

# Secondary Containment Isolation Instrumentation 3.3.6.2

Table 3.3.6.2-1 (page 1 of 1)  
Secondary Containment Isolation Instrumentation

FUNCTION	APPLICABLE MODES AND OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS PER TRIP SYSTEM	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
1. Reactor Vessel Water Level - Low Low, Level 2	1,2,3	2	SR 3.3.6.2.1 SR 3.3.6.2.2 SR 3.3.6.2.3 SR 3.3.6.2.4 SR 3.3.6.2.5	$\geq -47$ inches
2. Drywell Pressure - High	1,2,3	2	SR 3.3.6.2.1 SR 3.3.6.2.2 SR 3.3.6.2.3 SR 3.3.6.2.4 SR 3.3.6.2.5	$\leq 1.88$ psid
3. Fuel Building Ventilation Exhaust Radiation - High (1RMS*RE5A)	(a)	1	SR 3.3.6.2.1 SR 3.3.6.2.2 SR 3.3.6.2.4 SR 3.3.6.2.5	$\leq 2.18 \times 10^3$ $\mu\text{Ci/sec}$
4. Fuel Building Ventilation Exhaust Radiation - High (1RMS*RE5B)	(a)	1	SR 3.3.6.2.1 SR 3.3.6.2.2 SR 3.3.6.2.4 SR 3.3.6.2.5	$\leq 7.05 \times 10^4$ $\mu\text{Ci/cc}$
5. Manual Initiation	1,2,3, (a)	2	SR 3.3.6.2.5	NA

(a) During movement of recently irradiated fuel assemblies in the fuel building for fuel building isolation.

CRFA System Instrumentation  
3.3.7.1

Table 3.3.7.1-1 (page 1 of 1)  
Control Room Fresh Air System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS PER TRIP SYSTEM	CONDITIONS REFERENCED FROM REQUIRED ACTION A.1	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
1. Reactor Vessel Water Level - Low Low, Level 2	1,2,3	2	B	SR 3.3.7.1.1 SR 3.3.7.1.2 SR 3.3.7.1.3 SR 3.3.7.1.4 SR 3.3.7.1.5	$\geq -47$ inches
2. Drywell Pressure - High	1,2,3	2	C	SR 3.3.7.1.1 SR 3.3.7.1.2 SR 3.3.7.1.3 SR 3.3.7.1.4 SR 3.3.7.1.5	$\leq 1.88$ psid
3. Control Room Ventilation Radiation Monitors	1,2,3 (a),(b)	1	D	SR 3.3.7.1.1 SR 3.3.7.1.2 SR 3.3.7.1.4 SR 3.3.7.1.5	$\leq 0.97 \times 10^{-5}$ $\mu\text{Ci/cc}$

(a) During operations with a potential for draining the reactor vessel.

(b) During ~~CORE ALTERATIONS and during movement of recently irradiated fuel assemblies~~ in the primary or secondary containment.

### 3.6 CONTAINMENT SYSTEMS

#### 3.6.1.2 Primary Containment Air Locks

LCO 3.6.1.2 Two primary containment air locks shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3,  
During movement of recently irradiated fuel assemblies in  
the primary containment,  
~~During CORE ALTERATIONS,~~  
During operations with a potential for draining the reactor  
vessel (OPDRVs).

#### ACTIONS

#### NOTES

1. Entry and exit is permissible to perform repairs of the affected air lock components.
2. Separate Condition entry is allowed for each air lock.
3. Enter applicable Conditions and Required Actions of LCO 3.6.1.1, "Primary Containment-Operating," when air lock leakage results in exceeding overall containment leakage rate acceptance criteria in MODES 1, 2, and 3.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more primary containment air locks with one primary containment air lock door inoperable.	<p>-----NOTES-----</p> <ol style="list-style-type: none"> <li>1. Required Actions A.1, A.2, and A.3 are not applicable if both doors in the same air lock are inoperable and Condition C is entered.</li> <li>2. Entry and exit is permissible for 7 days under administrative controls if both air locks are inoperable.</li> </ol> <p>-----</p>	(continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. (continued)	C.3 Restore air lock to OPERABLE status.	24 hours
D. Required Action and associated Completion Time of Condition A, B, or C not met in MODE 1, 2, or 3.	D.1 Be in MODE 3. <u>AND</u>	12 hours
	D.2 Be in MODE 4.	36 hours
E. Required Action and associated Completion Time of Condition A, B, or C not met during movement of recently irradiated fuel assemblies in the primary containment, <del>CORE ALTERATIONS</del> , or OPDRVs.	E.1 Suspend movement of recently irradiated fuel assemblies in the primary containment. <u>AND</u>	Immediately
	<del>E.2 Suspend CORE ALTERATIONS.</del>	<del>Immediately</del>
	<u>AND</u> E.32 Initiate action to suspend OPDRVs.	Immediately

### 3.6 CONTAINMENT SYSTEMS

#### 3.6.1.10 Primary Containment—Shutdown

LCO 3.6.1.10 Primary containment shall be OPERABLE.

APPLICABILITY: During movement of recently irradiated fuel assemblies in the primary containment,  
~~During CORE ALTERATIONS,~~  
During operations with a potential for draining the reactor vessel (OPDRVs).

#### ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Primary containment inoperable.	A.1 Suspend movement of recently irradiated fuel assemblies in the primary containment.	Immediately
	<u>AND</u>	
	A.2 <del>Suspend CORE ALTERATIONS.</del>	<del>Immediately</del>
	<u>AND</u>	
	A.32 Initiate action to suspend OPDRVs.	Immediately

### 3.6 CONTAINMENT SYSTEMS

#### 3.6.4.2 Secondary Containment Isolation Dampers (SCIDs)

LCO 3.6.4.2 Each SCID shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3,  
During movement of recently irradiated fuel assemblies in  
the fuel building for fuel building isolation.

#### ACTIONS

#### NOTES

1. Penetration flow paths may be unisolated intermittently under administrative controls.
2. Separate Condition entry is allowed for each penetration flow path.
3. Enter applicable Conditions and Required Actions for systems made inoperable by SCIDs.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more penetration flow paths with one SCID inoperable.	A.1 Isolate the affected penetration flow path by use of at least one closed and de-activated automatic damper, closed manual damper, or blind flange.	8 hours
	AND	(continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. (continued)	<p>A.2 -----NOTE----- Isolation devices in high radiation areas may be verified by use of administrative means. -----</p> <p>Verify the affected penetration flow path is isolated.</p>	Once per 31 days
B. One or more penetration flow paths with two SCIDs inoperable.	B.1 Isolate the affected penetration flow path by use of at least one closed and de-activated automatic damper, closed manual damper, or blind flange.	4 hours
C. Required Action and associated Completion Time of Condition A or B not met in MODE 1, 2, or 3.	<p>C.1 Be in MODE 3.</p> <p><u>AND</u></p> <p>C.2 Be in MODE 4.</p>	<p>12 hours</p> <p>36 hours</p>
D. Required Action and associated Completion Time of Condition A or B not met during movement of recently irradiated fuel assemblies in the fuel building.	<p>-----NOTE----- LCO 3.0.3 is not applicable. -----</p> <p>D.1 Suspend movement of recently irradiated fuel assemblies in the fuel building.</p>	Immediately

### 3.6 CONTAINMENT SYSTEMS

#### 3.6.4.5 Fuel Building

LCO 3.6.4.5 The fuel building shall be OPERABLE.

APPLICABILITY: During movement of recently irradiated fuel assemblies in the fuel building.

#### ACTIONS

-----NOTE-----  
LCO 3.0.3 is not applicable.  
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CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Fuel building inoperable.	A.1 Suspend movement of recently irradiated fuel assemblies in the fuel building.	Immediately

#### SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.6.4.5.1	Verify fuel building vacuum is $\geq 0.25$ inch of vacuum water gauge.	24 hours
SR 3.6.4.5.2	Verify all fuel building equipment hatches and shield blocks are installed.	31 days
SR 3.6.4.5.3	Verify each fuel building access door is closed, except when the access opening is being used for entry and exit.	31 days

### 3.6 CONTAINMENT SYSTEMS

#### 3.6.4.7 Fuel Building Ventilation System - Fuel Handling

LCO 3.6.4.7 Two fuel building ventilation charcoal filtration subsystems shall be OPERABLE and one shall be operating in emergency mode.

APPLICABILITY: During movement of recently irradiated fuel assemblies in the fuel building.

#### ACTIONS

-----NOTE-----  
LCO 3.0.3 is not applicable.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One fuel building ventilation charcoal filtration subsystem inoperable.	A.1 Restore fuel building ventilation charcoal filtration subsystem to OPERABLE status.	7 days
B. Required Action and associated Completion Time of Condition A not met.  <u>OR</u>  Two fuel building ventilation charcoal filtration subsystems inoperable.  <u>OR</u>  One fuel building ventilation charcoal filtration subsystem not in operation.	B.1 Suspend movement of <u>recently</u> irradiated fuel assemblies in the fuel building.	Immediately

### 3.7 PLANT SYSTEM

#### 3.7.2 Control Room Fresh Air (CRFA) System

LCO 3.7.2 Two CRFA subsystems shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3,  
During movement of recently irradiated fuel assemblies in  
the primary or secondary containment,  
~~During CORE ALTERATIONS,~~  
During operations with a potential for draining the reactor  
vessel (OPDRVs).

#### ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One CRFA subsystem inoperable.	A.1 Restore CRFA subsystem to OPERABLE status.	7 days
B. Required Action and Associated Completion Time of Condition A not met in MODE 1, 2, or 3.	B.1 Be in MODE 3.	12 hours
	<u>AND</u> B.2 Be in MODE 4.	36 hours

(continued)

## ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. Required Action and associated Completion Time of Condition A not met during movement of recently irradiated fuel assemblies in the primary or secondary containment, <del>during CORE ALTERATIONS</del> , or during OPDRVs.	-----NOTE----- LCO 3.0.3 is not applicable. -----	
	C.1 Place OPERABLE CRFA subsystem in emergency mode.	Immediately
	<u>OR</u>	
	C.2.1 Suspend movement of recently irradiated fuel assemblies in the primary and secondary containment.	Immediately
	<u>AND</u>	
	<del>C.2.2 Suspend CORE ALTERATIONS.</del>	Immediately
	<u>AND</u>	
	C.2.32 Initiate action to suspend OPDRVs.	Immediately
D. Two CRFA subsystems inoperable in MODE 1, 2, or 3.	D.1 Enter LCO 3.0.3.	Immediately

(continued)

## ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
E. Two CRFA subsystems inoperable during movement of recently irradiated fuel assemblies in the primary or secondary containment, <del>during CORE ALTERATIONS</del> , or during OPDRVs.	E.1 Suspend movement of recently irradiated fuel assemblies in the primary and secondary containment.	Immediately
	<u>AND</u>	
	<del>E.2 Suspend CORE ALTERATIONS.</del>	<del>Immediately</del>
	<u>AND</u> E.32 Initiate action to suspend OPDRVs.	Immediately

## SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.7.2.1	Operate each CRFA subsystem for $\geq 10$ continuous hours with the heaters operating.	31 days
SR 3.7.2.2	Perform required CRFA filter testing in accordance with the Ventilation Filter Testing Program (VFTP).	In accordance with the VFTP
SR 3.7.2.3	Verify each CRFA subsystem actuates on an actual or simulated initiation signal.	18 months

(continued)

### 3.7 PLANT SYSTEMS

#### 3.7.3 Control Room Air Conditioning (AC) System

LCO 3.7.3 Two control room AC subsystems shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3,  
During movement of recently irradiated fuel assemblies in  
the primary or secondary containment,  
~~During CORE ALTERATIONS,~~  
During operations with a potential for draining the reactor  
vessel (OPDRVs).

#### ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One control room AC subsystem inoperable.	A.1 Restore control room AC subsystem to OPERABLE status.	30 days
B. Two control room AC subsystems inoperable.	B.1 Verify control room area temperature $\leq 104^{\circ}\text{F}$ .	Once per 4 hours
	<u>AND</u> B.2 Restore one control room AC subsystem to OPERABLE status.	7 days
C. Required Action and Associated Completion Time of Condition A or B not met in MODE 1, 2, or 3.	C.1 Be in MODE 3.	12 hours
	<u>AND</u> C.2 Be in MODE 4.	36 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. Required Action and associated Completion Time of Condition A not met during movement of recently irradiated fuel assemblies in the primary or secondary containment, <del>during CORE ALTERATIONS, or during OPDRVs.</del>	-----NOTE----- LCO 3.0.3 is not applicable. -----	
	D.1 Place OPERABLE control room AC subsystem in operation.	Immediately
	<u>OR</u>	
	D.2.1 Suspend movement of recently irradiated fuel assemblies in the primary and secondary containment.	Immediately
	<u>AND</u>	
	<del>D.2.2 Suspend CORE ALTERATIONS.</del>	<del>Immediately</del>
	<u>AND</u>	
	D.2.32 Initiate action to suspend OPDRVs.	Immediately

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
E. Required Action and associated Completion Time of Condition B not met during movement of recently irradiated fuel assemblies in the primary or secondary containment, <del>during CORE ALTERATIONS, or during OPDRVs.</del>	E.1 Suspend movement of recently irradiated fuel assemblies in the primary and secondary containment.	Immediately
	<u>AND</u>	
	<del>E.2 Suspend CORE ALTERATIONS.</del>	Immediately
	<u>AND</u>	
	E.32 Initiate action to suspend OPDRVs.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.7.3.1 Verify each control room AC subsystem has the capability to remove the assumed heat load.	18 months

### 3.8 ELECTRICAL POWER SYSTEMS

#### 3.8.2 AC Sources—Shutdown

LCO 3.8.2 The following AC electrical power sources shall be OPERABLE:

- a. One qualified circuit between the offsite transmission network and the onsite Class 1E AC electrical power distribution subsystem(s) required by LCO 3.8.10, "Distribution Systems—Shutdown"; and
- b. One diesel generator (DG) capable of supplying one division of the Division I or II onsite Class 1E AC electrical power distribution subsystem(s) required by LCO 3.8.10; and
- c. One qualified circuit, other than the circuit in LCO 3.8.2.a, between the offsite transmission and the Division III onsite Class 1E electrical power distribution subsystem, or the Division III DG capable of supplying the Division III onsite Class 1E AC electrical power distribution subsystem, when the Division III onsite Class 1E electrical power distribution subsystem is required by LCO 3.8.10.

APPLICABILITY: MODES 4 and 5,  
During movement of recently irradiated fuel assemblies in  
the primary containment or fuel building.

ACTIONS

-----NOTE-----  
LCO 3.0.3 is not applicable.  
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CONDITION	REQUIRED ACTION	COMPLETION TIME
A. LCO Item a not met.	-----NOTE----- Enter applicable Condition and Required Actions of LCO 3.8.10, when any required division is de-energized as a result of Condition A. -----	
	A.1 Declare affected required feature(s) with no offsite power available from a required circuit inoperable.	Immediately
	<u>OR</u>	
	A.2.1 Suspend CORE ALTERATIONS.	Immediately
	<u>AND</u>	
	A.2.2 Suspend movement of recently irradiated fuel assemblies in the primary containment and fuel building.	Immediately
	<u>AND</u>	
	A.2.3 Initiate action to suspend operations with a potential for draining the reactor vessel (OPDRVs).	Immediately
	<u>AND</u>	
		(continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. (continued)	A.2.4 Initiate action to restore required offsite power circuit to OPERABLE status.	Immediately
B. LCO Item b not met.	B.1 Suspend CORE ALTERATIONS.	Immediately
	<u>AND</u>	
	B.2 Suspend movement of recently irradiated fuel assemblies in primary containment and fuel building.	Immediately
	<u>AND</u>	
	B.3 Initiate action to suspend OPDRVs.	Immediately
	<u>AND</u>	
	B.4 Initiate action to restore required DG to OPERABLE status.	Immediately
C. LCO Item c not met.	C.1 Declare High Pressure Core Spray System and Standby Service Water System pump 2C inoperable.	72 hours

### 3.8 ELECTRICAL POWER SYSTEMS

#### 3.8.5 DC Sources—Shutdown

LCO 3.8.5 The following shall be OPERABLE:

- a. One Class 1E DC electrical power subsystem capable of supplying one division of the Division I or II onsite Class 1E DC electrical power distribution subsystem(s) required by LCO 3.8.10, "Distribution Systems-Shutdown";
- b. One Class 1E battery or battery charger, other than the DC electrical power subsystem in LCO 3.8.5.a, capable of supplying the remaining Division I or II onsite Class 1E DC electrical power distribution subsystem(s) when required by LCO 3.8.10; and
- c. The Division III DC electrical power subsystem capable of supplying the Division III onsite Class 1E DC electrical power distribution subsystem, when the Division III onsite Class 1E DC electrical power distribution subsystem is required by LCO 3.8.10.

APPLICABILITY: MODES 4 and 5,  
During movement of recently irradiated fuel assemblies in  
the primary containment or fuel building.

ACTIONS

-----NOTE-----  
 LCO 3.0.3 is not applicable  
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CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more required DC electrical power subsystems inoperable.	A.1 Declare affected required feature(s) inoperable.	Immediately
	<u>OR</u>	
	A.2.1 Suspend CORE ALTERATIONS.	Immediately
	<u>AND</u>	
	A.2.2 Suspend movement of recently irradiated fuel assemblies in the primary containment and fuel building.	Immediately
	<u>AND</u>	
	A.2.3 Initiate action to suspend operations with a potential for draining the reactor vessel.	Immediately
	<u>AND</u>	
	A.2.4 Initiate action to restore required DC electrical power subsystems to OPERABLE status.	Immediately

### 3.8 ELECTRICAL POWER SYSTEMS

#### 3.8.8 Inverters—Shutdown

LCO 3.8.8 One Divisional inverter shall be OPERABLE capable of supplying one division of the Division I or II onsite Class 1E uninterruptible AC vital bus electrical power distribution subsystem(s) required by LCO 3.8.10, "Distribution Systems-Shutdown".

APPLICABILITY: MODES 4 and 5,  
During movement of recently irradiated fuel assemblies in the primary containment or fuel building.

#### ACTIONS

-----NOTE-----  
LCO 3.0.3 is not applicable  
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CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more required inverters inoperable.	A.1 Declare affected required feature(s) inoperable.	Immediately
	<u>OR</u>	
	A.2.1 Suspend CORE ALTERATIONS.	Immediately
	<u>AND</u>	
	A.2.2 Suspend handling of recently irradiated fuel assemblies in the primary containment or fuel building.	Immediately
	<u>AND</u>	
		(continued)

### 3.8 ELECTRICAL POWER SYSTEMS

#### 3.8.10 Distribution Systems—Shutdown

LCO 3.8.10 The necessary portions of the Division I, Division II, and Division III AC, DC, and Division I and II AC vital bus electrical power distribution subsystems shall be OPERABLE to support equipment required to be OPERABLE.

APPLICABILITY: MODES 4 and 5,  
During movement of recently irradiated fuel assemblies in the primary containment or fuel building.

#### ACTIONS

-----NOTE-----  
LCO 3.0.3 is not applicable  
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CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more required AC, DC, or AC vital bus electrical power distribution subsystems inoperable.	A.1 Declare associated supported required feature(s) inoperable.	Immediately
	<u>OR</u>	
	A.2.1 Suspend CORE ALTERATIONS.	Immediately
	<u>AND</u>	
	A.2.2 Suspend movement of recently irradiated fuel assemblies in the primary containment and fuel building.	Immediately
	<u>AND</u>	
		(continued)

## Enclosure 5

Revised ITS Bases

BASES

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APPLICABLE  
SAFETY ANALYSES,  
LCO, and  
APPLICABILITY

2. Drywell Pressure—High  
(continued)

steam and gas. This Function is not required in MODES 4 and 5 because the probability and consequences of these events are low due to the RCS pressure and temperature limitations of these MODES.

3 and 4. Fuel Building Ventilation Exhaust Radiation—High

High secondary containment exhaust radiation is an indication of possible gross failure of the fuel cladding. The release may have originated from the primary containment due to a break in the RCPB or the fuel building due to a fuel handling accident. When Exhaust Radiation—High is detected, secondary containment isolation and actuation of the associated ventilation system are initiated to limit the release of fission products as assumed in the USAR safety analyses (Ref. 1).

The Exhaust Radiation—High signals are initiated from radiation detectors that are located on the ventilation exhaust piping coming from the fuel building ventilation. The signal from each detector is input to an individual monitor whose trip outputs are assigned to an isolation channel.

The Allowable Values are chosen to promptly detect gross failure of the fuel cladding.

The Exhaust Radiation—High Function is required to be OPERABLE during movement of recently irradiated fuel assemblies in the fuel building because the capability of detecting radiation releases due to fuel failures (due to fuel uncover or dropped fuel assemblies) must be provided to ensure that offsite dose limits are not exceeded. Due to radioactive decay, this Function is only required to isolate the fuel building during fuel handling accidents in the fuel building involving handling recently irradiated fuel (i.e., fuel that has occupied part of a critical reactor core within the previous 11 days).

5. Manual Initiation

The Manual Initiation push button channels introduce signals

(continued)

BASES

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APPLICABLE  
SAFETY ANALYSES,  
LCO, and  
APPLICABILITY  
(continued)

into the secondary containment isolation logic that are redundant to the automatic protective instrumentation channels, and provide manual isolation capability. There is no specific USAR safety analysis that takes credit for this Function. It is retained for the secondary containment isolation instrumentation as required by the NRC approved licensing basis.

There are four push buttons for the logic, two manual initiation push buttons per trip system. There is no Allowable Value for this Function since the channels are mechanically actuated based solely on the position of the push buttons.

