

## NRC Written Exam Provided Reference List

### RO Exam

None

### SRO Exam

Hot EAL Matrix

Technical Specifications:

- 3.1.7
- 3.3.2.2
- 3.5.1
- 3.8.1

ODCM Section 2.1



### 3.1 REACTIVITY CONTROL SYSTEMS

#### 3.1.7 Standby Liquid Control (SLC) System

LCO 3.1.7 Two SLC subsystems shall be OPERABLE.

APPLICABILITY: MODES 1 and 2.

#### ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One SLC subsystem inoperable.	A.1 Restore SLC subsystem to OPERABLE status.	7 days
B. Two SLC subsystems inoperable.	B.1 Restore one SLC subsystem to OPERABLE status.	8 hours
C. Required Action and associated Completion Time not met.	C.1 Be in MODE 3.	12 hours

**SURVEILLANCE REQUIREMENTS**

<b>SURVEILLANCE</b>		<b>FREQUENCY</b>
<b>SR 3.1.7.1</b>	<b>Verify available volume of sodium pentaborate solution is within the limits of Figure 3.1.7-1.</b>	<b>In accordance with the Surveillance Frequency Control Program</b>
<b>SR 3.1.7.2</b>	<b>Verify temperature of sodium pentaborate solution is within the limits of Figure 3.1.7-2.</b>	<b>In accordance with the Surveillance Frequency Control Program</b>
<b>SR 3.1.7.3</b>	<b>Verify temperature of pump suction piping is within the limits of Figure 3.1.7-2.</b>	<b>In accordance with the Surveillance Frequency Control Program</b>
<b>SR 3.1.7.4</b>	<b>Verify continuity of explosive charge.</b>	<b>In accordance with the Surveillance Frequency Control Program</b>

(continued)

**SURVEILLANCE REQUIREMENTS (continued)**

<b>SURVEILLANCE</b>		<b>FREQUENCY</b>
<b>SR 3.1.7.5</b>	<b>Verify the concentration of sodium pentaborate in solution is within the limits of Figure 3.1.7-1.</b>	<p>In accordance with the Surveillance Frequency Control Program</p> <p><b>AND</b></p> <p>Once within 24 hours after water or sodium pentaborate is added to solution</p> <p><b>AND</b></p> <p>Once within 24 hours after solution temperature is restored within the limits of Figure 3.1.7-2</p>
<b>SR 3.1.7.6</b>	<b>Verify each SLC subsystem manual valve in the flow path that is not locked, sealed, or otherwise secured in position is in the correct position, or can be aligned to the correct position.</b>	In accordance with the Surveillance Frequency Control Program
<b>SR 3.1.7.7</b>	<b>Verify each pump develops a flow rate <math>\geq 50</math> gpm at a discharge pressure <math>\geq 1275</math> psig.</b>	In accordance with the Inservice Testing Program
<b>SR 3.1.7.8</b>	<b>Verify flow through one SLC subsystem from pump into reactor pressure vessel.</b>	In accordance with the Surveillance Frequency Control Program

(continued)

**SURVEILLANCE REQUIREMENTS (continued)**

<b>SURVEILLANCE</b>		<b>FREQUENCY</b>
<b>SR 3.1.7.9</b>	<b>Verify all heat traced piping between storage tank and pump suction is unblocked.</b>	<p>In accordance with the Surveillance Frequency Control Program</p> <p><b>AND</b></p> <p>Once within 24 hours after piping temperature is restored within the limits of Figure 3.1.7-2</p>
<b>SR 3.1.7.10</b>	<b>Verify sodium pentaborate enrichment is <math>\geq 34.7</math> atom percent B-10.</b>	<b>Prior to addition to SLC tank</b>
<b>SR 3.1.7.11</b>	<b>Verify sodium pentaborate enrichment in solution in the SLC tank is <math>\geq 34.7</math> atom percent B-10.</b>	<b>In accordance with the Surveillance Frequency Control Program</b>

