are operated under procedural control and the probability of their being mispositioned during this time period is low.

In MODES 4 and 5, the RHR System may operate in the shutdown cooling mode to remove decay heat and sensible heat from the reactor. Therefore, RHR valves that are required for LPCI subsystem operation may be aligned for decay heat removal. Therefore, this SR is modified by a Note that allows one LPCI subsystem of the RHR System to be considered OPERABLE for the ECCS function if all the required valves in the LPCI flow path can be manually realigned (remote or local) to allow injection into the RPV, and the system is not otherwise inoperable. This will ensure adequate core cooling if an inadvertent RPV draindown should occur.

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REFERENCES      1.    FSAR, Section [6.3.2].

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

3.5.1 ECCS - Operating

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

← Insert from SR 3.5.1.2

APPLICABILITY: MODE 1, MODES 2 and 3, except ADS valves are not required to be OPERABLE with reactor steam dome pressure  $\leq$  [150] psig.

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.	Immediately
	<u>AND</u> B.2 Restore HPCS System to OPERABLE status.	
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

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY												
SR 3.5.1.2	<p style="text-align: center;">- 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>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 [air receiver] pressure is $\geq$ [150] psig.	31 days												
SR 3.5.1.4	<p>Verify each ECCS pump develops the specified flow rate [against a system head corresponding to the specified reactor pressure].</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>System</th> <th>Flow Rate</th> <th>[System Head Corresponding to a Reactor Pressure Of]</th> </tr> </thead> <tbody> <tr> <td>LPCS</td> <td><math>\geq</math> [7115] gpm</td> <td><math>\geq</math> [290] psig</td> </tr> <tr> <td>LPCI</td> <td><math>\geq</math> [7450] gpm</td> <td><math>\geq</math> [125] psig</td> </tr> <tr> <td>HPCS</td> <td><math>\geq</math> [7115] gpm</td> <td><math>\geq</math> [445] psig</td> </tr> </tbody> </table>	System	Flow Rate	[System Head Corresponding to a Reactor Pressure Of]	LPCS	$\geq$ [7115] gpm	$\geq$ [290] psig	LPCI	$\geq$ [7450] gpm	$\geq$ [125] psig	HPCS	$\geq$ [7115] gpm	$\geq$ [445] psig	[In accordance with the Inservice Testing Program or 92 days]
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SR 3.5.1.5	<p style="text-align: center;">- NOTE -</p> <p>Vessel injection/spray may be excluded.</p> <p>Verify each ECCS injection/spray subsystem actuates on an actual or simulated automatic initiation signal.</p>	[18] months												

Move to LCO

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

3.5.2 ECCS - Shutdown

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

← Insert from SR 3.5.2.4

APPLICABILITY: MODE 4,  
 MODE 5 except with the upper containment [cavity to dryer] pool [gate] removed and water level  $\geq$  [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
D. Required Action C.2 and associated Completion Time not met.	D.1 Initiate action to restore [secondary containment] to OPERABLE status.	Immediately
	<u>AND</u>	

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE	FREQUENCY															
<p>SR 3.5.2.4</p> <div style="border: 1px dashed black; padding: 5px; margin: 10px 0;"> <p align="center"><b>- NOTE -</b></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> </div> <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>	<p>31 days</p>															
<p>SR 3.5.2.5</p> <p>Verify each required ECCS pump develops the specified flow rate [against a system head corresponding to the specified reactor pressure].</p> <table border="0" style="width: 100%; margin-top: 10px;"> <tr> <td></td> <td></td> <td align="center">[System Head Corresponding to a Reactor Pressure of]</td> </tr> <tr> <td align="center"><u>System</u></td> <td align="center"><u>Flow Rate</u></td> <td></td> </tr> <tr> <td>LPCS</td> <td>≥ [7115] gpm</td> <td>≥ [290] psig</td> </tr> <tr> <td>LPCI</td> <td>≥ [7450] gpm</td> <td>≥ [125] psig</td> </tr> <tr> <td>HPCS</td> <td>≥ [7115] gpm</td> <td>≥ [445] psig</td> </tr> </table>			[System Head Corresponding to a Reactor Pressure of]	<u>System</u>	<u>Flow Rate</u>		LPCS	≥ [7115] gpm	≥ [290] psig	LPCI	≥ [7450] gpm	≥ [125] psig	HPCS	≥ [7115] gpm	≥ [445] psig	<p>[In accordance with the Inservice Testing Program or 92 days]</p>
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LPCI	≥ [7450] gpm	≥ [125] psig														
HPCS	≥ [7115] gpm	≥ [445] psig														
<p>SR 3.5.2.6</p> <div style="border: 1px dashed black; padding: 5px; margin: 10px 0;"> <p align="center"><b>- NOTE -</b></p> <p>Vessel injection/spray may be excluded.</p> </div> <p>Verify each required ECCS injection/spray subsystem actuates on an actual or simulated automatic initiation signal.</p>	<p>[18] months</p>															