Four channels of the Manual Initiation Function are available and are required to be OPERABLE in MODES 1, 2, and 3 and during movement of recently irradiated fuel assemblies in the fuel building, since these are the MODES and other specified conditions in which the Secondary Containment Isolation automatic Functions are required to be OPERABLE.

Moving recently irradiated fuel assemblies in the fuel building (the only portion of secondary containment in which fuel can be handled) requires only that portion of the Manual Initiation Function associated with the fuel building to be OPERABLE.

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ACTIONS

A Note has been provided to modify the ACTIONS related to secondary containment isolation instrumentation channels. Section 1.3, Completion Times, specifies that once a Condition has been entered, subsequent divisions, subsystems, components, or variables expressed in the Condition discovered to be inoperable or not within limits will not result in separate entry into the Condition. Section 1.3 also specifies that Required Actions of the Condition continue to apply for each additional failure, with Completion Times based on initial entry into the Condition. However, the Required Actions for inoperable secondary containment isolation instrumentation channels provide appropriate compensatory measures for separate inoperable channels. As such, a Note has been provided that allows separate Condition entry for each inoperable secondary containment isolation instrumentation channel.

(continued)

BASES

APPLICABLE  
SAFETY ANALYSES,  
LCO, and  
APPLICABILITY  
(continued)

1. Reactor Vessel Water Level—Low Low, Level 2

Low reactor pressure vessel (RPV) water level indicates that the capability to cool the fuel may be threatened. A low reactor vessel water level could indicate a LOCA, and will automatically initiate the CRFA System, since this could be a precursor to a potential radiation release and subsequent radiation exposure to control room personnel.

Reactor Vessel Water Level—Low Low, Level 2 signals are initiated from four level transmitters that sense the difference between the pressure due to a constant column of water (reference leg) and the pressure due to the actual water level (variable leg) in the vessel. Four channels of Reactor Vessel Water Level—Low Low, Level 2 Function are available (two channels per trip system) and are required to be OPERABLE to ensure that no single instrument failure can preclude CRFA System initiation. The Allowable Value for the Reactor Vessel Water Level—Low Low, Level 2 is chosen to be the same as the Secondary Containment Isolation Reactor Vessel Water Level—Low Low, Level 2 Allowable Value (LCO 3.3.6.2).

The Reactor Vessel Water Level—Low Low, Level 2 Function is required to be OPERABLE in MODES 1, 2, and 3 to ensure that the control room personnel are protected. In MODES 4 and 5, the probability of a vessel draindown event or of a LOCA, is minimal. Therefore this Function is not required. In addition, the Control Room Ventilation Radiation Monitor Function provides adequate protection.

2. Drywell Pressure—High

High pressure in the drywell could indicate a break in the reactor coolant pressure boundary (RCPB). A high drywell pressure signal could indicate a LOCA and will automatically initiate the CRFA System, since this could be a precursor to a potential radiation release and subsequent radiation exposure to control room personnel.

Drywell Pressure—High signals are initiated from four pressure transmitters that sense drywell pressure. Four channels of Drywell Pressure—High Function are available (two channels per trip system) and are required to be OPERABLE to ensure that no single instrument failure can preclude CRFA System initiation.

(continued)

BASES

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APPLICABLE  
SAFETY ANALYSES,  
LCO, and  
APPLICABILITY

2. Drywell Pressure—High (continued)

The Drywell Pressure—High Allowable Value was chosen to be the same as the Secondary Containment Isolation Drywell Pressure—High Allowable Value (LCO 3.3.6.2).

The Drywell Pressure—High Function is required to be OPERABLE in MODES 1, 2, and 3 to ensure that control room personnel are protected during a LOCA. In MODES 4 and 5, the Drywell Pressure—High Function is not required since there is insufficient energy in the reactor to pressurize the drywell to the Drywell Pressure—High setpoint.

3. Control Room Ventilation Radiation Monitors

The Control Room Ventilation Radiation Monitors measure radiation levels exterior to the inlet ducting of the MCR. A high radiation level may pose a threat to MCR personnel; thus, a detector indicating this condition automatically signals initiation of the CRFA System.

The Control Room Ventilation Radiation Monitors Function consists of two independent monitors. Two channels of Control Room Ventilation Radiation Monitors are available and are required to be OPERABLE to ensure that no single instrument failure can preclude CRFA System initiation. The Allowable Value was selected to ensure protection of the control room personnel.

The Control Room Ventilation Radiation Monitors Function is required to be OPERABLE in MODES 1, 2, and 3, and during ~~CORE ALTERATIONS~~, operations with a potential for draining the reactor vessel (OPDRVs), and movement of recently irradiated fuel in the secondary containment to ensure that control room personnel are protected during a LOCA, fuel handling event, or a vessel draindown event. During MODES 4 and 5, when these specified conditions are not in progress (e.g., ~~CORE ALTERATIONS~~ OPDRVs), the probability of a LOCA or fuel damage is low; thus, the Function is not required. Also due to radioactive decay, this Function is only required to initiate the CRFA System during fuel handling accidents involving handling recently irradiated fuel (i.e., fuel that has occupied part of a critical reactor core within the previous 11 days).

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(continued)

BASES

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BACKGROUND  
(continued)

DBA. Not maintaining air lock integrity or leak tightness may result in a leakage rate in excess of that assumed in the unit safety analysis.

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APPLICABLE  
SAFETY ANALYSES

The DBA that postulates the maximum release of radioactive material within primary containment is a LOCA. In the analysis of this accident, it is assumed that primary containment is OPERABLE, such that release of fission products to the environment is controlled by the rate of primary containment leakage. The primary containment is designed with a maximum allowable leakage rate ( $L_a$ ) of 0.26% by weight of the containment and drywell air per 24 hours at the calculated maximum peak containment pressure ( $P_a$ ) of 7.6 psig. This allowable leakage rate forms the basis for the acceptance criteria imposed on the SRs associated with the air locks.

Primary containment air lock OPERABILITY is also required to minimize the amount of fission product gases that may escape primary containment through the air lock and contaminate and pressurize the secondary containment.

During plant operations in other than MODES 1, 2, and 3, the primary containment contains the fission products from a fuel handling accident (FHA), involving handling recently irradiated fuel (i.e., fuel that has occupied part of a critical reactor core within the previous 11 days) inside the primary containment (Ref. 4), to limit doses at the site boundary to within limits. The primary containment air lock OPERABILITY assures a leak tight fission product barrier during activities with the unit shutdown.

Primary containment air locks satisfy Criterion 3 of the NRC Policy Statement.

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LCO

As part of the primary containment, the air lock's safety function is related to control of containment leakage rates following a DBA, an FHA involving handling recently irradiated fuel (i.e., fuel that has occupied part of a critical reactor core within the previous 11 days) or other unanticipated reactivity or water level excursion. Thus, the air lock's structural integrity and leak tightness are essential to the successful mitigation of such events.

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BASES

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LCO  
(continued)

The primary containment air locks are required to be OPERABLE. For each air lock to be considered OPERABLE, the air lock interlock mechanism must be OPERABLE, the air lock must be in compliance with the Type B air lock leakage test, and both air lock doors must be OPERABLE. The interlock allows only one air lock door to be open at a time. This provision ensures that a gross breach of primary containment does not exist when primary containment is required to be OPERABLE. Closure of a single door in each air lock is sufficient to provide a leak tight barrier following postulated events. Nevertheless, both doors are kept closed when the air lock is not being used for normal entry into and exit from primary containment.

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APPLICABILITY

In MODES 1, 2, and 3, a DBA could cause a release of radioactive material to primary containment. In MODES 4 and 5, the probability and consequences of these events are reduced due to the pressure and temperature limitations of these MODES. Therefore, maintaining OPERABLE primary containment air locks in MODE 4 or 5 to ensure a control volume is only required during situations for which significant releases of radioactive material can be postulated; such as during operations with a potential for draining the reactor vessel (OPDRVs), ~~during CORE ALTERATIONS~~, or during fuel movement of recently irradiated fuel assemblies in the primary containment. Due to radioactive decay, primary containment air locks are only required during fuel handling in the primary containment involving handling recently irradiated fuel (i.e., fuel that has occupied part of a critical reactor core within the previous 11 days).

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ACTIONS

The ACTIONS are modified by Note 1, which allows entry and exit to perform repairs of the affected air lock component. If the outer door is inoperable, then it may be easily accessed for most repairs. It is preferred that the air lock be accessed from inside primary containment by entering through the other OPERABLE air lock. However, if this is not practicable, or if repairs on either door must be performed from the barrel side of the door, then it is permissible to enter the air lock through the OPERABLE door, which means there is a short time during which the primary containment boundary is not intact (during access through the OPERABLE door). The ability to open the OPERABLE door,

(continued)

BASES

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ACTIONS  
(continued)

even if it means the primary containment boundary is temporarily not intact, is acceptable due to the low probability of an event that could pressurize the primary containment during the short time in which the OPERABLE door is expected to be open. After each entry and exit, the OPERABLE door must be immediately closed.

Note 2 has been included to provide clarification that, for this LCO, separate Condition entry is allowed for each air lock.

This is acceptable, since the Required Actions for each Condition provide appropriate compensatory actions for each inoperable air lock. Complying with the Required Actions may allow for continued operation, and a subsequent inoperable air lock is governed by subsequent Condition entry and application of associated Required Actions.

The ACTIONS are modified by a third Note, which ensures appropriate remedial actions are taken when necessary. Pursuant to LCO 3.0.6, ACTIONS are not required even if primary containment is exceeding its leakage limit. Therefore, the Note is added to require ACTIONS for LCO 3.6.1.1, "Primary Containment-Operating," to be taken in this event.

The leakage limits of LCO 3.6.1.1 are only applicable in MODES 1, 2, and 3, therefore, the provisions of Note 3 apply only during MODES 1, 2, and 3.

A.1, A.2, and A.3

With one primary containment air lock door inoperable in one or more primary containment air locks, the OPERABLE door must be verified closed (Required Action A.1) in each affected air lock. This ensures that a leak tight primary containment barrier is maintained by the use of an OPERABLE air lock door. This action must be completed within 1 hour. The 1 hour Completion Time is consistent with the ACTIONS of LCO 3.6.1.1, which requires that primary containment be restored to OPERABLE status within 1 hour.

In addition, the affected air lock penetration must be isolated by locking closed the OPERABLE air lock door within the 24 hour Completion Time. The 24 hour Completion Time is considered reasonable for locking the OPERABLE air lock door, considering the OPERABLE door of the affected air lock is being maintained closed.

(continued)

BASES

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ACTIONS

A.1, A.2, and A.3 (continued)

Required Action A.3 ensures that the affected air lock with an inoperable door has been isolated by the use of a locked closed OPERABLE air lock door. This ensures that an acceptable primary containment leakage boundary is maintained. The Completion Time of once per 31 days is based on engineering judgment and is considered adequate in view of the low likelihood of a locked door being mispositioned and other administrative controls.

Required Action A.3 is modified by a Note that applies to air lock doors located in high radiation areas and allows these doors to be verified locked closed by use of administrative controls. Allowing verification by administrative controls is considered acceptable, since access to these areas is typically restricted. Therefore, the probability of misalignment of the door, once it has been verified to be in the proper position, is small.

The Required Actions have been modified by two Notes. Note 1 ensures that only the Required Actions and associated Completion Times of Condition C are required if both doors in the air lock are inoperable. With both doors in the air lock inoperable, an OPERABLE door is not available to be closed. Required Actions C.1 and C.2 are the appropriate remedial actions. The exception of Note 1 does not affect tracking the Completion Times from the initial entry into Condition A; only the requirement to comply with the Required Actions. Note 2 allows use of the air lock for entry and exit for 7 days under administrative controls if both have an inoperable door. This 7 day restriction begins when the second airlock is discovered inoperable.

Primary containment entry may be required to perform Technical Specifications (TS) Surveillances and Required Actions, as well as other activities inside primary containment that are required by TS or activities that support TS-required equipment. This Note is not intended to preclude performing other activities (i.e., non-TS-related activities) if the primary containment was entered, using the inoperable air lock, to perform an allowed activity listed above. The administrative controls required consist of the stationing of a dedicated individual to assure closure of the OPERABLE door except during the entry and exit, and assuring the OPERABLE door is relocked after

(continued)

BASES

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ACTIONS

A.1, A.2, and A.3 (continued)

completion of the containment entry and exit. This allowance is acceptable due to the low probability of an event that could pressurize the primary containment during the short time that the OPERABLE door is expected to be open.

B.1, B.2, and B.3

With an air lock interlock mechanism inoperable in one or both primary containment air locks, the Required Actions and associated Completion Times are consistent with those specified in Condition A.

The Required Actions have been modified by two Notes. Note 1 ensures that only the Required Actions and associated Completion Times of Condition C are required if both doors in one air lock are inoperable. With both doors in the air lock inoperable, an OPERABLE door is not available to be closed. Required Actions C.1 and C.2 are the appropriate remedial actions. Note 2 allows entry into and exit from the primary containment under the control of a dedicated individual stationed at the air lock to ensure that only one door is opened at a time (i.e., the individual performs the function of the interlock).

Required Action B.3 is modified by a Note that applies to air lock doors located in high radiation areas and allows these doors to be verified locked closed by use of administrative controls. Allowing verification by administrative controls is considered acceptable, since access to these areas is typically restricted. Therefore, the probability of misalignment of the door, once it has been verified to be in the proper position, is small.

C.1, C.2, and C.3

With one or more air locks inoperable for reasons other than those described in Condition A or B, Required Action C.1 requires action to be immediately initiated to evaluate containment overall leakage rates using current air lock leakage test results. An evaluation is acceptable since it is overly conservative to immediately declare the primary containment inoperable if both doors in an air lock have

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(continued)

BASES

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ACTIONS

C.1, C.2, and C.3 (continued)

failed a seal test or if the overall air lock leakage is not within limits. In many instances (e.g., only one seal per door has failed) primary containment remains OPERABLE, yet only 1 hour (according to LCO 3.6.1.1) would be provided to restore the air lock door to OPERABLE status prior to requiring a plant shutdown. In addition, even with both doors failing the seal test, the overall containment leakage rate can still be within limits. Required Action C.2 requires that one door in the affected primary containment air locks must be verified closed. This Required Action must be completed within the 1 hour Completion Time. This specified time period is consistent with the ACTIONS of LCO 3.6.1.1, which require that primary containment be restored to OPERABLE status within 1 hour.

Additionally, the air lock must be restored to OPERABLE status within 24 hours. The 24 hour Completion Time is reasonable for restoring an inoperable air lock to OPERABLE status considering that at least one door is maintained closed in each affected air lock.

D.1 and D.2

If the inoperable primary containment air lock cannot be restored to OPERABLE status within the associated Completion Time while operating in MODE 1, 2, or 3, 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 at least MODE 3 within 12 hours and to MODE 4 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

E.1 and E.2

If the inoperable primary containment airlock cannot be restored to OPERABLE status within the associated Completion Time during operations with a potential for draining the reactor vessel (OPDRVs), ~~during CORE ALTERATIONS~~, or during movement of recently irradiated fuel assemblies in the primary containment, action is required to immediately suspend activities that represent a potential for releasing

(continued)

BASES

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ACTIONS

E.1 and E.2 (continued)

radioactive material, thus placing the unit in a Condition that minimizes risk. If applicable, ~~CORE ALTERATIONS~~ and movement of ~~recently~~ irradiated fuel assemblies in the primary containment must be immediately suspended. Suspension of these activities shall not preclude completion of movement of a component to a safe position. Also, if applicable, action must be immediately initiated to suspend OPDRVs to minimize the probability of a vessel draindown and subsequent potential for fission product release. Action must continue until OPDRVs are suspended.

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SURVEILLANCE  
REQUIREMENTS

SR 3.6.1.2.1

Maintaining primary containment air locks OPERABLE requires compliance with the leakage rate test requirements of 10 CFR 50, Appendix J (Ref. 2), as modified by approved exemptions when in MODES 1, 2, and 3. This SR reflects the leakage rate testing requirements with regard to air lock leakage (Type B leakage tests). The acceptance criteria (i.e.,  $\leq 13,500$  cc/hr for the combination of all annulus bypass leakage paths that are required to be meeting leak tightness) ensures that the combined leakage rate of annulus bypass leakage paths is less than the specified leakage rate. This provides assurance in MODES 1, 2, and 3 that the assumptions in the radiological evaluations are met. The leakage rate of each bypass leakage path is assumed to be the maximum pathway leakage (e.g., leakage through the air lock door with the highest leakage) unless the penetration is isolated by use of (for this Specification) one closed and locked air lock door. The leakage rate of the isolated bypass leakage path is assumed to be the actual pathway leakage through the isolation devices (e.g., air lock door). If both air lock doors are closed, the actual leakage rate is the lesser leakage rate of the two barriers (doors). This method of quantifying maximum pathway leakage is only to be used for this SR (i.e., Appendix J maximum pathway leakage limits used to evaluate Type A, B and C limits are to be quantified in accordance with Appendix J).

During the operational conditions of moving ~~recently~~ irradiated fuel assemblies in the primary containment, ~~CORE ALTERATIONS~~, or OPDRVS, the only annulus bypass path leakage required to be met is through the two primary containment airlocks; therefore the entire 13,500 cc/hr limit can be

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BASES

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SURVEILLANCE  
REQUIREMENTS

SR 3.6.1.2.1 (continued)

applied to the air locks. In these operational conditions the reactor coolant system is not pressurized and specific primary containment leakage limits are not imposed. However, due to the size of the air lock penetration, leakage limits are imposed to assure an OPERABLE barrier. In these conditions the leakage limits are not related to radiological evaluations, but only reflect engineering judgment of an acceptable barrier. The periodic testing requirements verify that the air lock leakage does not exceed the allowed fraction of the overall primary containment leakage rate. The Frequency is required by 10 CFR 50, Appendix J, as modified by approved exemptions. Thus, SR 3.0.2 (which allows Frequency extensions) does not apply.

The SR has been modified by two Notes. Note 1 states that an inoperable air lock door does not invalidate the previous successful performance of the overall air lock leakage test. This is considered reasonable since either air lock door is capable of providing a fission product barrier in the event of a DBA. Note 2 has been added to this SR, requiring the results to be evaluated against the acceptance criteria of SR 3.6.1.1.1 during operation in MODES 1, 2, and 3. This ensures that air lock leakage is properly accounted for in determining the overall primary containment leakage rate. Since the overall primary containment leakage rate is only applicable in MODE 1, 2, and 3 operation, the Note 2 requirement is imposed only during these MODES.

SR 3.6.1.2.2

The seal air flask pressure is verified to be at  $\geq 90$  psig every 7 days to ensure that the seal system remains viable. It must be checked because it could bleed down during or following access through the air lock, which occurs regularly. The 7 day Frequency has been shown to be acceptable through operating experience and is considered adequate in view of the other indications available to operations personnel that the seal air flask pressure is low.

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BASES

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SURVEILLANCE  
REQUIREMENTS  
(continued)

SR 3.6.1.2.3

The air lock interlock mechanism is designed to prevent simultaneous opening of both doors in the air lock. Since both the inner and outer doors of an air lock are designed to withstand the maximum expected post accident primary containment pressure (Ref. 3), closure of either door will support primary containment OPERABILITY. Thus, the interlock feature supports primary containment OPERABILITY while the air lock is being used for personnel transit in and out of the containment. Periodic testing of this interlock demonstrates that the interlock will function as designed and that simultaneous inner and outer door opening will not inadvertently occur. Due to the nature of this interlock, and given that the interlock mechanism is only challenged when the primary containment airlock door is opened, this test is only required to be performed upon entering or exiting a primary containment air lock, but is not required more frequently than once per 184 days. The 184 day Frequency is based on engineering judgment and is considered adequate in view of other administrative controls.

SR 3.6.1.2.4

A seal pneumatic system test to ensure that pressure does not decay at a rate equivalent to  $> 1.28$  psig for a period of 24 hours from an initial pressure of 90 psig is an effective leakage rate test to verify system performance.

The 18 month Frequency is based on the fact that operating experience has shown these components usually pass the Surveillance when performed at the 18 month Frequency, which is based on the refueling cycle. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

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REFERENCES

1. USAR, Section 3.8.
  2. 10 CFR 50, Appendix J.
  3. USAR, Table 6.2-1.
  4. USAR, 15.7.4.
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## B 3.6 CONTAINMENT SYSTEMS

### B 3.6.1.10 Primary Containment-Shutdown

#### BASES

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##### BACKGROUND

The function of the primary containment is to isolate and contain fission products released from the Reactor Primary System following a Design Basis Accident (DBA) and to confine the postulated release of radioactive material to within limits. The primary containment consists of a steel lined, reinforced concrete vessel, which surrounds the Reactor Primary System and provides an essentially leak tight barrier against an uncontrolled release of radioactive material to the environment. Additionally, this structure provides shielding from the fission products that may be present in the primary containment atmosphere following accident conditions.

The isolation devices for the penetrations in the primary containment boundary are a part of the primary containment leak tight barrier. To maintain this leak tight barrier for accidents during shutdown conditions:

- a. All penetrations required to be closed during accident conditions are closed by manual valves, blind flanges, or de-activated automatic valves secured in their closed positions, except as provided in LCO 3.6.1.3, "Primary Containment Isolation Valves (PCIVs)";
- b. Primary containment air locks are OPERABLE, except as provided in LCO 3.6.1.2, "Primary Containment Air Locks"; and
- c. All equipment hatches are closed.