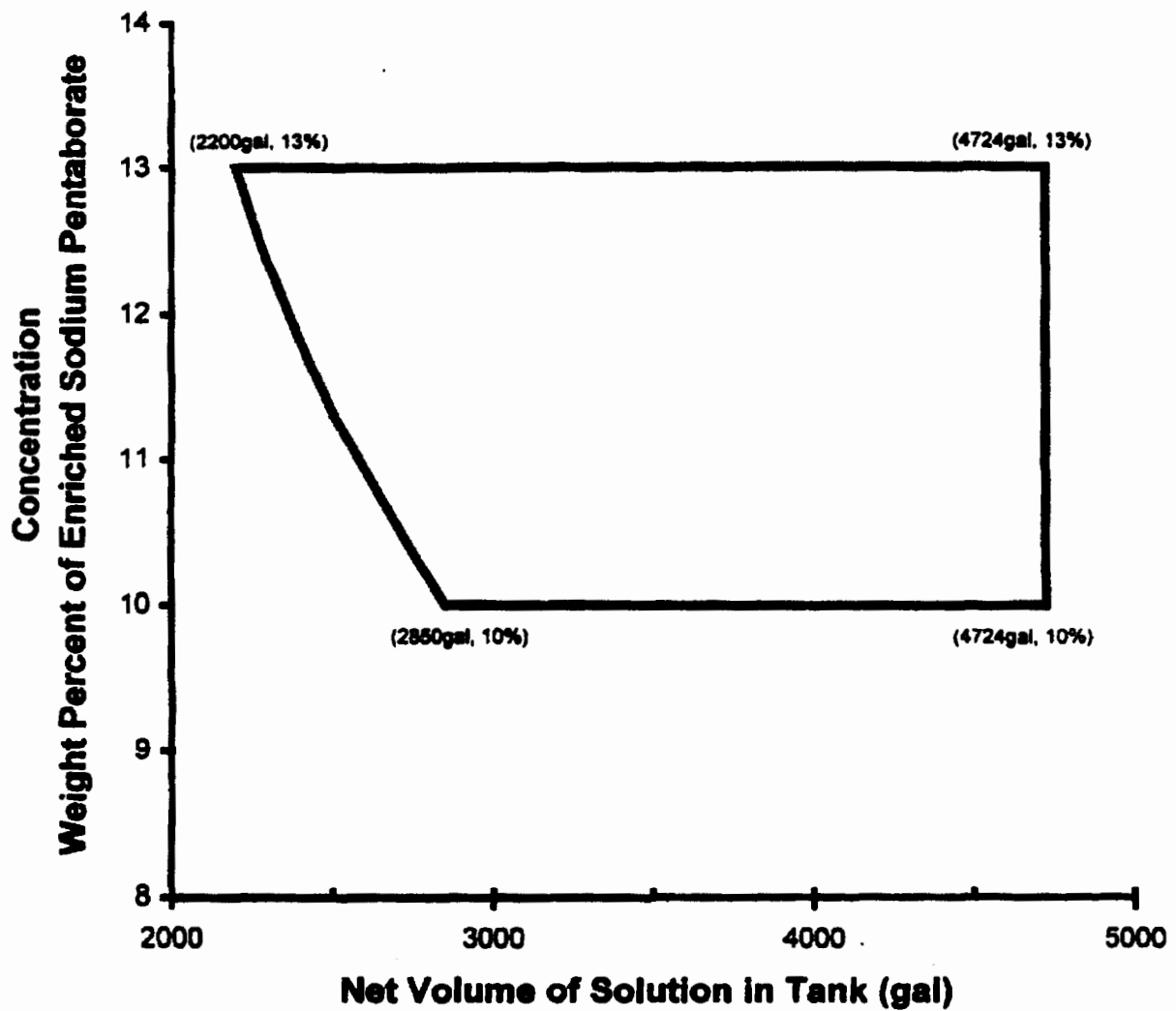


Figure 3.1.7-1 (page 1 of 1)  
Sodium Pentaborate Solution Volume  
Versus Concentration Requirements