Move to LCO

BASES

APPLICABLE SAFETY ANALYSES (continued)

- c. Maximum hydrogen generation from zirconium water reaction is  $\leq 0.01$  times the hypothetical amount that would be generated if all of the metal in the cladding surrounding the fuel, excluding the cladding surrounding the plenum volume, were to react,
- d. The core is maintained in a coolable geometry, and
- e. Adequate long term cooling capability is maintained.

The limiting single failures are discussed in Reference 11. For a large break LOCA, failure of ECCS subsystems in Division 1 (LPCS and LPCI-A) or Division 2 (LPCI-B and LPCI-C) due to failure of its associated diesel generator is, in general, the most severe failure. For a small break LOCA, HPCS System failure is the most severe failure. One ADS valve failure is analyzed as a limiting single failure for events requiring ADS operation. The remaining OPERABLE ECCS subsystems provide the capability to adequately cool the core and prevent excessive fuel damage.

The ECCS satisfy Criterion 3 of 10 CFR 50.36(c)(2)(ii).

LCO

Each ECCS injection/spray subsystem and eight ADS valves are required to be OPERABLE. The ECCS injection/spray subsystems are defined as the three LPCI subsystems, the LPCS System, and the HPCS System. The low pressure ECCS injection/spray subsystems are defined as the LPCS System and the three LPCI subsystems.

With less than the required number of ECCS subsystems OPERABLE during a limiting design basis LOCA concurrent with the worst case single failure, the limits specified in 10 CFR 50.46 (Ref. 10) could potentially be exceeded. All ECCS subsystems must therefore be OPERABLE to satisfy the single failure criterion required by 10 CFR 50.46 (Ref. 10). LPCI subsystems may be considered OPERABLE during alignment and operation for decay heat removal when below the actual RHR cut in permissive pressure in MODE 3, if capable of being manually realigned (remote or local) to the LPCI mode and not otherwise inoperable. At these low pressures and decay heat levels, a reduced complement of ECCS subsystems should provide the required core cooling, thereby allowing operation of RHR shutdown cooling when necessary.

As noted

Insert 1

BASES

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SURVEILLANCE REQUIREMENTS (continued)

experience, on the procedural controls governing system operation, and on the gradual nature of void buildup in the ECCS piping.

SR 3.5.1.2

Verifying the correct alignment for manual, power operated, and automatic valves in the ECCS flow paths provides assurance that the proper flow paths will exist for ECCS operation. This SR does not apply to valves that are locked, sealed, or otherwise secured in position since these valves were verified to be in the correct position prior to locking, sealing, or securing. A valve that receives an initiation signal is allowed to be in a nonaccident position provided the valve will automatically reposition in the proper stroke time. This SR does not require any testing or valve manipulation; rather, it involves verification that those valves potentially capable of being mispositioned are in the correct position. This SR does not apply to valves that cannot be inadvertently misaligned, such as check valves.

The 31 day Frequency of this SR was derived from the Inservice Testing Program requirements for performing valve testing at least once every 92 days. The Frequency of 31 days is further justified because the valves are operated under procedural control and because improper valve alignment would only affect a single subsystem. This Frequency has been shown to be acceptable through operating experience.

This SR is modified by a Note that allows LPCI subsystems to be considered OPERABLE during alignment and operation for decay heat removal with reactor steam dome pressure less than the RHR cut in permissive pressure in MODE 3, if capable of being manually realigned (remote or local) to the LPCI mode and not otherwise inoperable. This allows operation in the RHR shutdown cooling mode during MODE 3 if necessary.

SR 3.5.1.3

Verification every 31 days that ADS air receiver pressure is  $\geq$  [150] psig assures adequate air pressure for reliable ADS operation. The accumulator on each ADS valve provides pneumatic pressure for valve actuation. The designed pneumatic supply pressure requirements for the accumulator are such that, following a failure of the pneumatic supply to the accumulator, at least two valve actuations can occur with the drywell at 70% of design pressure (Ref. 14). The ECCS safety analysis assumes only one actuation to achieve the depressurization required for operation

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

### B 3.5.2 ECCS - Shutdown

#### BASES

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**BACKGROUND** A description of the High Pressure Core Spray (HPCS) System, Low Pressure Core Spray (LPCS) System, and low pressure coolant injection (LPCI) mode of the Residual Heat Removal (RHR) System is provided in the Bases for LCO 3.5.1, "ECCS - Operating."