This Specification ensures that the performance of the primary containment, in the event of a fuel handling accident (FHA) involving handling recently irradiated fuel (i.e., fuel that has occupied part of a critical reactor core within the previous 11 days), inadvertent criticality, or reactor vessel draindown, provides an acceptable leakage barrier to contain fission products, thereby minimizing offsite doses.

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(continued)

BASES (continued)

APPLICABLE  
SAFETY ANALYSES

The safety design basis for the primary containment is that it contain the fission products from a FHA involving handling recently irradiated fuel (i.e., fuel that has occupied part of a critical reactor core within the previous 11 days) inside the primary containment (Ref.2), to limit doses at the site boundary to within limits. The primary containment performs no active function in response to this event; however, its leak tightness is required to ensure that the release of radioactive materials from the primary containment is restricted to those leakage rates assumed in safety analyses.

The FHA inside the primary containment is assumed to occur only after  $\geq 80$  hours since the reactor was last critical. The fission product release is, in turn, based on an assumed leakage rate from vent and drain valves with a combined flow rate of 70.2 cfm (based on an assumed 0.367 inch water gauge differential pressure). This assumed pressure reflects the fact that the FHA does not produce elevated containment pressures as is the case for the DBA LOCA. However, as an added conservatism, the analysis assumes a non-mechanistic additional leakage of 0.26% of the containment volume per day.

Primary containment satisfies Criterion 3 of the NRC Policy Statement.

LCO

Primary containment OPERABILITY is maintained by providing a contained volume to limit fission product escape following a FHA involving handling recently irradiated fuel (i.e., fuel that has occupied part of a critical reactor core within the previous 11 days) or other unanticipated reactivity or water level excursion. Compliance with this LCO will ensure a primary containment configuration, including equipment hatches, that is structurally sound and that will limit leakage to those leakage rates assumed in the safety analysis. Since no credit is assumed for automatic isolation valve closure, and any leakage which would occur prior to valve closure is similarly not accounted for, all penetrations which could communicate gaseous fission products to the environment must remain closed.

However, a limited number of primary containment penetration vent and drain valves may remain opened, and the primary

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BASES

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LCO  
(continued)

containment considered OPERABLE provided the calculated leakage flow rate through the open vent and drain valves is less  $\leq$  70.2 cfm.

Leakage rates specified for the primary containment and air locks, addressed in LCO 3.6.1.1 and LCO 3.6.1.2 are not directly applicable during the shutdown conditions addressed in this LCO.

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APPLICABILITY

In MODES 4 and 5, the probability and consequences of the LOCA are reduced due to the pressure and temperature limitations in these MODES. Therefore, maintaining an OPERABLE primary containment in MODE 4 or 5 to ensure a control volume, is only required during situations for which significant releases of radioactive material can be postulated; such as during operations with a potential for draining the reactor vessel (OPDRVs), ~~during CORE ALTERATIONS~~, or during movement of recently irradiated fuel assemblies in the primary containment. Due to radioactive decay, primary containment is only required during fuel handling in the primary containment involving handling recently irradiated fuel (i.e., fuel that has occupied part of a critical reactor core within the previous 11 days).

Requirements for ECCS OPERABILITY during MODES 1, 2, and 3 are discussed in the Applicability section of the Bases for LCO 3.5.1.

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ACTIONS

A.1 and A.2

In the event that primary containment is inoperable, action is required to immediately suspend activities that represent a potential for releasing radioactive material, thus placing the unit in a Condition that minimizes risk. If applicable, ~~CORE ALTERATIONS~~ and movement of recently irradiated fuel assemblies must be immediately suspended. Suspension of these activities shall not preclude completion of movement of a component to a safe position. Also, if applicable, action must be immediately initiated to suspend OPDRVs to minimize the probability of a vessel draindown and subsequent potential for fission product release. Action must continue until OPDRVs are suspended.

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BASES (continued)

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SURVEILLANCE  
REQUIREMENTS

SR 3.6.1.10.1

This SR verifies that each primary containment penetration that could communicate gaseous fission products to the environment during accident conditions is closed. The SR helps to ensure that post accident leakage of radioactive gases outside of the primary containment boundary is within design limits. 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 de-activated automatic valve, a closed manual valve, or a blind flange. This SR does not require any testing or valve manipulation. Rather, it involves verification, through a system walkdown, that the required valves are in the correct position. The 31 day Frequency was chosen to provide added assurance that the valves remain in the correct positions.

The SR is modified by a Note stating that the SR is not required to be met for vent and drain line pathways provided the total calculated flow rate through open vent and drain pathways is  $\leq 70.2$  cfm. Administrative controls ensure that open vent and drain pathways will: (1) only be opened to support leakage rate testing; (2) not exceed 12 valves; (3) require monitoring opened vent and drain valves, as well as the containment-to-auxiliary building differential pressure every 2 hours; and (4) assure at least one person is assigned to each open penetration (Ref. 1).

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REFERENCES

1. NRC SER for TS Amendment #35, dated March 3, 1989.
  2. USAR, Section 15.7.6.
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## B 3.6 CONTAINMENT SYSTEMS

### B 3.6.4.1 Secondary Containment—Operating

#### BASES

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##### BACKGROUND

The function of the secondary containment is to contain, dilute, and hold up fission products that may leak from primary containment following a Design Basis Accident (DBA). In conjunction with operation of the Standby Gas Treatment (SGT) System, Fuel Building Ventilation System, and closure of certain valves whose lines penetrate the secondary containment, the secondary containment is designed to reduce the activity level of the fission products prior to release to the environment and to isolate and contain fission products that are released during certain operations that take place inside primary containment, when primary containment is not required to be OPERABLE, or that take place outside primary containment.

The secondary containment consists of the shield building, auxiliary building, and fuel building, and completely encloses the primary containment and those components that may be postulated to contain primary system fluid. This structure forms a control volume that serves to hold up and dilute the fission products. It is possible for the pressure in the control volume to rise relative to the environmental pressure (e.g., due to pump/motor heat load additions). To prevent ground level exfiltration while allowing the secondary containment to be designed as a conventional structure, the secondary containment requires support systems to maintain the control volume pressure at less than the external pressure. Requirements for these systems are specified separately in LCO 3.6.4.2, "Secondary Containment Isolation Dampers (SCIDs)," LCO 3.6.4.3, "Standby Gas Treatment (SGT) System," LCO 3.6.4.4, "Shield Building Annulus Mixing System," and LCO 3.6.4.5, "Fuel Building Ventilation System."

The isolation devices for the penetrations in the secondary containment boundary are a part of the secondary containment barrier. To maintain this barrier:

- a. All Auxiliary Building penetrations, Fuel Building penetrations and Shield Building annulus penetrations required to be closed during accident conditions are either:

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(continued)

BASES

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BACKGROUND  
(continued)

1. Capable of being closed by an OPERABLE secondary containment automatic isolation signal, or
  2. Closed by at least one manual valve, blind flange, or deactivated automatic valve or damper, as applicable, secured in its closed position, except as provided in LCO 3.6.4.2;
- b. All Auxiliary Building, Fuel Building and Shield Building Annulus equipment hatches are closed and sealed;
  - c. The Standby Gas Treatment System is OPERABLE, except as provided in LCO 3.6.4.3;
  - d. The Fuel Building Charcoal Filtration System is OPERABLE, except as provided in LCO 3.6.4.6; and
  - e. At least one door in each access to the Auxiliary Building, Fuel Building and Shield Building Annulus is closed, except for routine entry and exit of personnel and equipment.
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APPLICABLE  
SAFETY ANALYSES

There are two principal accidents for which credit is taken for secondary containment OPERABILITY. These are a LOCA (Ref. 1) and a fuel handling accident involving handling recently irradiated fuel (i.e., fuel that has occupied part of a critical reactor core within the previous 11 days) in the fuel building (Ref. 2). The secondary containment performs no active function in response to each of these limiting events; however, its leak tightness is required to ensure that the release of radioactive materials from the primary containment is restricted to those leakage paths and associated leakage rates assumed in the accident analysis, and that fission products entrapped within the secondary containment structures will be treated by the SGT System or Fuel Building Ventilation System prior to discharge to the environment.

Secondary containment—operating satisfies Criterion 3 of the NRC Policy Statement.

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LCO

An OPERABLE secondary containment provides a control volume into which fission products that bypass or leak from primary

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BASES

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LCO  
(continued)

containment, or are released from the reactor coolant pressure boundary components located in the shield building, auxiliary building, or fuel building, can be diluted and processed prior to release to the environment. For the secondary containment to be considered OPERABLE, it must have adequate leak tightness to ensure that the required vacuum can be established and maintained.

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APPLICABILITY

In MODES 1, 2, and 3, a LOCA could lead to a fission product release to primary containment that leaks to secondary containment. Therefore, secondary containment OPERABILITY is required during the same operating conditions that require primary containment OPERABILITY.

In MODES 4 and 5, the probability and consequences of the LOCA are reduced due to the pressure and temperature limitations in these MODES. Therefore, maintaining secondary containment OPERABLE is not required in MODE 4 or 5 to ensure a control volume, except for other situations for which significant releases of radioactive material can be postulated, such as during movement of recently irradiated fuel (i.e., fuel that has occupied part of a critical reactor core within the previous 11 days) assemblies in the fuel building. The fuel building OPERABILITY during recently irradiated fuel handling is addressed in LCO 3.6.4.6, "Fuel Building Ventilation Systems—Operating."

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ACTIONS

A.1

If secondary containment is inoperable, it must be restored to OPERABLE status within 4 hours. The 4 hour Completion Time provides a period of time to correct the problem that is commensurate with the importance of maintaining secondary containment during MODES 1, 2, and 3. This time period also ensures that the probability of an accident (requiring secondary containment OPERABILITY) occurring during periods where secondary containment is inoperable is minimal.

B.1 and B.2

If the secondary containment cannot be restored to OPERABLE status within the required Completion Time, the plant must

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BASES

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ACTIONS

B.1 and B.2 (continued)

be brought to 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 4 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

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SURVEILLANCE  
REQUIREMENTS

SR 3.6.4.1.1

This SR ensures that the shield building annulus, auxiliary building, and fuel building boundary is sufficiently leak tight to preclude exfiltration under expected wind conditions. The 24 hour Frequency of this SR was developed based on operating experience related to secondary containment vacuum variations during the applicable MODES and the low probability of a DBA occurring between surveillances.

Furthermore, the 24 hour Frequency is considered adequate in view of other indications available in the control room, including alarms, to alert the operator to an abnormal secondary containment vacuum condition.

SR 3.6.4.1.2 and SR 3.6.4.1.3

Verifying that secondary containment equipment hatches and access doors are closed ensures that the infiltration of outside air of such a magnitude as to prevent maintaining the desired negative pressure does not occur. Verifying that all such openings are closed provides adequate assurance that exfiltration from the secondary containment will not occur. In this application the term "sealed" has no connotation of leak tightness. Maintaining secondary containment OPERABILITY requires verifying each door in the access opening is closed, except when the access opening is being used for entry and exit. The 31 day Frequency for these SRs has been shown to be adequate based on operating experience, and is considered adequate in view of the other controls on secondary containment access openings.

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BASES

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SURVEILLANCE  
REQUIREMENTS  
(continued)

SR 3.6.4.1.4 and SR 3.6.4.1.6

The SGT System exhausts the shield building annulus and auxiliary building atmosphere to the environment through appropriate treatment equipment. To ensure that all fission products are treated, SR 3.6.4.1.4 verifies that the SGT System will rapidly establish and maintain a pressure in the shield building annulus and auxiliary building that is less than the lowest postulated pressure external to the secondary containment boundary. This is confirmed by demonstrating that one SGT subsystem will draw down the shield building annulus and auxiliary building to  $\geq 0.5$  and  $\geq 0.25$  inches of vacuum water gauge in  $\leq 18.5$  and  $\leq 13.5$  seconds, respectively. This cannot be accomplished if the secondary containment boundary is not intact. SR 3.6.4.1.6 demonstrates that each SGT subsystem can maintain  $\geq 0.5$  and  $\geq 0.25$  inches of vacuum water gauge for 1 hour. The 1 hour test period allows shield building annulus and auxiliary building to be in thermal equilibrium at steady state conditions. Therefore, these two tests are used to ensure the integrity of this portion of the secondary containment boundary. Since these SRs are secondary containment tests, they need not be performed with each SGT subsystem. The SGT subsystems are tested on a STAGGERED TEST BASIS, however, to ensure that in addition to the requirements of LCO 3.6.4.3, either SGT subsystem will perform this test. Operating experience has shown these components usually pass the Surveillance when performed at the 18 month Frequency. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

SR 3.6.4.1.5 and SR 3.6.4.1.7

The Fuel Building Ventilation System exhausts the fuel building atmosphere to the environment through appropriate treatment equipment. To ensure that all fission products are treated, SR 3.6.4.1.5 verifies that the Fuel Building Ventilation System will rapidly establish and maintain a pressure in the fuel building that is less than the lowest postulated pressure external to the secondary containment boundary. This is confirmed by demonstrating that one fuel building ventilation subsystem will draw down the fuel building to  $\geq 0.25$  inches of vacuum water gauge in  $\leq 12.5$  seconds. This cannot be accomplished if the secondary containment boundary is not intact. SR 3.6.4.1.7 demonstrates that each SGT subsystem can maintain

(continued)

BASES

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SURVEILLANCE  
REQUIREMENTS

SR 3.6.4.1.5 and SR 3.6.4.1.7 (continued)

≥ 0.25 inches of vacuum water gauge for 1 hour. The 1 hour test period allows the fuel building to be in thermal equilibrium at steady state conditions. Therefore, these two tests are used to ensure the integrity of this portion of the secondary containment boundary. Since these SRs are secondary containment tests, they need not be performed with each SGT subsystem. The SGT subsystems are tested on a STAGGERED TEST BASIS, however, to ensure that in addition to the requirements of LCO 3.6.4.3, either SGT subsystem will perform this test. The 18 month Frequency is based on the need to perform this Surveillance under the conditions that apply during a plant outage and the potential for an unplanned transient if the Surveillance were performed with the reactor at power. Operating experience has shown these components usually pass the Surveillance when performed at the 18 month Frequency. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

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REFERENCES

1. USAR, Section 15.6.5.
  2. USAR, Section 15.7.4.
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## B 3.6 CONTAINMENT SYSTEMS

### B 3.6.4.2 Secondary Containment Isolation Dampers (SCIDs)

#### BASES

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##### BACKGROUND

The function of the SCIDs, in combination with other accident mitigation systems, is to limit fission product release during and following postulated Design Basis Accidents (DBAs) (Ref. 1). Secondary containment isolation within the time limits specified for those isolation dampers designed to close automatically ensures that fission products that leak from primary containment following a DBA, that are released during certain operations when primary containment is not required to be OPERABLE, or that take place outside primary containment, are maintained within the secondary containment boundary.

The OPERABILITY requirements for SCIDs help ensure that an adequate secondary containment boundary is maintained during and after an accident by minimizing potential paths to the environment. Isolation barrier(s) for the penetration are discussed in Reference 2. The isolation devices addressed by this LCO are either passive or active (automatic). Manual dampers, de-activated automatic dampers secured in their closed position, check dampers with flow through the damper secured, and blind flanges are considered passive devices. Check dampers and other automatic dampers designed to close without operator action following an accident are considered active devices.

Automatic SCIDs close on a secondary containment isolation signal to establish a boundary for untreated radioactive material within secondary containment following a DBA or other accidents.

Other penetrations are isolated by the use of dampers or valves in the closed position or blind flanges.

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##### APPLICABLE SAFETY ANALYSES

The SCIDs must be OPERABLE to ensure the secondary containment barrier to fission product releases is established. The principal accidents for which the secondary containment boundary is required are a loss of coolant accident (Ref. 1) and a fuel handling accident involving handling recently irradiated fuel (i.e., fuel that has occupied part of a critical reactor core within the previous 11 days) in the fuel building (Ref. 3). The

(continued)

BASES

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APPLICABLE  
SAFETY ANALYSES  
(continued)

secondary containment performs no active function in response to each of these limiting events, but the boundary established by SCIDs is required to ensure that leakage from the primary containment is processed by the Standby Gas Treatment (SGT) System and Fuel Building Ventilation System before being released to the environment.

Maintaining SCIDs OPERABLE with isolation times within limits ensures that fission products will remain trapped inside secondary containment so that they can be treated by the SGT System or Fuel Building Ventilation System prior to discharge to the environment.

SCIDs satisfy Criterion 3 of the NRC Policy Statement.

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LCO

SCIDs form a part of the secondary containment boundary. The SCID safety function is related to control of offsite radiation releases resulting from DBAs.

The power operated isolation dampers are considered OPERABLE when their isolation times are within limits. Additionally, power operated automatic dampers are required to actuate on an automatic isolation signal.

The normally closed isolation dampers or blind flanges are considered OPERABLE when manual dampers are closed or open in accordance with appropriate administrative controls, automatic dampers are de-activated and secured in their closed position, or blind flanges are in place. The SCIDs covered by this LCO, along with their associated stroke times, if applicable, are listed in Reference 4.

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APPLICABILITY

In MODES 1, 2, and 3, a DBA could lead to a fission product release to the primary containment that leaks to the secondary containment. Therefore, OPERABILITY of SCIDs is required.

In MODES 4 and 5, the probability and consequences of these events are reduced due to pressure and temperature limitations in these MODES. Therefore, maintaining SCIDs OPERABLE is not required in MODE 4 or 5, except for other situations under which significant releases of radioactive material can be postulated, such as during movement of recently irradiated fuel assemblies. Moving recently irradiated fuel assemblies in the Primary Containment is

(continued)

BASES

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APPLICABILITY  
(continued)

addressed adequately in LCO 3.6.1.10, "Primary Containment-Shutdown." Due to radioactive decay, SCIDs are only required to be OPERABLE during fuel handling in the fuel building involving handling recently irradiated fuel (i.e., fuel that has occupied part of a critical reactor core within the previous 11 days).

Moving recently irradiated fuel assemblies in the fuel building (the only portion of secondary containment in which fuel can be handled) will require only the SCIDs associated with the fuel building to be OPERABLE.

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ACTIONS

The ACTIONS are modified by three Notes. The first Note allows penetration flow paths to be unisolated intermittently under administrative controls. These controls consist of stationing a dedicated operator, who is in continuous communication with the control room, at the controls of the isolation device. In this way, the penetration can be rapidly isolated when the need for secondary containment isolation is indicated.

The second Note provides clarification that for the purpose of this LCO separate Condition entry is allowed for each penetration flow path. This is acceptable, since the Required Actions for each Condition provide appropriate compensatory actions for each inoperable SCID. Complying with the Required Actions may allow for continued operation, and subsequent inoperable SCIDs are governed by subsequent Condition entry and application of associated Required Actions.

The third Note ensures appropriate remedial actions are taken, if necessary, if the affected system(s) are rendered inoperable by an inoperable SCID.

A.1 and A.2

In the event that there are one or more penetration flow paths with one SCID inoperable, the affected penetration flow path(s) must be isolated. 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 criteria are a closed and de-activated automatic damper, a closed manual damper or a blind flange. For penetrations isolated in accordance with Required Action A.1, the device used to isolate the

(continued)

BASES

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ACTIONS

A.1 and A.2 (continued)

penetration should be the closest available device to secondary containment. This Required Action must be completed within the 8 hour Completion Time. The specified time period is reasonable considering the time required to isolate the penetration and the low probability of a DBA, which requires the SCIDs to close, occurring during this short time.

For affected penetrations that have been isolated in accordance with Required Action A.1, the affected penetration must be verified to be isolated on a periodic basis. This is necessary to ensure that secondary containment penetrations required to be isolated following an accident, but no longer capable of being automatically isolated, will be isolated should an event occur. This Required Action does not require any testing or isolation device manipulation. Rather, it involves verification that the affected penetration remains isolated.

Required Action A.2 is modified by a Note that applies to isolation devices located in high radiation areas and allows them to be verified by use of administrative controls. Allowing verification by administrative controls is considered acceptable, since access to these areas is typically restricted. Therefore, the probability of misalignment once they have been verified to be in the proper position, is low.

B.1

With two SCIDs in one or more penetration flow paths inoperable (Condition A is entered if one SCID is inoperable in each of two penetrations), the affected penetration flow path must be isolated within 4 hours. 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 de-activated automatic damper, a closed manual damper, and a blind flange. The 4 hour Completion Time is reasonable, considering the time required to isolate the penetration and the low probability of a DBA, which requires the SCIDs to close, occurring during this short time.

(continued)

BASES

ACTIONS  
(continued)

C.1 and C.2

If any Required Action and associated Completion Time cannot be 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 at least MODE 3 within 12 hours and to MODE 4 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

D.1, D.2, and D.3

If any Required Action and associated Completion Time cannot be met, the plant must be placed in a condition in which the LCO does not apply. When applicable, movement of recently irradiated fuel assemblies in the fuel building must be immediately suspended. Suspension of this activity shall not preclude completion of movement of a component to a safe position.

Required Action D.1 has been modified by a Note stating that LCO 3.0.3 is not applicable. If moving recently irradiated fuel assemblies while in MODE 4 or 5, LCO 3.0.3 would not specify any action. If moving recently irradiated fuel assemblies while in MODE 1, 2, or 3, the fuel movement is independent of reactor operations. Therefore, in either case, inability to suspend movement of recently irradiated fuel assemblies would not be a sufficient reason to require a reactor shutdown.

SURVEILLANCE  
REQUIREMENTS

SR 3.6.4.2.1

This SR verifies each secondary containment isolation manual damper and blind flange that is required to be closed during accident conditions is closed. The SR helps to ensure that post accident leakage of radioactive fluids or gases outside of the secondary containment boundary is within design limits. This SR does not require any testing or damper manipulation. Rather, it involves verification that those SCIDs in secondary containment that are capable of being mispositioned are in the correct position.