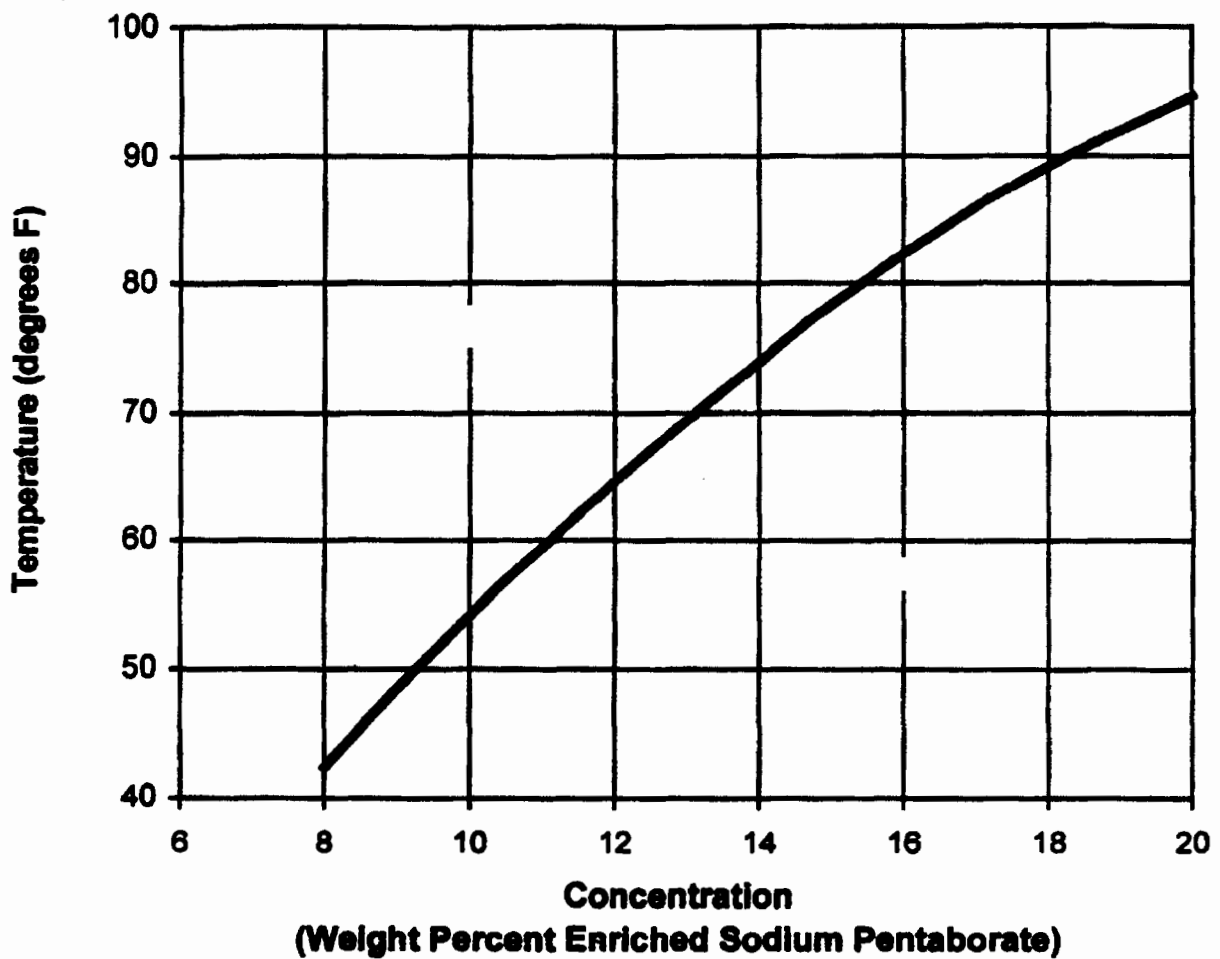


Figure 3.1.7-2 (page 1 of 1)  
Sodium Pentaborate Solution Temperature  
Versus Concentration Requirements



## Feedwater and Main Turbine High Water Level Trip Instrumentation

### 3.3.2.2

### 3.3 INSTRUMENTATION

#### 3.3.2.2 Feedwater and Main Turbine High Water Level Trip Instrumentation

**LCO 3.3.2.2**      Three channels of feedwater and main turbine high water level trip instrumentation shall be OPERABLE.