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**APPLICABLE SAFETY ANALYSES** The ECCS performance is evaluated for the entire spectrum of break sizes for a postulated loss of coolant accident (LOCA). The long term cooling analysis following a design basis LOCA (Ref. 1) demonstrates that only one low pressure ECCS injection/spray subsystem is required, post LOCA, to maintain adequate reactor vessel water level in the event of an inadvertent vessel draindown. It is reasonable to assume, based on engineering judgment, that while in MODES 4 and 5, one low pressure ECCS injection/spray subsystem can maintain adequate reactor vessel water level. To provide redundancy, a minimum of two low pressure ECCS injection/spray subsystems are required to be OPERABLE in MODES 4 and 5.

The ECCS satisfy Criterion 3 of 10 CFR 50.36(c)(2)(ii).

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**LCO** Two ECCS injection/spray subsystems are required to be OPERABLE. The ECCS injection/spray subsystems are defined as the three LPCI subsystems, the LPCS System, and the HPCS System. The LPCS System and each LPCI subsystem consist of one motor driven pump, piping, and valves to transfer water from the suppression pool to the RPV. The HPCS System consists of one motor driven pump, piping, and valves to transfer water from the suppression pool or condensate storage tank (CST) to the RPV.

As noted,

Capable of being

Insert 1

One LPCI subsystem (A or B) may be aligned for decay heat removal in MODE 4 or 5 and considered OPERABLE for the ECCS function, if it can be manually realigned (remote or local) to the LPCI mode and is not otherwise inoperable. Because of low pressure and low temperature conditions in MODES 4 and 5, sufficient time will be available to manually align and initiate LPCI subsystem operation to provide core cooling prior to postulated fuel uncoverly.

During alignment and operation for decay heat removal

BASES

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SURVEILLANCE REQUIREMENTS (continued)

pump. Therefore, a verification that either the suppression pool water level is  $\geq$  [12.67 ft] or the HPCS System is aligned to take suction from the CST and the CST contains  $\geq$  [170,000] gallons of water, equivalent to 18 ft, ensures that the HPCS System can supply makeup water to the RPV.

The 12 hour Frequency of these SRs was developed considering operating experience related to suppression pool and CST water level variations and instrument drift during the applicable MODES. Furthermore, the 12 hour Frequency is considered adequate in view of other indications in the control room, including alarms, to alert the operator to an abnormal suppression pool or CST water level condition.

SR 3.5.2.3, SR 3.5.2.5, and SR 3.5.2.6

The Bases provided for SR 3.5.1.1, SR 3.5.1.4, and SR 3.5.1.5 are applicable to SR 3.5.2.3, SR 3.5.2.5, and SR 3.5.2.6, respectively.

SR 3.5.2.4

Verifying the correct alignment for manual, power operated, and automatic valves in the ECCS flow paths provides assurance that the proper flow paths will exist for ECCS operation. This SR does not apply to valves that are locked, sealed, or otherwise secured in position since these valves were verified to be in the correct position prior to locking, sealing, or securing. A valve that receives an initiation signal is allowed to be in a nonaccident position provided the valve will automatically reposition in the proper stroke time. This SR does not require any testing or valve manipulation; rather, it involves verification that those valves capable of potentially being mispositioned are in the correct position. This SR does not apply to valves that cannot be inadvertently misaligned, such as check valves. The 31 day Frequency is appropriate because the valves are operated under procedural control and the probability of their being mispositioned during this time period is low.

In MODES 4 and 5, the RHR System may operate in the shutdown cooling mode to remove decay heat and sensible heat from the reactor. Therefore, RHR valves that are required for LPCI subsystem operation may be aligned for decay heat removal. Therefore, this SR is modified by a Note that allows one LPCI subsystem of the RHR System to be considered OPERABLE for the ECCS function if all the required valves in the LPCI flow path can be manually realigned (remote or local) to allow injection into the RPV and the system is not otherwise inoperable. This

BASES

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SURVEILLANCE REQUIREMENTS (continued)

will ensure adequate core cooling if an inadvertent vessel draindown should occur.

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REFERENCES      1. FSAR, Section [6.3.3.4].

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