(continued)

BASES

SURVEILLANCE  
REQUIREMENTS

SR 3.6.4.2.1 (continued)

Since these SCIDs are readily accessible to personnel during normal unit operation and verification of their position is relatively easy, the 31 day Frequency was chosen to provide added assurance that the SCIDs are in the correct positions.

Two Notes have been added to this SR. The first Note applies to dampers and blind flanges located in high radiation areas and allows them to be verified by use of administrative means. Allowing verification by administrative means is considered acceptable, since access to these areas is typically restricted during MODES 1, 2, and 3 for ALARA reasons. Therefore, the probability of misalignment of these SCIDs, once they have been verified to be in the proper position, is low.

A second Note has been included to clarify that SCIDs that are open under administrative controls are not required to meet the SR during the time the SCIDs are open.

SR 3.6.4.2.2

Verifying the isolation time of each power operated and each automatic SCID is within limits is required to demonstrate OPERABILITY. The isolation time test ensures that the SCIDs will isolate in a time period less than or equal to that assumed in the safety analyses. The Frequency of this SR is 92 days.

SR 3.6.4.2.3

Verifying that each automatic SCID closes on a secondary containment isolation signal is required to prevent leakage of radioactive material from secondary containment following a DBA or other accidents. This SR ensures that each automatic SCID will actuate to the isolation position on a secondary containment isolation signal. The LOGIC SYSTEM FUNCTIONAL TEST in SR 3.3.6.2.5 overlaps this SR to provide complete testing of the safety function. The 18 month Frequency is based on the need to perform this Surveillance under the conditions that apply during a plant outage and the potential for an unplanned transient if the Surveillance were performed with the reactor at power.

(continued)

BASES

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SURVEILLANCE  
REQUIREMENTS

SR 3.6.4.2.3 (continued)

Operating experience has shown these components usually pass the Surveillance when performed at the 18 month Frequency. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

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REFERENCES

1. USAR, Section 15.6.5.
  2. USAR, Section 6.2.3.
  3. USAR, Section 15.7.4.
  4. USAR, Table 6.2-40.
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## B 3.6 CONTAINMENT SYSTEMS

### B 3.6.4.3 Standby Gas Treatment (SGT) System

#### BASES

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##### BACKGROUND

The SGT System is required by 10 CFR 50, Appendix A, GDC 41, "Containment Atmosphere Cleanup" (Ref. 1). The function of the SGT System is to ensure that radioactive materials that leak from the primary containment into the secondary containment following a Design Basis Accident (DBA) are filtered and adsorbed prior to exhausting to the environment.

The SGT System consists of two fully redundant subsystems, each with its own set of ductwork, dampers, charcoal filter train, and controls.

Each charcoal filter train consists of (components listed in order of the direction of the air flow):

- a. A moisture separator;
- b. An electric heater;
- c. A prefilter;
- d. A high efficiency particulate air (HEPA) filter;
- e. A charcoal adsorber;
- f. A second HEPA filter; and
- g. A centrifugal fan.

The SGT System serves as a backup non-ESF system to the Annulus Pressure Control System (APCS) during normal operation. Upon loss of the APCS, or upon an ESF signal (i.e., LOCA), the annulus air and air from the shielded compartments in the auxiliary building are automatically diverted through the SGT System filter trains.

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(continued)

## BASES

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### BACKGROUND (continued)

If the SGT System filter trains are not treating the annulus atmosphere or the exhaust air of the shielded compartments in the auxiliary building, the containment and drywell purge can be manually diverted through both SGT System filter trains. By utilizing both SGT System filter trains, a maximum of 25,000 cfm of containment/drywell purge air can be processed by the filter trains.

The SGT System is designed to maintain a negative pressure of at least 0.50 in W.G. in the annulus during post-LOCA operation. With the annulus at a negative pressure, any potential leakage is directed inward (away from the shield building). Therefore, if a primary containment DBA occurs, airborne radioactivity which exfiltrates the steel primary containment is collected and passed through a filter train of the SGT System before being released.

The SGT System is also designed to maintain a negative pressure of at least 0.25 in W.G. in the Auxiliary Building.

The moisture separator is provided to remove entrained water in the air, while the electric heater reduces the relative humidity of the airstream. The prefilter removes large particulate matter, while the HEPA filter is provided to remove fine particulate matter and protect the charcoal from fouling. The charcoal adsorber removes gaseous elemental iodine and organic iodides, and the final HEPA filter is provided to collect any carbon fines exhausted from the charcoal adsorber (Ref. 2).

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### APPLICABLE SAFETY ANALYSES

The design basis for the SGT System is to mitigate the consequences of a loss of coolant accident and fuel handling accidents (Ref. 3). For all events analyzed, the SGT System is shown to be automatically initiated to reduce, via filtration and adsorption, the radioactive material released to the environment.

The SGT System satisfies Criterion 3 of the NRC Policy Statement.

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### LCO

Following a DBA, a minimum of one SGT subsystem is required to maintain the secondary containment at a negative pressure with respect to the environment and to process gaseous releases. Meeting the LCO requirements for two operable subsystems ensures operation of at least one SGT subsystem in the event of a single active failure.

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(continued)

BASES (continued)

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APPLICABILITY

In MODES 1, 2, and 3, a DBA could lead to a fission product release to primary containment that leaks to secondary containment. Therefore, SGT System OPERABILITY is required during these MODES.

In MODES 4 and 5, the probability and consequences of these events are reduced due to the pressure and temperature limitations in these MODES. Therefore, maintaining the SGT System OPERABLE is not required in MODE 4 or 5.

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ACTIONS

A.1 and A.2

With one SGT subsystem inoperable, action must be taken to verify that the OPERABLE SGT subsystem is not operating in the primary containment purge flowpath.

Additionally, the inoperable subsystem must be restored to OPERABLE status within 7 days. In this Condition, the remaining OPERABLE SGT subsystem is adequate to perform the required radioactivity release control function. However, the overall system reliability is reduced because a single failure in the OPERABLE subsystem could result in the radioactivity release control function not being adequately performed. The 7 day Completion Time is based on consideration of such factors as the availability of the OPERABLE redundant SGT subsystem and the low probability of a DBA occurring during this period.

B.1 and B.2

If the SGT subsystem cannot be restored to OPERABLE status within the required Completion Time in MODE 1, 2, or 3, 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 at least MODE 3 within 12 hours and to MODE 4 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

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(continued)

BASES (continued)

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SURVEILLANCE  
REQUIREMENTS

SR 3.6.4.3.1

Operating each SGT subsystem for  $\geq 10$  continuous hours ensures that both subsystems are OPERABLE and that all associated controls are functioning properly. It also ensures that blockage, fan or motor failure, or excessive vibration can be detected for corrective action. Operation with the heaters on (automatic heater cycling to maintain temperature) for  $\geq 10$  continuous hours every 31 days eliminates moisture on the adsorbers and HEPA filters. The 31 day Frequency was developed in consideration of the known reliability of fan motors and controls and the redundancy available in the system.

SR 3.6.4.3.2

This SR verifies that the required SGT filter testing is performed in accordance with the Ventilation Filter Testing Program (VFTP). The SGT System filter tests are in accordance with Regulatory Guide 1.52 (Ref. 4). The VFTP includes testing HEPA filter performance, charcoal adsorber efficiency, minimum system flow rate, and the physical properties of the activated charcoal (general use and following specific operations). Specified test frequencies and additional information are discussed in detail in the VFTP.

SR 3.6.4.3.3

This SR requires verification that each SGT subsystem starts upon receipt of an actual or simulated initiation signal. The LOGIC SYSTEM FUNCTIONAL TEST in SR 3.3.6.2.5 overlaps this SR to provide complete testing of the safety function. While this Surveillance can be performed with the reactor at power, operating experience has shown these components usually pass the Surveillance when performed at the 18 month Frequency, which is based on the refueling cycle. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

SR 3.6.4.3.4

This SR requires verification that the SGT filter cooling bypass damper can be opened and the fan started. This ensures that the ventilation mode of SGT System operation is

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BASES

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SURVEILLANCE  
REQUIREMENTS

SR 3.6.4.3.4 (continued)

available. While this Surveillance can be performed with the reactor at power, operating experience has shown these components usually pass the Surveillance when performed at the 18 month Frequency, which is based on the refueling cycle. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

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REFERENCES

1. 10 CFR 50, Appendix A, GDC 41.
  2. USAR, Section 6.2.3.
  3. USAR, Section 15.6.5.
  4. Regulatory Guide 1.52, Rev. 2.
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## B 3.6 CONTAINMENT SYSTEMS

### B 3.6.4.4 Shield Building Annulus Mixing System

#### BASES

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##### BACKGROUND

The Shield Building Annulus Mixing System, in conjunction with the secondary containment and Standby Gas Treatment System, is required to ensure that radioactive materials that leak from the primary containment into the shield building annulus portion of the secondary containment following a Design Basis Accident (DBA) are filtered and adsorbed prior to exhausting to the environment. Specifically, the Shield Building Annulus Mixing System provides thorough mixing of the iodine and noble gases leaking from the primary containment into the volume between the steel containment and the shield building.

The Shield Building Annulus Mixing System consists of two fully redundant subsystems, each with its own set of ductwork, dampers, and controls. The Shield Building Annulus Mixing System automatically starts and operates in response to actuation signals indicative of a LOCA. Following initiation, both shield Building Annulus Mixing fans start.

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##### APPLICABLE SAFETY ANALYSIS

The design basis for the Shield Building Annulus Mixing System is to mitigate the consequences of a loss of coolant accident (Ref. 1). For the events analyzed, the Shield Building Annulus Mixing System is shown to be automatically initiated to reduce, via mixing, the quantity of radioactive material processed by the Standby Gas Treatment System. This results in minimizing the release rates for radioactive material released to the environment.

The Shield Building Annulus Mixing System satisfies Criterion 3 of the NRC Policy Statement.

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##### LCO

Following a DBA, a minimum of one shield building annulus mixing subsystem is required to adequately mix gaseous releases for processing by the Standby Gas Treatment System. Meeting the LCO requirements for two operable subsystems ensures operation of at least one shield building annulus mixing subsystem in the event of a single active failure.

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(continued)

BASES (continued)

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APPLICABILITY      In MODES 1, 2, and 3, a DBA LOCA could lead to a fission product release to primary containment that leaks to secondary containment, including the annulus. Therefore, Shield Building Annulus Mixing System OPERABILITY is required during these MODES.

In MODES 4 and 5, the probability and consequences of a DBA LOCA event is reduced due to the pressure and temperature limitations in these MODES. Therefore, maintaining the Shield Building Annulus Mixing System OPERABLE is not required in MODE 4 or 5.

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ACTIONS

A.1

With one shield building annulus mixing subsystem inoperable, the inoperable subsystem must be restored to OPERABLE status within 7 days. In this condition, the remaining OPERABLE shield building annulus mixing subsystem is adequate to perform the required radioactivity release mixing function. However, the overall system reliability is reduced because a single failure in the OPERABLE subsystem could result in the radioactivity release mixing function not being adequately performed. The 7 day Completion Time is based on consideration of such factors as the availability of the OPERABLE redundant shield building annulus mixing subsystem and the low probability of a DBA occurring during this period.

B.1 and B.2

If the shield building annulus mixing subsystem(s) cannot be restored to OPERABLE status within the required Completion Time, 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 at least MODE 3 within 12 hours and to MODE 4 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

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(continued)

BASES (continued)

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SURVEILLANCE  
REQUIREMENTS

SR 3.6.4.4.1

Operating each shield building annulus mixing subsystem for  $\geq 15$  minutes ensures that both subsystems are OPERABLE and that all associated controls are functioning properly. It also ensures that blockage, fan or motor failure, or excessive vibration can be detected for corrective action. The 31 day Frequency was developed in consideration of the known reliability of fan motors and controls and the redundancy available in the system.

SR 3.6.4.4.2

This SR requires verification that each shield building annulus mixing subsystem starts upon receipt of an actual or simulated initiation signal. The LOGIC SYSTEM FUNCTIONAL TEST in SR 3.3.6.2.5 overlaps this SR to provide complete testing of the safety function. While this Surveillance can be performed with the reactor at power, operating experience has shown these components usually pass the Surveillance when performed at the 18 month Frequency, which is based on the refueling cycle. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

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REFERENCES

1. USAR, Section 15.6.5.
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## B 3.6 CONTAINMENT SYSTEMS

### B 3.6.4.5 Fuel Building

#### BASES

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##### BACKGROUND

The function of the fuel building is to contain, dilute, and hold up fission products that are released from a design basis accident. In conjunction with operation of the Fuel Building Charcoal Filtration (FBCF) System and closure of certain valves whose lines penetrate the fuel building, the fuel building is designed to reduce the activity level of the fission products prior to release to the environment.

The fuel building is a structure that houses the spent fuel pool. This structure forms a control volume that serves to hold up and dilute the fission products. To prevent ground level exfiltration, the fuel building requires support systems to maintain the control volume pressure at less than the external pressure. Requirements for these systems are specified separately in LCO 3.6.4.2, "Secondary Containment Isolation Dampers (SCIDs)," and LCO 3.6.4.7, "Fuel Building Ventilation System - Fuel Handling."

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##### APPLICABLE SAFETY ANALYSES

There are two principal accidents for which credit is taken for the fuel building OPERABILITY. These are a LOCA, and a Fuel Handling Accident (FHA) involving handling recently irradiated fuel (i.e., fuel that has occupied part of a critical reactor core within the previous 11 days) inside the fuel building (Ref. 1). The fuel building performs no active function in response to these events; however, its leak tightness is required to ensure that the release of radioactive materials is restricted to those leakage rates assumed in the accident analysis.

The fuel building satisfies Criterion 3 of the NRC Policy Statement.

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##### LCO

An OPERABLE fuel building provides a control volume into which fission products can be diluted and processed prior to release. For the fuel building to be considered OPERABLE, it must have adequate leak tightness to ensure the required vacuum can be established and maintained.

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BASES (continued)

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APPLICABILITY      In plant operating MODES 1,2, and 3, OPERABILITY of the fuel building is addressed in LCO 3.6.4.1, "Secondary Containment - Operating." Regardless of the plant operating MODE, anytime recently irradiated fuel is being handled in the fuel building there is the potential for a FHA involving handling recently irradiated fuel and the fuel building OPERABILITY is required to mitigate the consequences. Due to radioactive decay, the fuel building is only required during fuel handling in the fuel building involving handling recently irradiated fuel (i.e., fuel that has occupied part of a critical reactor core within the previous 11 days).

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ACTIONS

A.1

With the fuel building inoperable the plant must be brought to a condition in which the LCO does not apply since it is incapable of performing its required accident mitigation function. To achieve this, recently irradiated fuel handling must be suspended immediately. Suspension shall not preclude completion of fuel movement to a safe position.

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SURVEILLANCE  
REQUIREMENTS

SR 3.6.4.5.1

This SR ensures that the fuel building boundary is sufficiently leak tight to preclude exfiltration under expected wind conditions. The 24 hour Frequency of this SR was developed based on operating experience related to fuel building vacuum variations during the applicable MODES and the low probability of a FHA in the fuel building involving handling recently irradiated fuel (i.e., fuel that has occupied part of a critical reactor core within the previous 11 days) occurring between surveillances.

Furthermore, the 24 hour Frequency is considered adequate in view of other indications available in the control room, including alarms, to alert the operator to an abnormal fuel building vacuum condition.

SR 3.6.4.5.2 and SR 3.6.4.5.3

Verifying that fuel building equipment hatches and access doors are closed ensures that the infiltration of outside air of such a magnitude as to prevent maintaining the desired negative pressure does not occur. Verifying that all such openings are closed provides adequate assurance

(continued)

BASES

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SURVEILLANCE  
REQUIREMENTS

SR 3.6.4.5.2 and SR 3.6.4.5.3 (continued)

that exfiltration from the fuel building will not occur. Maintaining fuel building OPERABILITY requires verifying each door in the access opening is closed, except when the access opening is being used for entry and exit.

The 31 day Frequency for these SRs has been shown to be adequate based on operating experience, and is considered adequate in view of the other indications of door and hatch status that are available to the operator.

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REFERENCES

1. USAR, Chapter 15.
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## B 3.6 CONTAINMENT SYSTEMS

### B 3.6.4.6 Fuel Building Ventilation System—Operating

#### BASES

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##### BACKGROUND

The Fuel Building Ventilation System is required by 10 CFR 50, Appendix A, GDC 41, "Containment Atmosphere Cleanup" (Ref. 1). One function of the Fuel Building Ventilation System is to ensure that radioactive materials that leak from the primary containment into the Fuel Building portion of the secondary containment following a Design Basis Accident (DBA) are filtered and adsorbed prior to exhausting to the environment.

The Fuel Building Ventilation System consists of two fully redundant fuel building ventilation charcoal filtration subsystems, each with its own set of ductwork, dampers, charcoal filter train, and controls. Each charcoal filter train consists of (components listed in order of the direction of the air flow):

- a. A moisture separator;
- b. An electric heater;
- c. A prefilter;
- d. A high efficiency particulate air (HEPA) filter;
- e. A charcoal adsorber;
- f. A second HEPA filter; and
- g. A centrifugal fan.

The moisture separator is provided to remove entrained water in the air, while the electric heater reduces the relative humidity of the airstream to less than 70% (Ref. 2). The prefilter removes large particulate matter, while the HEPA filter is provided to remove fine particulate matter and protect the charcoal from fouling. The charcoal adsorber removes gaseous elemental iodine and organic iodides, and the final HEPA filter is provided to collect any carbon fines exhausted from the charcoal adsorber.

The Fuel Building Ventilation System automatically starts and operates the charcoal filtration subsystems in response to actuation signals indicative of a Fuel Handling Accident (FHA) in the fuel building involving handling recently irradiated fuel (i.e., fuel that has occupied part of a critical reactor core within the previous 11 days) or LOCA. Following initiation, both fuel building ventilation charcoal filtration fans start.

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BASES (continued)

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APPLICABLE  
SAFETY ANALYSIS

The design basis for the Fuel Building Ventilation System is to mitigate the consequences of a loss of coolant accident (Ref. 2). (Additionally this system functions to mitigate the FHA in the fuel building involving handling recently irradiated fuel, however this function and Applicable Safety Analysis is addressed in LCO 3.7.9, "Fuel Building Ventilation System-Fuel Handling.") For the events analyzed, the fuel building ventilation charcoal filtration subsystems are shown to be automatically initiated to reduce, via filtration and adsorption, the radioactive material released to the environment.

The fuel building charcoal filtration subsystems of the Fuel Building Ventilation System satisfies Criterion 3 of the NRC Policy Statement.

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LCO

Following a DBA, a minimum of one fuel building ventilation charcoal filtration subsystem is required to maintain the fuel building at a negative pressure with respect to the environment and to process gaseous releases. Meeting the LCO requirements for two operable subsystems ensures operation of at least one fuel building ventilation charcoal filtration subsystem in the event of a single active failure.

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APPLICABILITY

In MODES 1, 2, and 3, a DBA LOCA could lead to a fission product release to primary containment that leaks to secondary containment, including the fuel building. Therefore, fuel building ventilation charcoal filtration subsystem OPERABILITY is required during these MODES.

In MODES 4 and 5, the probability and consequences of a DBA LOCA event is reduced due to the pressure and temperature limitations in these MODES. Therefore, maintaining the fuel building ventilation charcoal filtration subsystems OPERABLE is not required in MODE 4 or 5, except for other situations under which significant releases of radioactive material can be postulated, such as during movement of recently irradiated fuel (i.e., fuel that has occupied part of a critical reactor core within the previous 11 days) assemblies in the fuel building. The OPERABILITY of the Fuel Building Ventilation System during recently irradiated fuel handling is addressed in LCO 3.6.4.7, "Fuel Building Ventilation System-Fuel Handling."

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(continued)

BASES (continued)

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ACTIONS

A.1

With one fuel building ventilation charcoal filtration subsystem inoperable, the inoperable subsystem must be restored to OPERABLE status within 7 days. In this condition, the remaining OPERABLE fuel building ventilation charcoal filtration subsystem is adequate to perform the required radioactivity release control function. However, the overall system reliability is reduced because a single failure in the OPERABLE subsystem could result in the radioactivity release control function not being adequately performed. The 7 day Completion Time is based on consideration of such factors as the availability of the OPERABLE redundant fuel building ventilation charcoal filtration subsystem and the low probability of a DBA occurring during this period.

B.1 and B.2

If the fuel building ventilation charcoal filtration subsystem cannot be restored to OPERABLE status within the required Completion Time, 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 at least MODE 3 within 12 hours and to MODE 4 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

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SURVEILLANCE  
REQUIREMENTS

SR 3.6.4.6.1

Operating each fuel building ventilation charcoal filtration subsystem for  $\geq 10$  continuous hours ensures that both subsystems are OPERABLE and that all associated controls are functioning properly. It also ensures that blockage, fan or motor failure, or excessive vibration can be detected for corrective action. Operation with the heaters operating (automatic heater cycling to maintain temperature) for  $\geq 10$  continuous hours every 31 days eliminates moisture on the adsorbers and HEPA filters. The 31 day Frequency was developed in consideration of the known reliability of fan motors and controls and the redundancy available in the system.