**APPLICABILITY:**      THERMAL POWER  $\geq$  25% RTP.

#### ACTIONS

----- NOTE -----  
 Separate Condition entry is allowed for each channel.  
 -----

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One feedwater and main turbine high water level trip channel inoperable.	A.1      Place channel in trip.	7 days
B. Two or more feedwater and main turbine high water level trip channels inoperable.	B.1      Restore feedwater and main turbine high water level trip capability.	2 hours
C. Required Action and associated Completion Time not met.	C.1      ----- NOTE ----- Only applicable if inoperable channel is the result of inoperable feedwater pump turbine or main turbine stop valve. -----	
	Remove affected stop valve(s) from service.	4 hours
	<u>OR</u> C.2      Reduce THERMAL POWER to < 25% RTP.	4 hours

**Feedwater and Main Turbine High Water Level Trip Instrumentation**  
**3.3.2.2**

**SURVEILLANCE REQUIREMENTS**

----- NOTE -----

When a channel is placed in an inoperable status solely for performance of required Surveillances, entry into associated Conditions and Required Actions may be delayed for up to 6 hours provided feedwater and main turbine high water level trip capability is maintained.

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SURVEILLANCE		FREQUENCY
SR 3.3.2.2.1	Perform CHANNEL CHECK.	In accordance with the Surveillance Frequency Control Program
SR 3.3.2.2.2	<p style="text-align: center;">----- NOTE -----</p> <p>Only required to be performed when in MODE 4 for &gt; 24 hours.</p> <p style="text-align: center;">-----</p> <p>Perform CHANNEL FUNCTIONAL TEST.</p>	In accordance with the Surveillance Frequency Control Program
SR 3.3.2.2.3	Perform CHANNEL CALIBRATION. The Allowable Value shall be $\leq 222.5$ inches.	In accordance with the Surveillance Frequency Control Program
SR 3.3.2.2.4	Perform LOGIC SYSTEM FUNCTIONAL TEST including valve actuation.	In accordance with the Surveillance Frequency Control Program

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

#### 3.5.1 ECCS-Operating

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

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

#### ACTIONS

#### NOTE

LCO 3.0.4.b is not applicable to HPCI.

CONDITION	REQUIRED ACTION	COMPLETION TIME
<b>A.</b> One low pressure ECCS Injection/spray subsystem inoperable. <u>OR</u> One low pressure coolant injection (LPCI) pump in both LPCI subsystems inoperable.	<b>A.1</b> Restore low pressure ECCS injection/spray subsystem(s) to OPERABLE status.	7 days
<b>B.</b> Required Action and associated Completion Time of Condition A not met.	<b>B.1</b> Be in MODE 3. <u>AND</u> <b>B.2</b> Be in MODE 4.	12 hours  36 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. HPCI System inoperable.	C.1 Verify by administrative means RCIC System is OPERABLE.	Immediately
	<u>AND</u> C.2 Restore HPCI System to OPERABLE status.	14 days
D. HPCI System inoperable.  <u>AND</u> Condition A entered.	D.1 Restore HPCI System to OPERABLE status.	72 hours
	<u>OR</u> D.2 Restore low pressure ECCS injection/spray subsystem(s) to OPERABLE status.	72 hours
E. One required ADS valve inoperable.	E.1 Restore required ADS valve to OPERABLE status.	14 days
F. One required ADS valve inoperable.  <u>AND</u> Condition A entered.	F.1 Restore required ADS valve to OPERABLE status.	72 hours
	<u>OR</u> F.2 Restore low pressure ECCS injection/spray subsystem(s) to OPERABLE status.	72 hours

(continued)

**ACTIONS (continued)**

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>G. Required Action and associated Completion Time of Condition C, D, E, or F not met.</p> <p><u>OR</u></p> <p>Two or more required ADS valves inoperable.</p>	<p>G.1 Be in MODE 3.</p> <p><u>AND</u></p> <p>G.2 Reduce reactor steam dome pressure to <math>\leq 150</math> psig.</p>	<p>12 hours</p> <p>36 hours</p>
<p>H. Two or more low pressure ECCS injection/spray subsystems inoperable for reasons other than Condition A.</p> <p><u>OR</u></p> <p>HPCI System and one or more required ADS valves inoperable.</p>	<p>H.1 Enter LCO 3.0.3.</p>	<p>Immediately</p>