(continued)

BASES

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SURVEILLANCE  
REQUIREMENTS  
(continued)

SR 3.6.4.6.2

This SR verifies that the required fuel building ventilation charcoal filtration filter testing is performed in accordance with the Ventilation Filter Testing Program (VFTP). The fuel building ventilation charcoal filtration subsystem filter tests are in accordance with Regulatory Guide 1.52 (Ref. 3). The VFTP includes testing HEPA filter performance, charcoal adsorber efficiency, minimum system flow rate, and the physical properties of the activated charcoal (general use and following specific operations). Specified test frequencies and additional information are discussed in detail in the VFTP.

SR 3.6.4.6.3

This SR requires verification that each fuel building ventilation charcoal filtration subsystem starts upon receipt of an actual or simulated initiation signal. The LOGIC SYSTEM FUNCTIONAL TEST in SR 3.3.6.2.5 overlaps this SR to provide complete testing of the safety function. While this Surveillance can be performed with the reactor at power, operating experience has shown these components usually pass the Surveillance when performed at the 18 month Frequency, which is based on the refueling cycle. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

SR 3.6.4.6.4

This SR requires verification that the fuel building ventilation charcoal filtration filter cooling bypass damper can be opened and the fan started. This ensures that the ventilation mode of Fuel Building Ventilation Charcoal Filtration System operation is available. While this Surveillance can be performed with the reactor at power, operating experience has shown these components usually pass the Surveillance when performed at the 18 month Frequency, which is based on the refueling cycle. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

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(continued)

BASES (continued)

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- REFERENCES
1. 10 CFR 50, Appendix A, GDC 41.
  2. USAR, Section 9.4.2.
  3. Regulatory Guide 1.52, Rev. 2.
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## B 3.6 CONTAINMENT SYSTEMS

### B 3.6.4.7 Fuel Building Ventilation System—Fuel Handling

#### BASES

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##### BACKGROUND

The Fuel Building Ventilation System is required by 10 CFR 50, Appendix A, GDC 41, "Containment Atmosphere Cleanup" (Ref. 1). The function of the Fuel Building Ventilation System is to ensure that radioactive materials that escape from fuel assemblies damaged following a design basis Fuel Handling Accident (FHA) inside the fuel building involving handling recently irradiated fuel (i.e., fuel that has occupied part of a critical reactor core within the previous 11 days) are filtered and adsorbed prior to exhausting to the environment.

The Fuel Building Ventilation System consists of two fully redundant subsystems, each with its own set of ductwork, dampers, charcoal filter train, and controls.

Each charcoal filter train consists of (components listed in order of the direction of the air flow):

- a. A moisture separator;
- b. An electric heater;
- c. A prefilter;
- d. A high efficiency particulate air (HEPA) filter;
- e. A charcoal adsorber;
- f. A second HEPA filter; and
- g. A centrifugal fan with inlet flow control vanes.

The moisture separator is provided to remove entrained water in the air, while the electric heater reduces the relative humidity of the airstream to less than 70% (Ref. 2). The prefilter removes large particulate matter, while the HEPA filter is provided to remove fine particulate matter and protect the charcoal from fouling. The charcoal adsorber removes gaseous elemental iodine and organic iodides, and the final HEPA filter is provided to collect any carbon fines exhausted from the charcoal adsorber.

The Fuel Building Ventilation System automatically starts and operates in response to actuation signals indicative of conditions or an accident that could require operation of the system.

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(continued)

BASES (continued)

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APPLICABLE  
SAFETY ANALYSES

The design basis for the Fuel Building Ventilation System is to mitigate the consequences of a fuel handling accident (Ref. 3) involving handling recently irradiated fuel (i.e., fuel that has occupied part of a critical reactor core within the previous 11 days). For all events analyzed, the Fuel Building Ventilation System is shown to reduce, via filtration and adsorption, the radioactive material released to the environment. Since the system is assumed to filter all releases, with the analysis not accounting for any delay in system startup, at least one subsystem must be in operation while handling recently irradiated fuel.

The Fuel Building Ventilation System satisfies Criterion 3 of the NRC Policy Statement.

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LCO

Following a FHA inside the fuel building involving handling recently irradiated fuel (i.e., fuel that has occupied part of a critical reactor core within the previous 11 days), a minimum of one Fuel Building Ventilation subsystem is required to maintain the fuel building at a negative pressure with respect to the environment and to process gaseous releases. Meeting the LCO requirements for two operable subsystems ensures operation of at least one Fuel Building Ventilation subsystem in the event of a single active failure. Requiring one subsystem to be in operation ensures no releases occur that are not filtered and adsorbed.

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APPLICABILITY

In plant operating MODES 1,2 and 3, OPERABILITY of the fuel building is addressed in LCO 3.6.4.1, "Secondary Containment—Operating." Regardless of the plant operating MODE, anytime recently irradiated fuel is being handled there is the potential for a FHA inside the fuel building involving handling recently irradiated fuel and the Fuel Building Ventilation System is required to mitigate the consequences. Due to radioactive decay, the Fuel Building Ventilation System is only required during fuel handling in the fuel building involving handling recently irradiated fuel (i.e., fuel that has occupied part of a critical reactor core within the previous 11 days).

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(continued)

BASES (continued)

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ACTIONS

A.1

With one fuel building ventilation charcoal filtration subsystem inoperable, the inoperable subsystem must be restored to OPERABLE status within 7 days. In this Condition, the remaining OPERABLE fuel building ventilation charcoal filtration subsystem is adequate to perform the required radioactivity release control function. However, the overall system reliability is reduced because a single failure in the OPERABLE subsystem could result in the radioactivity release control function not being adequately performed. The 7 day Completion Time is based on consideration of such factors as the availability of the OPERABLE redundant fuel building ventilation charcoal filtration subsystem and the low probability of a FHA inside the fuel building involving handling recently irradiated fuel occurring during this period.

B.1 and R.2

If the fuel building ventilation charcoal filtration subsystem cannot be restored to OPERABLE status within the required Completion Time the plant must be brought to a condition in which the LCO does not apply. Additionally, if both subsystems are inoperable or if the one required subsystem not in operation the system is incapable of performing its required accident mitigation function and the plant must be brought to a condition in which the LCO does not apply. To achieve this, recently irradiated fuel handling must be suspended immediately. Suspension shall not preclude completion of fuel movement to a safe position.

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SURVEILLANCE  
REQUIREMENTS

SR 3.6.4.7.1

This Surveillance demonstrates that one fuel building ventilation charcoal filtration subsystem is in operation and filtering the fuel building atmosphere. The Frequency of 12 hours is sufficient in view of other visual and audible indications available to the operator for monitoring the fuel building ventilation charcoal filtration subsystem in the control room.

(continued)

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BASES

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SURVEILLANCE  
REQUIREMENTS  
(continued)

SR 3.6.4.7.2

Operating each fuel building ventilation charcoal filtration subsystem for  $\geq 10$  continuous hours ensures that both subsystems are OPERABLE and that all associated controls are functioning properly. It also ensures that blockage, fan or motor failure, or excessive vibration can be detected for corrective action. Operation with the heaters operating (automatic heater cycling to maintain temperature) for  $\geq 10$  continuous hours every 31 days eliminates moisture on the adsorbers and HEPA filters. The 31 day Frequency was developed in consideration of the known reliability of fan motors and controls and the redundancy available in the system.

SR 3.6.4.7.3

This SR verifies that the required fuel building ventilation charcoal filtration filter testing is performed in accordance with the Ventilation Filter Testing Program (VFTP). The fuel building ventilation charcoal filtration filter tests are in accordance with Regulatory Guide 1.52 (Ref. 4). The VFTP includes testing HEPA filter performance, charcoal adsorber efficiency, minimum system flow rate, and the physical properties of the activated charcoal (general use and following specific operations). Specified test frequencies and additional information are discussed in detail in the VFTP.

SR 3.6.4.7.4

This SR requires verification that each fuel building ventilation charcoal filtration subsystem starts upon receipt of an actual or simulated initiation signal. The LOGIC SYSTEM FUNCTIONAL TEST in SR 3.3.6.2.5 overlaps this SR to provide complete testing of the safety function. While this Surveillance can be performed with the reactor at power, operating experience has shown these components usually pass the Surveillance when performed at the 18 month Frequency, which is based on the refueling cycle. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

(continued)

BASES

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SURVEILLANCE  
REQUIREMENTS  
(continued)

SR 3.6.4.7.5

This SR requires verification that the fuel building ventilation charcoal filtration filter cooling bypass damper can be opened and the fan started. This ensures that the ventilation mode of Fuel Building Ventilation System operation is available. While this Surveillance can be performed with the reactor at power, operating experience has shown these components usually pass the Surveillance when performed at the 18 month Frequency, which is based on the refueling cycle. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

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REFERENCES

1. 10 CFR 50, Appendix A, GDC 41.
  2. USAR, Section 6.2.3.
  3. USAR, Section 15.6.5.
  4. Regulatory Guide 1.52, Rev. 2.
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## B 3.6 CONTAINMENT SYSTEMS

### B 3.6.5.1 Drywell

#### BASES

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#### BACKGROUND

The drywell houses the reactor pressure vessel (RPV), the reactor coolant recirculating loops, and branch connections of the Reactor Coolant System (RCS), which have isolation valves at the primary containment boundary. The function of the drywell is to maintain a pressure boundary that channels steam from a loss of coolant accident (LOCA) to the suppression pool, where it is condensed. Air forced from the drywell is released into the primary containment through the suppression pool. The pressure suppression capability of the suppression pool assures that peak LOCA temperature and pressure in the primary containment are within design limits. The drywell also protects accessible areas of the containment from radiation originating in the reactor core and RCS.

To ensure the drywell pressure suppression capability, the drywell bypass leakage must be minimized to prevent overpressurization of the primary containment during the drywell pressurization phase of a LOCA. This requires periodic testing of the drywell bypass leakage, confirmation that the drywell air lock is leak tight, OPERABILITY of the drywell isolation valves.

The isolation devices for the drywell penetrations are a part of the drywell barrier. To maintain this barrier:

- a. The drywell air lock is OPERABLE except as provided in LCO 3.6.5.2, "Drywell Air Lock";
- b. The drywell penetrations required to be closed during accident conditions are either:
  1. capable of being closed by an OPERABLE automatic drywell isolation valve, or
  2. closed by a manual valve, blind flange, or de-activated automatic valve secured in the closed position except as provided in LCO 3.6.5.3, "Drywell Isolation Valves."; and
- c. All drywell equipment hatches are closed and sealed.

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(continued)

BASES

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BACKGROUND  
(continued)

This Specification is intended to ensure that the performance of the drywell in the event of a DBA meets the assumptions used in the safety analyses (Ref. 1).

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APPLICABLE  
SAFETY ANALYSES

Analytical methods and assumptions involving the drywell are presented in Reference 1. The safety analyses assume that for a high energy line break inside the drywell, the steam is directed to the suppression pool through the horizontal vents where it is condensed. Maintaining the pressure suppression capability assures that safety analyses remain valid and that the peak LOCA temperature and pressure in the primary containment are within design limits.

The drywell satisfies Criteria 2 and 3 of the NRC Policy Statement.

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LCO

Maintaining the drywell OPERABLE is required to ensure that the pressure suppression design functions assumed in the safety analyses are met. The drywell is OPERABLE if the drywell structural integrity is intact and the bypass leakage is within limits, except prior to the first startup after performing a required drywell bypass leakage test. At this time, the drywell bypass leakage must be  $\leq 10\%$  of the drywell bypass leakage limit.

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APPLICABILITY

In MODES 1, 2, and 3, a DBA could cause a release of radioactive material to the primary containment. In MODES 4 and 5, the probability and consequences of these events are reduced due to the pressure and temperature limitations of these MODES. Therefore, the drywell is not required to be OPERABLE in MODES 4 and 5.

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ACTIONS

A.1

In the event the drywell is inoperable, it must be restored to OPERABLE status within 1 hour. The 1 hour Completion Time provides a period of time to correct the problem commensurate with the importance of maintaining the drywell OPERABLE during MODES 1, 2, and 3. This time period also ensures that the probability of an accident (requiring drywell OPERABILITY) occurring during periods when the

(continued)

BASES

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ACTIONS

A.1 (continued)

drywell is inoperable is minimal. Also, the Completion Time is the same as that applied to inoperability of the primary containment in LCO 3.6.1.1, "Primary Containment-Operating."

B.1 and B.2

If the drywell cannot be restored to OPERABLE status within the required Completion Time, 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 at least MODE 3 within 12 hours and to MODE 4 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

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SURVEILLANCE  
REQUIREMENTS

SR 3.6.5.1.1

The seal air flask pressure is verified to be at  $\geq 75$  psig every 7 days to ensure that the seal system remains viable. It must be checked because it could bleed down during or following access through the personnel door. The 7 day Frequency has been shown to be acceptable through operating experience and is considered adequate in view of the other indications available to operations personnel that the seal air flask pressure is low.

SR 3.6.5.1.2

A seal pneumatic system test to ensure that pressure does not decay at a rate equivalent to  $> 0.67$  psig for a period of 24 hours from an initial pressure of 75 psig is an effective leakage rate test to verify system performance. The 18 month Frequency is based on the need to perform this Surveillance under the conditions that apply during a plant outage and the potential for an unplanned transient if the Surveillance were performed with the reactor at power. Operating experience has shown these components usually pass the Surveillance when performed at the 18 month Frequency, which is based on the refueling cycle. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

(continued)

BASES

SURVEILLANCE  
REQUIREMENTS  
(continued)

SR 3.6.5.1.3

The analyses in Reference 1 are based on a maximum drywell bypass leakage. This Surveillance ensures that the actual drywell bypass leakage is less than or equal to the acceptable  $A/\sqrt{k}$  design value of  $1.0 \text{ ft}^2$  assumed in the safety analysis. As left drywell bypass leakage, prior to the first startup after performing a required drywell bypass leakage test, is required to be  $\leq 10\%$  of the drywell bypass leakage limit. At all other times between required drywell leakage rate tests, the acceptance criteria is based on design  $A/\sqrt{k}$ . At the design  $A/\sqrt{k}$  the containment temperature and pressurization response are bounded by the assumptions of the safety analysis. The leakage test is performed every 18 months, consistent with the difficulty of performing the test, risk of high radiation exposure, and the remote possibility that a component failure that is not identified by some other drywell or primary containment SR might occur. Operating experience has shown that these components usually pass the Surveillance when performed at the 18 month Frequency. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

SR 3.6.5.1.4

The exposed accessible drywell interior and exterior surfaces are inspected to ensure there are no apparent physical defects that would prevent the drywell from performing its intended function. This SR ensures that drywell structural integrity is maintained. The Frequency was chosen so that the interior and exterior surfaces of the drywell can be inspected in conjunction with the inspections of the primary containment required by 10 CFR 50, Appendix J (Ref. 2). Due to the passive nature of the drywell structure, the specified Frequency is sufficient to identify component degradation that may affect drywell structural integrity.

REFERENCES

1. USAR, Chapter 6 and Chapter 15.

## B 3.6 CONTAINMENT SYSTEMS

### B 3.6.5.2 Drywell Air Lock

#### BASES

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##### BACKGROUND

The drywell air lock forms part of the drywell boundary and provides a means for personnel access during MODES 2 and 3 during low power phase of unit startup. For this purpose, one double door drywell air lock has been provided, which maintains drywell isolation during personnel entry and exit from the drywell. Under the normal unit operation, the drywell air lock is kept sealed. The air pressure in the seals is maintained  $> 60$  psig by the seal air flask and pneumatic system, which is maintained at a pressure  $\geq 75$  psig.

The drywell air lock is designed to the same standards as the drywell boundary. Thus, the drywell air lock must withstand the pressure and temperature transients associated with the rupture of any primary system line inside the drywell and also the rapid reversal in pressure when the steam in the drywell is condensed by the Emergency Core Cooling System flow following loss of coolant accident flooding of the reactor pressure vessel (RPV). It is also designed to withstand the high temperature associated with the break of a small steam line in the drywell that does not result in rapid depressurization of the RPV.

The air lock is nominally a right circular cylinder, 10 ft in diameter, with doors at each end that are interlocked to prevent simultaneous opening. During periods when the drywell is not required to be OPERABLE, the air lock interlock mechanism may be disabled, allowing both doors of the air lock to remain open for extended periods when frequent drywell entry is necessary. Each air lock door has been designed and tested to certify its ability to withstand a pressure in excess of the maximum expected pressure following a Design Basis Accident (DBA).

The air lock is provided with limit switches on both doors that provide control room indication of door position.

The drywell air lock forms part of the drywell pressure boundary. Not maintaining air lock OPERABILITY may result in degradation of the pressure suppression capability, which is assumed to be functional in the unit safety analyses.

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(continued)

BASES

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BACKGROUND  
(continued)

The drywell air lock does not need to meet the requirements of 10 CFR 50, Appendix J (Ref. 1), since it is not part of the primary containment leakage boundary. However, it is prudent to specify a leakage rate requirement for the drywell air lock. A seal leakage rate limit of  $\leq 4.05$  scfh and an air lock overall leakage rate limit of  $\leq 11.85$  scfh, at 3.0 psid, have been established to assure the integrity of the seals.

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APPLICABLE  
SAFETY ANALYSES

Analytical methods and assumptions involving the drywell are presented in Reference 2. The safety analyses assume that for a high energy line break inside the drywell, the steam is directed to the suppression pool through the horizontal vents where it is condensed. Since the drywell air lock is part of the drywell pressure boundary, its design and maintenance are essential to support drywell OPERABILITY, which assures that the safety analyses are met.

The drywell air lock satisfies Criterion 3 of the NRC Policy Statement.

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LCO

The drywell air lock forms part of the drywell pressure boundary. The air lock safety function assures that steam resulting from a DBA is directed to the suppression pool. Thus, the air lock's structural integrity is essential to the successful mitigation of such an event.

The air lock is required to be OPERABLE. For the air lock to be considered OPERABLE, the air lock interlock mechanism must be OPERABLE, air lock leakage must be within limits, and both air lock doors must be OPERABLE. The interlock allows only one air lock door of an air lock to be opened at one time. This provision ensures that a gross breach of the drywell does not exist when the drywell is required to be OPERABLE.

Closure of a single door in the air lock is necessary to support drywell OPERABILITY following postulated events. Nevertheless, both doors are kept closed when the air lock is not being used for entry into and exit from the drywell.

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(continued)

BASES (continued)

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APPLICABILITY      In MODES 1, 2, and 3, a DBA could cause a release of radioactive material to the primary containment. In MODES 4 and 5, the probability and consequences of these events are reduced due to the pressure and temperature limitations in these MODES. Therefore, the drywell air lock is not required to be OPERABLE in MODES 4 and 5.

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ACTIONS            The ACTIONS are modified by Note 1 which that allows entry and exit to perform repairs on the affected air lock component. If the outer door is inoperable, then it may be easily accessed to repair. If the inner door is inoperable, however, then there is a short time during which the drywell boundary is not intact (during access through the outer door). The ability to open the OPERABLE door, even if it means the drywell boundary is temporarily not intact, is acceptable due to the low probability of an event that could pressurize the drywell during the short time in which the OPERABLE door is expected to be open. The OPERABLE door must be immediately closed after each entry and exit.

The ACTIONS are modified by a second Note, which ensures appropriate remedial actions are taken when necessary. Pursuant to LCO 3.0.6, ACTIONS are not required even if the drywell is exceeding its bypass leakage limit. Therefore, the Note is added to require ACTIONS for LCO 3.6.5.1 to be taken in this event.

A.1, A.2, and A.3

With one drywell air lock door inoperable, the OPERABLE door must be verified closed (Required Action A.1). This ensures that a leak tight drywell barrier is maintained by the use of an OPERABLE air lock door. This action must be completed within 1 hour. The 1 hour Completion Time is consistent with the ACTIONS of LCO 3.6.5.1, "Drywell," which requires that the drywell be restored to OPERABLE status within 1 hour.

In addition, the air lock penetration must be isolated by locking closed the OPERABLE air lock door within the 24 hour Completion Time. The Completion Time is considered reasonable for locking the OPERABLE air lock door, considering that the OPERABLE door is being maintained closed.

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(continued)

BASES

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ACTIONS

A.1, A.2, and A.3 (continued)

Required Action A.3 verifies that the air lock has been isolated by the use of a locked and closed OPERABLE air lock door. This ensures that an acceptable drywell boundary is maintained. The Completion Time of once per 31 days is based on engineering judgment and is considered adequate in view of the low likelihood of a locked door being mispositioned and other administrative controls that ensure that the OPERABLE air lock door remains closed.

The Required Actions are modified by two Notes. Note 1 ensures only the Required Actions and associated Completion Times of Condition C are required if both doors in the air lock are inoperable. The exception of the Note does not affect tracking the Completion Times from the initial entry into Condition A; only the requirement to comply with the Required Actions. Note 2 allows use of the air lock for entry and exit for 7 days under administrative controls. Drywell entry may be required to perform Technical Specifications (TS) Surveillances and Required Actions, as well as other activities on equipment inside the drywell that are required by TS or activities on equipment that support TS-required equipment. This Note is not intended to preclude performing other activities (i.e., non-TS-required activities) if the drywell was entered, using the inoperable air lock, to perform an allowed activity listed above. The administrative controls required consist of the stationing of a dedicated individual to assure closure of the OPERABLE door except during the entry and exit, and assuring the OPERABLE door is relocked after completion of the drywell entry and exit. This allowance is acceptable due to the low probability of an event that could pressurize the drywell during the short time that the OPERABLE door is expected to be open.

B.1, B.2, and B.3

With the drywell air lock interlock mechanism inoperable, the Required Actions and associated Completion Times consistent with Condition A are applicable.

The Required Actions are modified by two Notes. Note 1 ensures only the Required Actions and associated Completion Times of Condition C are required if both doors in the air lock are inoperable. Note 2 allows entry and exit into the

(continued)

BASES

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ACTIONS

B.1, B.2, and B.3 (continued)

drywell under the control of a dedicated individual stationed at the air lock to ensure that only one door is opened at a time.

C.1, C.2, and C.3

With the air lock inoperable for reasons other than those described in Condition A or B, Required Action C.1 requires action to be immediately initiated to evaluate drywell bypass leakage using current air lock test results. An evaluation is acceptable, since it is overly conservative to immediately declare the drywell inoperable if both doors in an air lock have failed a seal test or the overall air lock leakage is not within limits. In many instances (e.g., only one seal per door has failed), drywell remains OPERABLE, yet only 1 hour (per LCO 3.6.5.1) would be provided to restore the air lock door to OPERABLE status prior to requiring a plant shutdown. In addition, even with both doors failing the seal test, the overall drywell leakage rate can still be within limits.

Required Action C.2 requires that one door in the drywell air lock must be verified to be closed. This Required Action must be completed within the 1 hour Completion Time. This specified time period is consistent with the ACTIONS of LCO 3.6.5.1, which requires that the drywell be restored to OPERABLE status within 1 hour.

Additionally, the air lock must be restored to OPERABLE status within 24 hours. The 24 hour Completion Time is reasonable for restoring an inoperable air lock to OPERABLE status, considering that at least one door is maintained closed in the air lock.

D.1 and D.2

If the inoperable drywell air lock cannot be restored to OPERABLE status within the required Completion Time, 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 at least MODE 3 within 12 hours and to MODE 4 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

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(continued)

BASES (continued)

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SURVEILLANCE  
REQUIREMENTS

SR 3.6.5.2.1

This SR requires a test be performed to verify seal leakage of the drywell air lock doors at 3.0 psid. A seal leakage rate limit of  $\leq 4.05$  scfh has been established to ensure the integrity of the seals. The Surveillance is only required to be performed once within 72 hours after each closing. The Frequency of 72 hours is based on operating experience.

SR 3.6.5.2.2

Every 7 days the drywell air lock seal air flask pressure is verified to be  $\geq 75$  psig to ensure that the seal system remains viable. It must be checked because it could bleed down during or following access through the air lock, which occurs regularly. The 7 day Frequency has been shown to be acceptable, based on operating experience, and is considered adequate in view of the other indications to the plant operations personnel that the seal air flask pressure is low.

SR 3.6.5.2.3

The air lock door interlock is designed to prevent simultaneous opening of both doors in the air lock. Since both the inner and outer doors of the air lock are designed to withstand the maximum expected post accident drywell pressure, closure of either door will support drywell OPERABILITY. Thus, the door interlock feature supports drywell OPERABILITY while the air lock is being used for personnel transit in and out of the drywell. Periodic testing and preventive maintenance of this interlock demonstrates that the interlock will function as designed and that simultaneous inner and outer door opening will not inadvertently occur. Due to the nature of this interlock, and given that the interlock mechanism is only challenged when a drywell air lock door is opened, this test is only required to be performed once every 18 months. The 18 month Frequency is based on the need to perform this Surveillance under the reduced reactivity conditions that apply during a plant outage and the potential for violating the drywell boundary. Operating experience has shown these components usually pass the Surveillance when performed at the 18 month

(continued)

BASES

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SURVEILLANCE  
REQUIREMENTS

SR 3.6.5.2.3 (continued)

Frequency, which is based on the refueling cycle. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

The Surveillance is modified by a Note requiring the Surveillance to be performed only upon entry into the drywell.

SR 3.6.5.2.4

This SR requires a test to be performed to verify overall air lock leakage of the drywell air lock at 3.0 psid. The 18 month Frequency is based on the need to perform this Surveillance under the conditions that apply during a plant outage and the potential for violating the drywell boundary. Operating experience has shown these components usually pass the Surveillance when performed at the 18 month Frequency, which is based on the refueling cycle. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

This SR has been modified by two Notes. The first Note indicates that an inoperable air lock door does not invalidate the previous successful performance of an overall air lock leakage test. This is considered reasonable, since either air lock door is capable of providing a fission product barrier in the event of a DBA.

The Surveillance is modified by a Note requiring the air lock to be pressurized to 19.2 psid prior to performance of the overall air lock leakage test. The 19.2 psid differential pressure is the assumed peak drywell pressure expected from the accident analysis. Since the drywell pressure rapidly returns to a steady state maximum differential pressure of 3.0 psid (due to suppression pool vent clearing), the leakage is allowed to be measured at this pressure.

SR 3.6.5.2.5

This SR ensures that the drywell air lock seal pneumatic system pressure does not decay at an unacceptable rate. The air lock seal will support drywell OPERABILITY down to a pneumatic pressure of 75 psig. Since the air lock seal air

(continued)

BASES

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SURVEILLANCE  
REQUIREMENTS

SR 3.6.5.2.5 (continued)

flask pressure is verified in SR 3.6.5.2.2 to be  $\geq 75$  psig, a decay rate  $\leq 0.67$  psig over 24 hours is acceptable. The 24 hour interval is based on engineering judgment, considering that there is no postulated DBA where the drywell is still pressurized 24 hours after the event. The 18 month Frequency is based on the need to perform this Surveillance under the conditions that apply during a plant outage when the air lock OPERABILITY is not required. Operating experience has shown that these components usually pass the Surveillance when performed at the 18 month Frequency. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

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REFERENCES

1. 10 CFR 50, Appendix J.
  2. USAR, Chapters 6 and 15.
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## B 3.6 CONTAINMENT SYSTEMS

### B 3.6.5.3 Drywell Isolation Valves

#### BASES

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##### BACKGROUND

The drywell isolation valves, in combination with other accident mitigation systems, function to ensure that steam and water releases to the drywell are channeled to the suppression pool to maintain the pressure suppression function of the drywell.

The OPERABILITY requirements for drywell isolation valves help ensure that valves are closed, when required, and isolation occurs within the time limits specified for those isolation valves designed to close automatically. Therefore, the OPERABILITY requirements support minimizing drywell bypass leakage assumed in the safety analysis (Ref. 1) for a DBA. Typically, two barriers in series are provided for each penetration so that no credible single failure or malfunction of an active component can result in a loss of isolation. The isolation devices addressed by this LCO are either passive or active (automatic). Manual valves, de-activated automatic valves secured in their closed position, check valves with flow through the valve secured, and blind flanges are considered passive devices. Check valves and automatic valves designed to close without operator action following an accident, are considered active devices.

The Drywell Vent and Purge System is a high capacity system with a 24 inch line, which has isolation valves covered by this LCO. The system supplies filtered outside air directly to the drywell through two primary containment isolation valves (PCIVs) and two drywell isolation valves called drywell purge isolation valves. The drywell air is exhausted through a line also containing two drywell purge isolation valves via both divisions of the SGTs or a low volume purge through 1HVR-FLT6/FN14. 1HVR-FLT6/FN14 may also be used to recirculate the drywell atmosphere. The system is used to remove trace radioactive airborne products prior to personnel entry. The Drywell Vent and Purge System is not used in MODE 1, 2, or 3; therefore, the drywell purge isolation valves are sealed shut during power operation.

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(continued)

BASES

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BACKGROUND (continued)	The drywell purge isolation valves fail closed on loss of instrument air or power. The drywell purge isolation valves are fast closing valves (approximately 4 seconds).
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APPLICABLE SAFETY ANALYSES	This LCO is intended to ensure that releases from the core do not bypass the suppression pool so that the pressure suppression capability of the drywell is maintained. Therefore, as part of the drywell boundary, drywell isolation valve OPERABILITY minimizes drywell bypass leakage. Therefore, the safety analysis of any event requiring isolation of the drywell is applicable to this LCO.
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The limiting DBA resulting in a release of steam, water, or radioactive material within the drywell is a LOCA. In the analysis for this accident, it is assumed that drywell isolation valves either are closed or function to close within the required isolation time following event initiation.

The drywell isolation valves and drywell purge isolation valves satisfy Criterion 3 of the NRC Policy Statement.

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LCO	The drywell isolation valve safety function is to form a part of the drywell boundary.
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The power operated drywell isolation valves are required to have isolation times within limits. Power operated automatic drywell isolation valves are also required to actuate on an automatic isolation signal. Additionally, drywell purge valves are required to be closed.

The normally closed isolation valves or blind flanges are considered OPERABLE when, as applicable, manual valves are closed or opened in accordance with applicable administrative controls, automatic valves are de-activated and secured in their closed position, check valves with flow through the valve secured, or blind flanges are in place. The valves covered by this LCO are included (with their associated stroke time, if applicable, for automatic valves) in Reference 2.

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(continued)

BASES (continued)

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**APPLICABILITY** In MODES 1, 2, and 3, a DBA could cause a release of radioactive material to the primary containment. In MODES 4 and 5, the probability and consequences of these events are reduced due to the pressure and temperature limitations in these MODES. Therefore, the drywell isolation valves are not required to be OPERABLE in MODES 4 and 5.

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**ACTIONS** The ACTIONS are modified by four Notes. The first Note allows penetration flow paths, except for the 24 inch purge valve penetration flow paths, to be unisolated intermittently under administrative controls. These controls consist of stationing a dedicated operator, who is in continuous communication with the control room, at the controls of the valve. In this way, the penetration can be rapidly isolated when a need for drywell isolation is indicated.

The second Note provides clarification that for the purpose of this LCO separate Condition entry is allowed for each penetration flow path. This is acceptable, since the Required Actions for each Condition provide appropriate compensatory actions for each inoperable drywell isolation valve. Complying with the Required Actions may allow for continued operation, and subsequent inoperable drywell isolation valves are governed by subsequent Condition entry and application of associated Required Actions.

The third Note requires the OPERABILITY of affected systems to be evaluated when a drywell isolation valve is inoperable. This ensures appropriate remedial actions are taken, if necessary, if the affected system(s) are rendered inoperable by an inoperable drywell isolation valve.

The fourth Note ensures appropriate remedial actions are taken when the drywell bypass leakage limits are exceeded. Pursuant to LCO 3.0.6, these ACTIONS are not required even when the associated LCO is not met. Therefore, Notes 3 and 4 are added to require the proper actions are taken.

A.1 and A.2

With one or more penetration flow paths with one drywell isolation valve inoperable, the affected penetration flow path must be isolated. The method of isolation must include the use of at least one isolation barrier that cannot be adversely affected by a single active failure.

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(continued)

BASES

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ACTIONS

A.1 and A.2 (continued)

Isolation barriers that meet this criterion are a closed and de-activated automatic valve, a closed manual valve, a blind flange, and a check valve with flow through the valve secured. In this condition, the remaining OPERABLE drywell isolation valve is adequate to perform the isolation function. However, the overall reliability is reduced because a single failure in the OPERABLE drywell isolation valve could result in a loss of drywell isolation. The 8 hour Completion Time is acceptable, since if the drywell design bypass leakage  $A/\sqrt{k}$  of 1.0 ft<sup>2</sup> were exceeded, ACTIONS Note 4 will ensure appropriate conservative actions are implemented. In addition, the Completion Time is reasonable, considering the time required to isolate the penetration and the relative importance of supporting drywell OPERABILITY during MODES 1, 2, and 3.

For affected penetration flow paths that have been isolated in accordance with Required Action A.1, the affected penetrations must be verified to be isolated on a periodic basis. This is necessary to ensure that drywell penetrations that are required to be isolated following an accident, and are no longer capable of being automatically isolated, will be isolated should an event occur. This Required Action does not require any testing or device manipulation; rather, it involves verification that those devices outside drywell and capable of potentially being mispositioned are in the correct position. Since these devices are inside primary containment, the time period specified as "prior to entering MODE 2 or 3 from MODE 4, if not performed within the previous 92 days," is based on engineering judgment and is considered reasonable in view of the inaccessibility of the devices and other administrative controls that will ensure that misalignment is an unlikely possibility. Also, this Completion Time is consistent with the Completion Time specified for PCIVs in LCO 3.6.1.3, "Primary Containment Isolation Valves (PCIVs)."

Required Action A.2 is modified by a Note that applies to isolation devices located in high radiation areas and allows them to be verified by use of administrative controls. Allowing verification by administrative controls is considered acceptable, since access to these areas is typically restricted. Therefore, the probability of misalignment, once they have been verified to be in the proper position, is low.

(continued)

BASES

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ACTIONS  
(continued)

B.1

With one or more penetration flow paths with two drywell isolation valves inoperable, the affected penetration flow path must be isolated. 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 de-activated automatic valve, a closed manual valve, a blind flange, and a check valve with flow through the valve secured. The 4 hour Completion Time is acceptable, since if the drywell design bypass leakage  $A/\sqrt{k}$  of 1.0 ft<sup>2</sup> were exceeded, ACTIONS Note 4 will ensure appropriate conservative actions are implemented. The Completion Time is reasonable, considering the time required to isolate the penetration, and the probability of a DBA, which requires the drywell isolation valves to close, occurring during this short time is very low.

C.1 and C.2

If any Required Action and associated Completion Time cannot be 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 4 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

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SURVEILLANCE  
REQUIREMENTS

SR 3.6.5.3.1

Each 24 inch drywell purge isolation valve is required to be verified sealed closed at 31 day intervals. This Surveillance is required since the drywell purge isolation valves are not qualified to close under accident conditions. This SR is designed to ensure that a gross breach of drywell is not caused by an inadvertent or spurious drywell purge isolation valve opening. Detailed analysis of these 24 inch drywell purge valves failed to conclusively demonstrate their ability to close during a LOCA in time to support drywell OPERABILITY. Therefore, these valves are required to be in sealed closed position during MODES 1, 2, and 3. These 24 inch drywell purge valves that are sealed closed must have motive power to the valve operator removed. This

(continued)

BASES

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SURVEILLANCE  
REQUIREMENTS

SR 3.6.5.3.1 (continued)

can be accomplished by de-energizing the source of electric power or removing the air supply to the valve operator. In this application, the term "sealed" has no connotation of leakage within limits. The Frequency is based on purge valve use during unit operations.

SR 3.6.5.3.2

This SR ensures that the primary containment/drywell hydrogen mixing isolation valves are closed as required or, if open, open for an allowable reason for limited periods of time. This SR has been modified by a Note indicating the SR is not required to be met when the primary containment/drywell hydrogen mixing inlet or outlet valves are open for pressure control, ALARA or air quality considerations for personnel entry, or Surveillances or special testing of the hydrogen mixing system that require the valve to be open. The 31 day Frequency is consistent with the valve requirements discussed under SR 3.6.5.3.1.

SR 3.6.5.3.3

This SR requires verification that each drywell isolation manual valve and blind flange that is required to be closed during accident conditions is closed. The SR helps to ensure that drywell bypass leakage is maintained to a minimum. Due to the location of these devices, the Frequency specified as "prior to entering MODE 2 or 3 from MODE 4, if not performed in the previous 92 days," is appropriate because of the inaccessibility of the devices and because these devices are operated under administrative controls and the probability of their misalignment is low.

Two Notes are added to this SR. The first Note allows valves and blind flanges located in high radiation areas to be verified by use of administrative controls. Allowing verification by administrative controls is considered acceptable since access to these areas is typically restricted during MODES 1, 2, and 3. Therefore, the probability of misalignment of these devices, once they have been verified to be in their proper position, is low. A second Note is included to clarify that the drywell isolation valves that are open under administrative controls are not required to meet the SR during the time that the devices are open.

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(continued)

BASES

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SURVEILLANCE  
REQUIREMENTS  
(continued)

SR 3.6.5.3.4

Verifying that the isolation time of each power operated and each automatic drywell isolation valve is within limits is required to demonstrate OPERABILITY. The isolation time test ensures the valve will isolate in a time period less than or equal to that assumed in the safety analysis. The isolation time and Frequency of this SR are in accordance with the Inservice Testing Program.

SR 3.6.5.3.5

Verifying that each automatic drywell isolation valve closes on a drywell isolation signal is required to prevent bypass leakage from the drywell following a DBA. This SR ensures each automatic drywell isolation valve will actuate to its isolation position on a drywell isolation signal. The LOGIC SYSTEM FUNCTIONAL TEST in SR 3.3.6.1.6 overlaps this SR to provide complete testing of the safety function. The 18 month Frequency is based on the need to perform this Surveillance under the conditions that apply during a plant outage and the potential for an unplanned transient if the Surveillance were performed with the reactor at power, since isolation of penetrations would eliminate cooling water flow and disrupt the normal operation of many critical components. Operating experience has shown these components usually pass this Surveillance when performed at the 18 month Frequency. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

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REFERENCES

1. USAR, Section 6.2.4.
  2. USAR, Table 6.2-40.
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## B 3.6 CONTAINMENT SYSTEMS

### B 3.6.5.4 Drywell Pressure

#### BASES

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##### BACKGROUND

Drywell-to-primary containment differential pressure is an assumed initial condition in the analyses that determine the primary containment thermal hydraulic and dynamic loads during a postulated loss of coolant accident (LOCA).

If drywell pressure is less than the primary containment airspace pressure, the water level in the weir annulus will increase and, consequently, the liquid inertia above the top vent will increase. This will cause top vent clearing during a postulated LOCA to be delayed, and that would increase the peak drywell pressure. In addition, a negative drywell-to-primary containment differential pressure could result in overflow over the weir wall.

The limitation on negative drywell-to-primary containment differential pressure ensures that changes in calculated peak LOCA drywell pressures due to differences in water level of the suppression pool and the drywell weir annulus are negligible. The limitation on positive drywell-to-primary containment differential pressure helps ensure that the horizontal vents are not cleared with normal weir annulus water level.

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##### APPLICABLE SAFETY ANALYSES

Primary containment performance is evaluated for the entire spectrum of break sizes for postulated LOCAs. Among the inputs to the design basis analysis is the initial drywell internal pressure (Ref. 1). The initial drywell internal pressure affects the drywell pressure response to a LOCA (Ref. 1) and the suppression pool swell load definition (Ref. 2).

Additional analyses (Ref. 3) have been performed to show that if initial drywell pressure does not exceed the negative pressure limit, the suppression pool swell and vent clearing loads will not be significantly increased and the probability of weir wall overflow is minimized.

Drywell pressure satisfies Criterion 2 of the NRC Policy Statement.

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(continued)

BASES (continued)

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LCO                      A limitation on the drywell-to-primary containment differential pressure of  $\geq -0.3$  psid and  $\leq 1.2$  psid is required to ensure that suppression pool water is not forced over the weir wall, vent clearing does not occur during normal operation, containment conditions are consistent with the safety analyses, and LOCA drywell pressures and pool swell loads are within design values.

---

APPLICABILITY        In MODES 1, 2, and 3, a DBA could cause a release of radioactive material to the primary containment. In MODES 4 and 5, the probability and consequences of these events are reduced due to the pressure and temperature limitations of these MODES. Therefore, maintaining the drywell-to-primary containment differential pressure limitation is not required in MODE 4 or 5.

---

ACTIONS

A.1

With drywell-to-primary containment differential pressure not within the limits of the LCO, it must be restored within 1 hour. The Required Action is necessary to return operation to within the bounds of the safety analyses. The 1 hour Completion Time is consistent with the ACTIONS of LCO 3.6.5.1, "Drywell," which requires that the drywell be restored to OPERABLE status within 1 hour.

B.1 and B.2

If drywell-to-primary containment differential pressure cannot be restored to within limits within the required Completion Time, 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 at least MODE 3 within 12 hours and to MODE 4 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

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(continued)

BASES (continued)

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SURVEILLANCE  
REQUIREMENTS

SR 3.6.5.4.1

This SR provides assurance that the limitations on drywell-to-primary containment differential pressure stated in the LCO are met. The 12 hour Frequency of this SR was developed, based on operating experience related to trending of drywell pressure variations during the applicable MODES and to assessing proximity to the specified LCO differential pressure limits. Furthermore, the 12 hour Frequency is considered adequate in view of other indications available in the control room, including alarms, to alert the operator to an abnormal drywell pressure condition.

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REFERENCES

1. USAR, Section 6.2.1.
  2. USAR, Section 3.8.
  3. USAR, Section 6.2.1.1.3.
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## B 3.6 CONTAINMENT SYSTEMS

### B 3.6.5.5 Drywell Air Temperature

#### BASES

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##### BACKGROUND

The drywell contains the reactor vessel and piping, which add heat to the airspace. Drywell coolers remove heat and maintain a suitable environment. The drywell average air temperature affects equipment OPERABILITY, personnel access, and the calculated response to postulated Design Basis Accidents (DBAs). The limitation on drywell average air temperature ensures that the peak drywell temperature during a design basis loss of coolant accident (LOCA) does not exceed the design temperature of 330°F. The limiting DBA for drywell atmosphere temperature is a small steam line break, assuming no heat transfer to the passive steel and concrete heat sinks in the drywell.

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##### APPLICABLE SAFETY ANALYSES

Primary containment performance for the DBA is evaluated for the entire spectrum of break sizes for postulated LOCAs inside containment (Ref. 1). Among the inputs to the design basis analysis is the initial drywell average air temperature. Increasing the initial drywell average air temperature could change the calculated results of the design bases analysis. The safety analyses (Ref. 1) assume an initial average drywell air temperature of 145°F. This limitation ensures that the safety analyses remain valid by maintaining the expected initial conditions and ensures that the peak LOCA drywell temperature does not exceed the maximum allowable temperature of 330°F. The consequence of exceeding this design temperature may result in the degradation of the drywell structure under accident loads. Equipment inside the drywell that is required to mitigate the effects of a DBA is designed and qualified to operate under environmental conditions expected for the accident.

Drywell average air temperature satisfies Criterion 2 of the NRC Policy Statement.

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##### LCO

If the initial drywell average air temperature is less than or equal to the LCO temperature limit, the peak accident temperature can be maintained below the drywell design

(continued)

BASES

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LCO  
(continued)      temperature during a DBA. This ensures the ability of the drywell to perform its design function.

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APPLICABILITY      In MODES 1, 2, and 3, a DBA could cause a release of radioactive material to the primary containment. In MODES 4 and 5, the probability and consequences of these events are reduced due to the pressure and temperature limitations of these MODES. Therefore, maintaining drywell average air temperature within the limit is not required in MODE 4 or 5.

---

ACTIONS

A.1

When the drywell average air temperature is not within the limit of the LCO, it must be restored within 8 hours. The Required Action is necessary to return operation to within the bounds of the safety analyses. The 8 hour Completion Time is acceptable, considering the sensitivity of the analyses to variations in this parameter, and provides sufficient time to correct minor problems.

B.1 and B.2

If drywell average air temperature cannot be restored to within limit within the associated Completion Time, 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 at least MODE 3 within 12 hours and to MODE 4 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

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SURVEILLANCE  
REQUIREMENTS

SR 3.6.5.5.1

Verifying that the drywell average air temperature is within the LCO limit ensures that operation remains within the limits assumed for the drywell analysis. Drywell air temperature is monitored in all quadrants and at various elevations. Since the measurements are uniformly

(continued)

BASES

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SURVEILLANCE  
REQUIREMENTS

SR 3.6.5.5.1 (continued)

distributed, an arithmetic average is an accurate representation of actual drywell average temperature.

The 24 hour Frequency of the SR was developed based on operating experience related to variations in drywell average air temperature variations during the applicable MODES. Furthermore, the 24 hour Frequency is considered adequate in view of other indications available in the control room, including alarms, to alert the operator to an abnormal drywell air temperature condition.

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REFERENCES

1. USAR, Section 6.2.
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BASES

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APPLICABLE  
SAFETY ANALYSES  
(continued)

and 15 (Refs. 3 and 4, respectively). The isolation mode of the CRFA System is assumed to operate following a loss of coolant accident, main steam line break, fuel handling accident involving handling recently irradiated fuel (i.e., fuel that has occupied part of a critical reactor core within the previous 11 days), and control rod drop accident. The radiological doses to control room personnel as a result of the various DBAs are summarized in Reference 4. No single active or passive failure will cause the loss of outside or recirculated air from the control room.

The CRFA System satisfies Criterion 3 of the NRC Policy Statement.

---

LCO

Two redundant subsystems of the CRFA System are required to be OPERABLE to ensure that at least one is available, assuming a single failure disables the other subsystem. Total system failure could result in a failure to meet the dose requirements of GDC 19 in the event of a DBA.

The CRFA System is considered OPERABLE when the individual components necessary to control operator exposure are OPERABLE in both subsystems. A subsystem is considered OPERABLE when its associated:

- a. Fan is OPERABLE;
- b. HEPA filter and charcoal adsorber are not excessively restricting flow and are capable of performing their filtration functions; and
- c. Heater, demister, ductwork, valves, and dampers are OPERABLE, and air circulation can be maintained.

In addition, the control room boundary must be maintained, including the integrity of the walls, floors, ceilings, ductwork, and access doors.

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APPLICABILITY

In MODES 1, 2, and 3, the CRFA System must be OPERABLE to control operator exposure during and following a DBA, since the DBA could lead to a fission product release.

In MODES 4 and 5, the probability and consequences of a DBA are reduced due to the pressure and temperature limitations in these MODES. Therefore, maintaining the CRFA System

(continued)

BASES

APPLICABILITY  
(continued)

OPERABLE is not required in MODE 4 or 5, except for the following situations under which significant radioactive releases can be postulated:

- a. During operations with a potential for draining the reactor vessel (OPDRVs); and
- ~~b. During CORE ALTERATIONS; and~~
- eb. During movement of recently irradiated fuel assemblies in the primary or secondary containment. Due to radioactive decay, the CRFA System is only required to be OPERABLE during fuel handling involving handling recently irradiated fuel (i.e., fuel that has occupied part of a critical reactor core within the previous 11 days).

ACTIONS

A.1

With one CRFA subsystem inoperable, the inoperable CRFA subsystem must be restored to OPERABLE status within 7 days. With the unit in this condition, the remaining OPERABLE CRFA subsystem is adequate to perform control room radiation protection. However, the overall reliability is reduced because a single failure in the OPERABLE subsystem could result in loss of CRFA System function. The 7 day Completion Time is based on the low probability of a DBA occurring during this time period, and that the remaining subsystem can provide the required capabilities.

B.1 and B.2

In MODE 1, 2, or 3, if the inoperable CRFA subsystem cannot be restored to OPERABLE status within the associated Completion Time, the unit must be placed in a MODE that minimizes risk. To achieve this status, the unit must be placed in at least MODE 3 within 12 hours and in MODE 4 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems.

(continued)

BASES

ACTIONS  
(continued)

C.1, C.2.1, and C.2.2, and ~~C.2.3~~

The Required Actions of Condition C are modified by a Note indicating that LCO 3.0.3 does not apply. If moving ~~recently~~ irradiated fuel assemblies while in MODE 1, 2, or 3, the fuel movement is independent of reactor operations. Therefore, inability to suspend movement of ~~recently~~ irradiated fuel assemblies is not sufficient reason to require a reactor shutdown.

During movement of ~~recently~~ irradiated fuel assemblies in the primary or secondary containment, ~~during CORE ALTERATIONS~~, or during OPDRVs, if the inoperable CRFA subsystem cannot be restored to OPERABLE status within the required Completion Time, the OPERABLE CRFA subsystem may be placed in the emergency mode. This action ensures that the remaining subsystem is OPERABLE, that no failures that would prevent automatic actuation will occur, and that any active failure will be readily detected.

An alternative to Required Action C.1 is to immediately suspend activities that present a potential for releasing radioactivity that might require isolation of the control room. This places the unit in a condition that minimizes risk.

If applicable, ~~CORE ALTERATIONS~~ and movement of ~~recently~~ irradiated fuel assemblies in the primary and secondary containment must be suspended immediately. Suspension of these activities shall not preclude completion of movement of a component to a safe position. Also, if applicable, actions must be initiated immediately to suspend OPDRVs to minimize the probability of a vessel draindown and subsequent potential for fission product release. Actions must continue until the OPDRVs are suspended.

D.1

If both CRFA subsystems are inoperable in MODE 1, 2, or 3, the CRFA System may not be capable of performing the intended function and the unit is in a condition outside of the accident analyses. Therefore, LCO 3.0.3 must be entered immediately.

(continued)

BASES

ACTIONS  
(continued)

E.1, and E.2, and E.3

During movement of recently irradiated fuel assemblies in the primary or secondary containment, ~~during CORE ALTERATIONS~~, or during OPDRVs, with two CRFA subsystems inoperable, action must be taken immediately to suspend activities that present a potential for releasing radioactivity that might require isolation of the control room. This places the unit in a condition that minimizes risk.

If applicable, ~~CORE ALTERATIONS~~ and movement of recently irradiated fuel assemblies in the primary and secondary containment must be suspended immediately. Suspension of these activities shall not preclude completion of movement of a component to a safe position. If applicable, actions must be initiated immediately to suspend OPDRVs to minimize the probability of a vessel draindown and subsequent potential for fission product release. Actions must continue until the OPDRVs are suspended.

SURVEILLANCE  
REQUIREMENTS

SR 3.7.2.1

This SR verifies that a subsystem in a standby mode starts on demand and continues to operate. Standby systems should be checked periodically to ensure that they start and function properly. As the environmental and normal operating conditions of this system are not severe, testing each subsystem once every month provides an adequate check on this system. Monthly heater operation dries out any moisture accumulated in the charcoal from humidity in the ambient air. Systems with heaters must be operated for  $\geq 10$  continuous hours with the heaters energized to demonstrate the function of the system. Furthermore, the 31 day Frequency is based on the known reliability of the equipment and the two subsystem redundancy available.

(continued)

BASES (continued)

LCO

Two independent and redundant subsystems of the Control Room AC System are required to be OPERABLE to ensure that at least one is available, assuming a single failure disables the other subsystem. Total system failure could result in the equipment operating temperature exceeding limits.

The Control Room AC System is considered OPERABLE when the individual components necessary to maintain the control room temperature are OPERABLE in both subsystems. These components include the cooling coils, fans, chillers, compressors, ductwork, dampers, and associated instrumentation and controls. The heating coils are not required for Control Room AC OPERABILITY.

APPLICABILITY

In MODE 1, 2, or 3, the Control Room AC System must be OPERABLE to ensure that the control room temperature will not exceed equipment OPERABILITY limits.

In MODES 4 and 5, the probability and consequences of a Design Basis Accident are reduced due to the pressure and temperature limitations in these MODES. Therefore, maintaining the Control Room AC System OPERABLE is not required in MODE 4 or 5, except for the following situations under which significant radioactive releases can be postulated:

- a. During operations with a potential for draining the reactor vessel (OPDRVs); and
- b. ~~During CORE ALTERATIONS; and~~
- eb. During movement of recently irradiated fuel assemblies in the primary or secondary containment. Due to radioactive decay, the Control Room AC System is only required to be OPERABLE during fuel handling involving handling recently irradiated fuel (i.e., fuel that has occupied part of a critical reactor core within the previous 11 days).

ACTIONS

A.1

With one control room AC subsystem inoperable, the inoperable control room AC subsystem must be restored to OPERABLE status within 30 days. With the unit in this condition, the remaining OPERABLE control room AC subsystem

(continued)

BASES

ACTIONS

A.1 (continued)

is adequate to perform the control room air conditioning function. However, the overall reliability is reduced because a single failure in the OPERABLE subsystem could result in loss of the control room air conditioning function. The 30 day Completion Time is based on the low probability of an event occurring requiring control room isolation, the consideration that the remaining subsystem can provide the required protection, and the availability of alternate cooling methods.

B.1 and B.2

If both control room AC subsystems are inoperable, the Control Room AC System may not be capable of performing its intended function. Therefore, the control room area temperature is required to be monitored once per 4 hours to ensure that temperature is being maintained low enough that equipment in the control room is not adversely affected. With the control room temperature being maintained within the temperature limit, 7 days is allowed to restore a control room AC subsystem to OPERABLE status. These Completion Times are reasonable considering that the control room temperature is being maintained within limits, the low probability of an event occurring requiring control room isolation, and the availability of alternate cooling methods.

C.1 and C.2

In MODE 1, 2, or 3, if the control room area temperature cannot be maintained  $\leq 104^{\circ}\text{F}$  or if the inoperable control room AC subsystem cannot be restored to OPERABLE status within the associated Completion Time, the unit must be placed in a MODE that minimizes risk. To achieve this status the unit must be placed in at least MODE 3 within 12 hours and in MODE 4 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems.

(continued)

BASES

ACTIONS  
(continued)

D.1, D.2.1, and D.2.2, and D.2.3

The Required Actions of Condition C are modified by a Note indicating that LCO 3.0.3 does not apply.

If moving recently irradiated fuel assemblies while in MODE 1, 2, or 3, the fuel movement is independent of reactor operations. Therefore, inability to suspend movement of recently irradiated fuel assemblies is not sufficient reason to require a reactor shutdown.

During movement of recently irradiated fuel assemblies in the primary or secondary containment, ~~during CORE ALTERATIONS~~, or during OPDRVs, if Required Action A.1 cannot be completed within the required Completion Time, the OPERABLE control room AC subsystem may be placed immediately in operation. This action ensures that the remaining subsystem is OPERABLE, that no failures that would prevent actuation will occur, and that any active failure will be readily detected.

An alternative to Required Action D.1 is to immediately suspend activities that present a potential for releasing radioactivity that might require isolation of the control room. This places the unit in a condition that minimizes risk.

If applicable, ~~CORE ALTERATIONS~~ and movement of recently irradiated fuel assemblies in the primary and secondary containment must be suspended immediately. Suspension of these activities shall not preclude completion of movement of a component to a safe position. Also, if applicable, actions must be initiated immediately to suspend OPDRVs to minimize the probability of a vessel draindown and subsequent potential for fission product release. Actions must continue until the OPDRVs are suspended.

E.1, and E.2, and E.3

During movement of recently irradiated fuel assemblies in the primary or secondary containment, ~~during CORE ALTERATIONS~~, or during OPDRVs if the Required Action and associated Completion Time of Condition B is not met, action must be taken to immediately suspend activities that present a potential for releasing radioactivity that might require

(continued)

BASES

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ACTIONS

E.1~~r~~ and E.2~~r~~ and E.3 (continued)

isolation of the control room. This places the unit in a condition that minimizes risk.

If applicable, ~~CORE ALTERATIONS~~ and handling of recently irradiated fuel in the primary or secondary containment must be suspended immediately. Suspension of these activities shall not preclude completion of movement of a component to a safe position. Also, if applicable, actions must be initiated immediately to suspend OPDRVs to minimize the probability of a vessel draindown and subsequent potential for fission product release. Actions must continue until the OPDRVs are suspended.

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SURVEILLANCE  
REQUIREMENTS

SR 3.7.3.1

This SR verifies that the heat removal capability of the system is sufficient to remove the control room heat load assumed in the safety analysis. The SR consists of a combination of testing and calculation. The 18 month Frequency is appropriate since significant degradation of the Control Room AC System is not expected over this time period.

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REFERENCES

1. USAR, Section 6.4.
  2. USAR, Section 9.4.1.
  3. USAR, Chapter 15
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## B 3.8 ELECTRICAL POWER SYSTEMS

### B 3.8.2 AC Sources—Shutdown

#### BASES

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BACKGROUND	A description of the AC sources is provided in the Bases for LCO 3.8.1, "AC Sources—Operating."
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APPLICABLE SAFETY ANALYSES	<p>The OPERABILITY of the minimum AC sources during MODES 4 and 5 and during movement of recently irradiated fuel assemblies in the primary containment or fuel building ensures that:</p> <ul style="list-style-type: none"><li>a. The unit can be maintained in the shutdown or refueling condition for extended periods;</li><li>b. Sufficient instrumentation and control capability is available for monitoring and maintaining the unit status; and</li><li>c. Adequate AC electrical power is provided to mitigate events postulated during shutdown, such as an inadvertent draindown of the vessel or a fuel handling accident involving handling recently irradiated fuel. Due to radioactive decay, AC electrical power is only required to mitigate fuel handling accidents involving handling recently irradiated fuel (i.e., fuel that has occupied part of a critical reactor core within the previous 11 days).</li></ul>
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In general, when the unit is shut down the Technical Specifications (TS) requirements ensure that the unit has the capability to mitigate the consequences of postulated accidents. However, assuming a single failure and concurrent loss of all offsite or loss of all onsite power is not required. The rationale for this is based on the fact that many Design Basis Accidents (DBAs) that are analyzed in MODES 1, 2, and 3 have no specific analyses in MODES 4 and 5. Worst case bounding events are deemed not credible in MODES 4 and 5 because the energy contained within the reactor pressure boundary, reactor coolant temperature and pressure, and the corresponding stresses result in the probabilities of occurrence significantly reduced or eliminated, and minimal consequences. These deviations from DBA analysis assumptions and design

(continued)

BASES

APPLICABLE  
SAFETY ANALYSES  
(continued)

requirements during shutdown conditions are allowed by the LCOs for required systems.

During MODES 1, 2, and 3, various deviations from the analysis assumptions and design requirements are allowed within the ACTIONS. This allowance is in recognition that certain testing and maintenance activities must be conducted provided an acceptable level of risk is not exceeded. During MODES 4 and 5, performance of a significant number of required testing and maintenance activities is also required. In MODES 4 and 5, the activities are generally planned and administratively controlled. Relaxations from typical MODE 1, 2, and 3 LCO requirements are acceptable during shutdown MODES based on:

- a. The fact that time in an outage is limited. This is a risk prudent goal as well as utility economic consideration.
- b. Requiring appropriate compensatory measures for certain conditions. These may include administrative controls, reliance on systems that do not necessarily meet typical design requirements applied to systems credited in operating MODE analyses, or both.
- c. Prudent utility consideration of the risk associated with multiple activities that could affect multiple systems.
- d. Maintaining, to the extent practical, the ability to perform required functions (even if not meeting MODE 1, 2, and 3 OPERABILITY requirements) with systems assumed to function during an event.

In the event of an accident during shutdown, this LCO ensures the capability of supporting systems necessary to avoid immediate difficulty, assuming either a loss of all offsite power or a loss of all onsite (diesel generator (DG)) power.

The AC sources satisfy Criterion 3 of the NRC Policy Statement.

LCO

One offsite circuit supplying onsite Class 1E power distribution subsystem(s) of LCO 3.8.8, "Distribution Systems—Shutdown," ensures that all required loads are

(continued)

BASES

LCO  
(continued)

powered from offsite power. An OPERABLE DG, associated with a Division I or Division II Distribution System Engineered Safety Feature (ESF) bus required OPERABLE by LCO 3.8.10, ensures a diverse power source is available to provide electrical power support, assuming a loss of the offsite circuit. Similarly, when the high pressure core spray (HPCS) is required to be OPERABLE, a separate offsite circuit to the Division III Class 1E onsite electrical power distribution subsystem, or an OPERABLE Division III DG, ensure an additional source of power for the HPCS. This additional source for Division III is not necessarily required to be connected to be OPERABLE. Either the circuit required by LCO Item a, or a circuit required to meet LCO Item c may be connected, with the second source available for connection. Together, OPERABILITY of the required offsite circuit(s) and DG(s) ensure the availability of sufficient AC sources to operate the plant in a safe manner and to mitigate the consequences of postulated events during shutdown (e.g., fuel handling accidents involving handling recently irradiated fuel, reactor vessel draindown).

The qualified offsite circuit(s) must be capable of maintaining rated frequency and voltage while connected to their respective ESF bus(es), and accepting required loads during an accident. Qualified offsite circuits are those that are described in the USAR and are part of the licensing basis for the plant. The offsite circuit consists of incoming breaker and disconnect to the respective preferred station service transformers 1C and 1D, the 1C and 1D preferred station service transformers, and the respective circuit path including feeder breakers to all 4.16 kV ESF buses required by LCO 3.8.10.

The required DG must be capable of starting, accelerating to rated speed and voltage, and connecting to its respective ESF bus on detection of bus undervoltage, and accepting required loads. This sequence must be accomplished within 10 seconds for DG 1A and DG 1B and 13 seconds for DG 1C. Each DG must also be capable of accepting required loads within the assumed loading sequence intervals, and must continue to operate until offsite power can be restored to the ESF buses. These capabilities are required to be met from a variety of initial conditions such as: DG in standby with the engine hot and DG in standby with the engine at ambient conditions. Additional DG capabilities must be demonstrated to meet required Surveillance, e.g., capability

(continued)

BASES

LCO  
(continued)

of the DG to revert to standby status on an ECCS signal while operating in parallel test mode.

Proper sequencing of loads, including tripping of nonessential loads, is a required function for DG OPERABILITY. In addition, proper load sequence operation is an integral part of offsite circuit and DG OPERABILITY since its inoperability impacts the ability to start and maintain energized any loads required OPERABLE by LCO 3.8.10.

It is acceptable for divisions to be cross tied during shutdown conditions, permitting a single offsite power circuit to supply all required AC electrical power distribution subsystems.

As described in Applicable Safety Analyses, in the event of an accident during shutdown, the TS are designed to maintain the plant in a condition such that, even with a single failure, the plant will not be in immediate difficulty.

APPLICABILITY

The AC sources required to be OPERABLE in MODES 4 and 5 and during movement of recently irradiated fuel assemblies (i.e., fuel that has occupied part of a critical reactor core within the previous 11 days) in the primary containment or fuel building provide assurance that:

- a. Systems to provide adequate coolant inventory makeup are available for the irradiated fuel in the core in case of an inadvertent draindown of the reactor vessel;
- b. Systems needed to mitigate a fuel handling accident involving recently irradiated fuel are available;
- c. Systems necessary to mitigate the effects of events that can lead to core damage during shutdown are available; and
- d. Instrumentation and control capability is available for monitoring and maintaining the unit in a cold shutdown condition or refueling condition.

The AC power requirements for MODES 1, 2, and 3 are covered in LCO 3.8.1.

(continued)

BASES (continued)

ACTIONS

The ACTIONS are modified by a Note indicating that LCO 3.0.3 does not apply. If moving recently irradiated fuel assemblies while in MON. 1, 2, or 3, the fuel movement is independent of reactor operations. Therefore, inability to suspend movement of recently irradiated fuel assemblies is not sufficient reason to require reactor shutdown.

A.1

An offsite circuit is considered inoperable if it is not available to one required ESF division. If two or more ESF 4.16 kV buses are required per LCO 3.8.10, division(s) with offsite power available may be capable of supporting sufficient required features to allow continuation of CORE ALTERATIONS, fuel movement, and operations with a potential for draining the reactor vessel. By the allowance of the option to declare required features inoperable which are not powered from offsite power, appropriate restrictions can be implemented in accordance with the required feature(s) LCOs' ACTIONS. Required features remaining powered from offsite power (even though that circuit may be inoperable due to failing to power other features) are not declared inoperable by this Required Action.

A.2.1, A.2.2, A.2.3, A.2.4, B.1, B.2, B.3, and B.4

With the offsite circuit not available to all required divisions, the option still exists to declare all required features inoperable. Since this option may involve undesired administrative efforts, the allowance for sufficiently conservative actions is made. With the required DG inoperable, the minimum required diversity of AC power sources is not available. It is, therefore, required to suspend CORE ALTERATIONS, movement of recently irradiated fuel assemblies in the primary containment or fuel building, and activities that could potentially result in inadvertent draining of the reactor vessel.

Suspension of these activities shall not preclude completion of actions to establish a safe conservative condition. These actions minimize probability of the occurrence of postulated events. It is further required to initiate action immediately to restore the required AC sources and to continue this action until restoration is accomplished in order to provide the necessary AC power to the plant safety systems.

(continued)

BASES

ACTIONS

A.2.1, A.2.2, A.2.3, A.2.4, B.1, B.2, B.3, and B.4  
(continued)

The Completion Time of immediately is consistent with the required times for actions requiring prompt attention. The restoration of the required AC electrical power sources should be completed as quickly as possible in order to minimize the time during which the plant safety systems may be without sufficient power.

Pursuant to LCO 3.0.6, the Distribution System ACTIONS are not entered even if all AC sources to it are inoperable, resulting in de-energization. Therefore, the Required Actions of Condition A have been modified by a Note to indicate that when Condition A is entered with no AC power to any required ESF bus, ACTIONS for LCO 3.8.10 must be immediately entered. This Note allows Condition A to provide requirements for the loss of the offsite circuit whether or not a division is de-energized. LCO 3.8.10 provides the appropriate restrictions for the situation involving a de-energized division.

C.1

When the HPCS is required to be OPERABLE, and the additional required Division III AC source is inoperable, the required diversity of AC power sources to the HPCS is not available. Since these sources only affect the HPCS, the HPCS is declared inoperable and the Required Actions of the affected Emergency Core Cooling Systems LCO entered.

In the event all sources of power to Division III are lost, Condition A will also be entered and direct that the ACTIONS of LCO 3.8.10 be taken. If only the Division III additional required AC source is inoperable, and power is still supplied to HPCS, 72 hours is allowed to restore the additional required AC source to OPERABLE. This is reasonable considering HPCS will still perform its function, absent an additional single failure.

SURVEILLANCE  
REQUIREMENTS

SR 3.8.2.1

SR 3.8.2.1 requires the SRs from LCO 3.8.1 that are necessary for ensuring the OPERABILITY of the AC sources in

(continued)

BASES

SURVEILLANCE  
REQUIREMENTS

SR 3.8.2.1 (continued)

other than MODES 1, 2, and 3. SR 3.8.1.7 is not required to be met since only one offsite circuit is required to be OPERABLE. SR 3.8.1.16 is not required to be met because the required OPERABLE DG(s) is not required to undergo periods of being synchronized to the offsite circuit. SR 3.8.1.19 is excepted because starting independence is not required with the DG(s) that is not required to be OPERABLE. Refer to the corresponding Basis for LCO 3.8.1 for a discussion of each SR.

This SR is modified by a Note. The reason for the Note is to preclude requiring the OPERABLE DG(s) from being paralleled with the offsite power network or otherwise rendered inoperable during the performance of SRs, and preclude de-energizing a required 4.16 KV ESF bus or disconnecting a required offsite circuit during performance of SRs. With limited AC sources available, a single event could compromise both the required circuit and the DG. It is the intent that these SRs must still be capable of being met, but actual performance is not required during periods when the DG is required to be OPERABLE.

REFERENCES

None.

## B 3.8 ELECTRICAL POWER SYSTEMS

### B 3.8.5 DC Sources—Shutdown

#### BASES

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BACKGROUND	A description of the DC sources is provided in the Bases for LCO 3.8.4, "DC Sources—Operating."
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APPLICABLE SAFETY ANALYSES	<p>The initial conditions of Design Basis Accident and transient analyses in the USAR, Chapter 6 (Ref. 1) and Chapter 15 (Ref. 2), assume that Engineered Safety Feature systems are OPERABLE. The DC electrical power system provides normal and emergency DC electrical power for the diesel generators, emergency auxiliaries, and control and switching during all MODES of operation.</p> <p>The OPERABILITY of the DC subsystems is consistent with the initial assumptions of the accident analysis and the requirements for the supported systems' OPERABILITY.</p> <p>The OPERABILITY of the minimum DC electrical power sources during MODES 4 and 5 and during movement of recently irradiated fuel assemblies in the primary containment or fuel building ensures that:</p> <ul style="list-style-type: none"><li>a. The facility can be maintained in the shutdown or refueling condition for extended periods;</li><li>b. Sufficient instrumentation and control capability is available for monitoring and maintaining the unit status; and</li><li>c. Adequate DC electrical power is provided to mitigate events postulated during shutdown, such as an inadvertent draindown of the vessel or a fuel handling accident involving handling recently irradiated fuel. Due to radioactive decay, DC electrical power is only required to mitigate fuel handling accidents involving handling recently irradiated fuel (i.e., fuel that has occupied part of a critical reactor core within the previous 11 days).</li></ul> <p>The DC sources satisfy Criterion 3 of the NRC Policy Statement.</p>
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(continued)

BASES (continued)

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LCO

One DC electrical power subsystem consisting of one battery, one battery charger, and the corresponding control equipment and interconnecting cabling supplying power to the associated bus within the division, associated with Division I or II onsite Class 1E DC electrical power distribution subsystem(s) required by LCO 3.8.10, "Distribution Systems-Shutdown" is required to be OPERABLE. Similarly, when the High Pressure Core Spray (HPCS) system is required to be OPERABLE, the Division III DC electrical power subsystem associated with the Division III onsite Class 1E DC electrical power distribution subsystem required to be OPERABLE by LCO 3.8.10 is required to be OPERABLE. In addition to the preceding subsystems required to be OPERABLE, a Class 1E battery or battery charger and the associated control equipment and interconnecting cabling capable of supplying power to the remaining Division I or II onsite Class 1E DC electrical power distribution subsystem(s), when portions of both Division I and II DC electrical power distribution subsystems are required to be OPERABLE by LCO 3.8.10. This ensures the availability of sufficient DC electrical power sources to operate the unit in a safe manner and to mitigate the consequences of postulated events during shutdown (e.g., fuel handling accidents involving recently irradiated fuel and inadvertent reactor vessel draindown).

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APPLICABILITY

The DC electrical power sources required to be OPERABLE in MODES 4 and 5 and during movement of recently irradiated fuel assemblies in the primary containment or fuel building provide assurance that:

- a. Required features to provide adequate coolant inventory makeup are available for the irradiated fuel assemblies in the core in case of an inadvertent draindown of the reactor vessel;
- b. Required features needed to mitigate a fuel handling accident involving recently irradiated fuel are available (Due to radioactive decay, DC electrical power is only required to mitigate fuel handling accidents involving handling fuel that has occupied part of a critical reactor core within the previous 11 days);

(continued)

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BASES

APPLICABILITY  
(continued)

- c. Required features necessary to mitigate the effects of events that can lead to core damage during shutdown are available; and
- d. Instrumentation and control capability is available for monitoring and maintaining the unit in a cold shutdown condition or refueling condition.

The DC electrical power requirements for MODES 1, 2, and 3 are covered in LCO 3.8.4.

ACTIONS

The ACTIONS are modified by a Note indicating that LCO 3.0.3 does not apply. If moving irradiated fuel assemblies while in MODE 1, 2, or 3, the fuel movement is independent of reactor operations. Therefore, inability to suspend movement of irradiated fuel assemblies is not sufficient reason to require reactor shutdown.

A.1, A.2.1, A.2.2, A.2.3, and A.2.4

If more than one DC distribution subsystem is required according to LCO 3.8.10, the DC subsystems remaining OPERABLE with one or more DC power sources inoperable may be capable of supporting sufficient required features to allow continuation of CORE ALTERATIONS, fuel movement involving recently irradiated fuel, and operations with a potential for draining the reactor vessel. By allowing the option to declare required features inoperable with associated DC power source(s) inoperable, appropriate restrictions are implemented in accordance with the affected system LCOs' ACTIONS. In many instances this option may involve undesired administrative efforts. Therefore, the allowance for sufficiently conservative actions is made (i.e., to suspend CORE ALTERATIONS, movement of recently irradiated fuel assemblies, and any activities that could result in inadvertent draining of the reactor vessel).

Suspension of these activities shall not preclude completion of actions to establish a safe conservative condition. These actions minimize the probability of the occurrence of postulated events. It is further required to immediately initiate action to restore the required DC electrical power subsystems and to continue this action until restoration is

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BASES

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ACTIONS (continued)	accomplished in order to provide the necessary DC electrical power to the plant safety systems.
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The Completion Time of immediately is consistent with the required times for actions requiring prompt attention. The restoration of the required DC electrical power subsystems should be completed as quickly as possible in order to minimize the time during which the plant safety systems may be without sufficient power.

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SURVEILLANCE  
REQUIREMENTS

SR 3.8.5.1

SR 3.8.5.1 requires performance of all Surveillances required by SR 3.8.4.1 through SR 3.8.4.8. Therefore, see the corresponding Bases for LCO 3.8.4 for a discussion of each SR.

This SR is modified by a Note. The reason for the Note is to preclude requiring the OPERABLE DC sources from being discharged below their capability to provide the required power supply or otherwise rendered inoperable during the performance of SRs. It is the intent that these SRs must still be capable of being met, but actual performance is not required.

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REFERENCES

1. USAR, Chapter 6.
  2. USAR, Chapter 15.
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## B 3.8 ELECTRICAL POWER SYSTEMS

### B 3.8.8 Inverters—Shutdown

#### BASES

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BACKGROUND	A description of the inverters is provided in the Bases for LCO 3.8.7, "Inverters—Operating."
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APPLICABLE SAFETY ANALYSES	<p>The initial conditions of Design Basis Accident (DBA) and transient accident analyses in the USAR, Chapter 6 (Ref. 1) and Chapter 15 (Ref. 2), assume Engineered Safety Feature systems are OPERABLE. The DC to AC inverters are designed to provide the required capacity, capability, redundancy, and reliability to ensure the availability of necessary power to the Reactor Protection System and Emergency Core Cooling Systems instrumentation and controls so that the fuel, Reactor Coolant System, and containment design limits are not exceeded.</p> <p>The OPERABILITY of the inverters is consistent with the initial assumptions of the accident analyses and the requirements for the supported systems' OPERABILITY.</p> <p>The OPERABILITY of the minimum inverters to each AC vital bus during MODES 4 and 5, and during movement of recently irradiated fuel assemblies in the primary containment or fuel building ensures that:</p> <ol style="list-style-type: none"><li>a. The facility can be maintained in the shutdown or refueling condition for extended periods;</li><li>b. Sufficient instrumentation and control capability are available for monitoring and maintaining the unit status; and</li><li>c. Adequate power is available to mitigate events postulated during shutdown, such as an inadvertent draindown of the vessel or a fuel handling accident involving handling recently irradiated fuel. Due to radioactive decay, AC and DC electrical power is only required to mitigate fuel handling accidents involving handling recently irradiated fuel (i.e., fuel that has occupied part of a critical reactor core within the previous 11 days).</li></ol>
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(continued)

BASES

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APPLICABLE SAFETY ANALYSES (continued)	The inverters were previously identified as part of the Distribution System and, as such, satisfy Criterion 3 of the NRC Policy Statement.
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LCO	The inverters ensure the availability of electrical power for the instrumentation for systems required to shut down the reactor and maintain it in a safe condition after an anticipated operational occurrence or postulated DBA. The battery powered inverters provide uninterruptible supply of AC electrical power to the AC vital buses even if the 4.16 kV safety buses are de-energized. OPERABLE inverters require the associated AC vital bus be powered by the inverter through inverted DC voltage from the required Class 1E battery, or from an internal AC source via a rectifier with the battery available as backup. This ensures the availability of sufficient inverter power sources to operate the plant in a safe manner and to mitigate the consequences of postulated events during shutdown (e.g., fuel handling accidents involving recently irradiated fuel and inadvertent reactor vessel draindown).
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APPLICABILITY	<p>The inverters required to be OPERABLE in MODES 4 and 5 and also any time during movement of recently irradiated fuel assemblies in the primary containment or fuel building provide assurance that:</p> <ul style="list-style-type: none"><li>a. Systems to provide adequate coolant inventory makeup are available for the irradiated fuel in the core in case of an inadvertent draindown of the reactor vessel;</li><li>b. Systems needed to mitigate a fuel handling accident involving handling recently irradiated fuel (i.e., fuel that has occupied part of a critical reactor core within the previous 11 days) are available;</li><li>c. Systems necessary to mitigate the effects of events that can lead to core damage during shutdown are available; and</li><li>d. Instrumentation and control capability is available for monitoring and maintaining the unit in a cold shutdown condition or refueling condition.</li></ul>
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Inverter requirements for MODES 1, 2, and 3 are covered in LCO 3.8.7.

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(continued)

BASES (continued)

ACTIONS

The ACTIONS are modified by a Note indicating that LCO 3.0.3 does not apply. If moving recently irradiated fuel assemblies while in MODE 1, 2, or 3, the fuel movement is independent of reactor operations. Therefore, inability to suspend movement of recently irradiated fuel assemblies is not sufficient reason to require reactor shutdown.

A.1, A.2.1, A.2.2, A.2.3, and A.2.4

If two divisions are required by LCO 3.8.10, "Distribution Systems-Shutdown," the remaining OPERABLE inverters may be capable of supporting sufficient required feature(s) to allow continuation of CORE ALTERATIONS, fuel movement involving handling recently irradiated fuel, and operations with a potential for draining the reactor vessel. By the allowance of the option to declare required feature(s) inoperable with the associated inverter(s) inoperable, appropriate restrictions are implemented in accordance with the affected required feature(s) of the LCOs' ACTIONS. In many instances, this option may involve undesired administrative efforts. Therefore, the allowance for sufficiently conservative actions is made (i.e., to suspend CORE ALTERATIONS, movement of recently irradiated fuel assemblies in the primary containment and fuel building, and any activities that could result in inadvertent draining of the reactor vessel).

Suspension of these activities shall not preclude completion of actions to establish a safe conservative condition. These actions minimize the probability of the occurrence of postulated events. It is further required to immediately initiate action to restore the required inverters and to continue this action until restoration is accomplished in order to provide the necessary inverter power to the plant safety systems.

Notwithstanding performance of the above conservative Required Actions, the unit is still without sufficient AC vital power sources to operate in a safe manner. Therefore, action must be initiated to restore the minimum required AC vital power sources and continue until the LCO requirements are restored.

The Completion Time of immediately is consistent with the required times for actions requiring prompt attention. The restoration of the required inverters should be completed as

(continued)

BASES

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ACTIONS (continued)	quickly as possible in order to minimize the time the plant safety systems may be without power or powered from a constant voltage source transformer.
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SURVEILLANCE REQUIREMENTS	<u>SR 3.8.8.1</u>  This Surveillance verifies that the inverters are functioning properly with all required circuit breakers closed and AC vital buses energized from the inverter. The verification of proper voltage and frequency output ensures that the required power is readily available for the instrumentation connected to the AC vital buses. The 7 day Frequency takes into account the redundant capability of the inverters and other indications available in the control room that alert the operator to inverter malfunctions.
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REFERENCES	1. USAR, Chapter 6.  2. USAR, Chapter 15.
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## B 3.8 ELECTRICAL POWER SYSTEMS

### B 3.8.10 Distribution Systems—Shutdown

#### BASES

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BACKGROUND	A description of the AC, DC, and AC vital bus electrical power distribution systems is provided in the Bases for LCO 3.8.9, "Distribution Systems—Operating."
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APPLICABLE SAFETY ANALYSES	<p>The initial conditions of Design Basis Accident and transient analyses in the USAR, Chapter 6 (Ref. 1) and Chapter 15 (Ref. 2), assume Engineered Safety Feature (ESF) systems are OPERABLE. The AC, DC, and AC vital bus electrical power distribution systems are designed to provide sufficient capacity, capability, redundancy, and reliability to ensure the availability of necessary power to ESF systems so that the fuel, Reactor Coolant System, and containment design limits are not exceeded.</p> <p>The OPERABILITY of the AC, DC, and AC vital bus electrical power distribution system is consistent with the initial assumptions of the accident analyses and the requirements for the supported systems' OPERABILITY.</p> <p>The OPERABILITY of the minimum AC, DC, and AC vital bus electrical power sources and associated power distribution subsystems during MODES 4 and 5 and during movement of recently irradiated fuel assemblies in the primary containment or fuel building ensures that:</p> <ol style="list-style-type: none"><li>The facility can be maintained in the shutdown or refueling condition for extended periods;</li><li>Sufficient instrumentation and control capability is available for monitoring and maintaining the unit status; and</li><li>Adequate power is provided to mitigate events postulated during shutdown, such as an inadvertent draindown of the vessel or a fuel handling accident involving handling recently irradiated fuel. Due to radioactive decay, AC and DC electrical power is only required to mitigate fuel handling accidents involving</li></ol>
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(continued)

BASES

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APPLICABLE  
SAFETY ANALYSES  
(continued)

handling recently irradiated fuel (i.e., fuel that has occupied part of a critical reactor core within the previous 11 days)..

The AC and DC electrical power distribution systems satisfy Criterion 3 of the NRC Policy Statement.

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LCO

Various combinations of subsystems, equipment, and components are required OPERABLE by other LCOs, depending on the specific plant condition. Implicit in those requirements is the required OPERABILITY of necessary support required features. This LCO explicitly requires energization of the portions of the electrical distribution system necessary to support OPERABILITY of Technical Specifications' required systems, equipment, and components—both specifically addressed by their own LCOs, and implicitly required by the definition of OPERABILITY.

Maintaining these portions of the distribution system energized ensures the availability of sufficient power to operate the plant in a safe manner to mitigate the consequences of postulated events during shutdown (e.g., fuel handling accidents involving recently irradiated fuel and inadvertent reactor vessel draindown).

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APPLICABILITY

The AC, DC, and AC vital bus electrical power distribution subsystems required to be OPERABLE in MODES 4 and 5 and during movement of recently irradiated fuel assemblies in the primary containment or fuel building provide assurance that:

- a. Systems to provide adequate coolant inventory makeup are available for the irradiated fuel in the core in case of an inadvertent draindown of the reactor vessel;
- b. Systems needed to mitigate a fuel handling accident involving recently irradiated fuel are available (Due to radioactive decay, AC and DC electrical power is only required to mitigate fuel handling accidents involving handling recently irradiated fuel that has occupied part of a critical reactor core within the previous 11 days);

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BASES

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APPLICABILITY  
(continued)

- c. Systems necessary to mitigate the effects of events that can lead to core damage during shutdown are available; and
- d. Instrumentation and control capability is available for monitoring and maintaining the unit in a cold shutdown or refueling condition.

The AC, DC, and AC vital bus electrical power distribution subsystem requirements for MODES 1, 2, and 3 are covered in LCO 3.8.9.

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ACTIONS

The ACTIONS are modified by a Note indicating that LCO 3.0.3 does not apply. If moving irradiated fuel assemblies while in MODE 1, 2, or 3, the fuel movement is independent of reactor operations. Therefore, inability to suspend movement of irradiated fuel assemblies is not sufficient reason to require reactor shutdown.

A.1, A.2.1, A.2.2, A.2.3, A.2.4, and A.2.5

Although redundant required features may require redundant divisions of electrical power distribution subsystems to be OPERABLE, one OPERABLE distribution subsystem division may be capable of supporting sufficient required features to allow continuation of CORE ALTERATIONS, recently irradiated fuel movement, and operations with a potential for draining the reactor vessel. By allowing the option to declare required features associated with an inoperable distribution subsystem inoperable, appropriate restrictions are implemented in accordance with the affected distribution subsystem LCO's Required Actions. In many instances, this option may involve undesired administrative efforts. Therefore, the allowance for sufficiently conservative actions is made (i.e., to suspend CORE ALTERATIONS, movement of recently irradiated fuel assemblies in the primary containment and fuel building and any activities that could result in inadvertent draining of the reactor vessel).

Suspension of these activities shall not preclude completion of actions to establish a safe conservative condition. These actions minimize the probability of the occurrence of postulated events. It is further required to immediately initiate action to restore the required AC and DC electrical power distribution subsystems and to continue this action

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(continued)

BASES

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ACTIONS

A.1, A.2.1, A.2.2, A.2.3, A.2.4, and A.2.5 (continued)

until restoration is accomplished in order to provide the necessary power to the plant safety systems.

Notwithstanding performance of the above conservative Required Actions, a required residual heat removal—shutdown cooling (RHR-SDC) subsystem may be inoperable. In this case, Required Actions A.2.1 through A.2.4 do not adequately address the concerns relating to coolant circulation and heat removal. Pursuant to LCO 3.0.6, the RHR-SDC ACTIONS would not be entered. Therefore, Required Action A.2.5 is provided to direct declaring RHR-SDC inoperable, which results in taking the appropriate RHR-SDC ACTIONS.

The Completion Time of immediately is consistent with the required times for actions requiring prompt attention. The restoration of the required distribution subsystems should be completed as quickly as possible in order to minimize the time the plant safety systems may be without power.

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SURVEILLANCE  
REQUIREMENTS

SR 3.8.10.1

This Surveillance verifies that the required AC, DC, and AC vital bus electrical power distribution subsystems are functioning properly, with the buses energized. The verification of proper voltage availability on the required buses ensures that the required power is readily available for motive as well as control functions for critical system loads connected to these buses. The 7 day Frequency takes into account the redundant capability of the electrical power distribution subsystems, as well as other indications available in the control room that alert the operator to subsystem malfunctions.

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REFERENCES

1. USAR, Chapter 6.
  2. USAR, Chapter 15.
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