**SURVEILLANCE REQUIREMENTS**

SURVEILLANCE	FREQUENCY
<p>SR 3.5.1.1 Verify, for each ECCS injection/spray subsystem, the piping is filled with water from the pump discharge valve to the injection valve.</p>	<p>In accordance with the Surveillance Frequency Control Program</p>

(continued)

**SURVEILLANCE REQUIREMENTS (continued)**

SURVEILLANCE	FREQUENCY
<p><b>SR 3.5.1.2</b></p> <p style="text-align: center;"><b>NOTE</b></p> <p>Low pressure coolant injection (LPCI) subsystems may be considered OPERABLE during alignment and operation for decay heat removal with reactor steam dome pressure less than the Residual Heat Removal (RHR) cut in permissive pressure in MODE 3, if capable of being manually realigned and not otherwise inoperable.</p> <hr/> <p>Verify each ECCS injection/spray subsystem manual, power operated, and automatic valve in the flow path, that is not locked, sealed, or otherwise secured in position, is in the correct position.</p>	<p>In accordance with the Surveillance Frequency Control Program</p>
<p><b>SR 3.5.1.3</b></p> <p>Verify ADS pneumatic supply header pressure is <math>\geq 95</math> psig.</p>	<p>In accordance with the Surveillance Frequency Control Program</p>
<p><b>SR 3.5.1.4</b></p> <p>Verify the RHR System cross tie valves are closed and power is removed from the electrical valve operator.</p>	<p>In accordance with the Surveillance Frequency Control Program</p>
<p><b>SR 3.5.1.5</b></p> <p>Cycle open and closed each LPCI motor operated valve independent power supply battery charger AC input breaker and verify each LPCI inverter output voltage is <math>\geq 576</math> V and <math>\leq 624</math> V while supplying the respective bus.</p>	<p>In accordance with the Surveillance Frequency Control Program</p>

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE				FREQUENCY																
SR 3.5.1.6	-----NOTE----- Not required to be performed if performed within the previous 31 days. -----  Verify each recirculation pump discharge valve cycles through one complete cycle of full travel or is de-energized in the closed position.			Once each startup prior to exceeding 25% RTP																
SR 3.5.1.7	Verify the following ECCS pumps develop the specified flow rate against a system head corresponding to the specified reactor pressure above primary containment pressure.  <table><thead><tr><th>SYSTEM</th><th>FLOW RATE</th><th>NO. OF PUMPS</th><th>SYSTEM HEAD CORRESPONDING TO A REACTOR PRESSURE ABOVE PRIMARY CONTAINMENT PRESSURE OF</th></tr></thead><tbody><tr><td>Core</td><td></td><td></td><td></td></tr><tr><td>Spray</td><td>≥ 4265 gpm</td><td>1</td><td>≥ 113 psi</td></tr><tr><td>LPCI</td><td>≥ 7700 gpm</td><td>1</td><td>≥ 20 psi</td></tr></tbody></table>			SYSTEM	FLOW RATE	NO. OF PUMPS	SYSTEM HEAD CORRESPONDING TO A REACTOR PRESSURE ABOVE PRIMARY CONTAINMENT PRESSURE OF	Core				Spray	≥ 4265 gpm	1	≥ 113 psi	LPCI	≥ 7700 gpm	1	≥ 20 psi	In accordance with the Inservice Testing Program
SYSTEM	FLOW RATE	NO. OF PUMPS	SYSTEM HEAD CORRESPONDING TO A REACTOR PRESSURE ABOVE PRIMARY CONTAINMENT PRESSURE OF																	
Core																				
Spray	≥ 4265 gpm	1	≥ 113 psi																	
LPCI	≥ 7700 gpm	1	≥ 20 psi																	
SR 3.5.1.8	-----NOTE----- Not required to be performed until 12 hours after reactor steam pressure and flow are adequate to perform the test. -----  Verify, with reactor pressure ≤ 1040 psig and ≥ 970 psig, the HPCI pump can develop a flow rate ≥ 3400 gpm against a system head corresponding to reactor pressure.			In accordance with the Inservice Testing Program																

(continued)

**SURVEILLANCE REQUIREMENTS (continued)**

SURVEILLANCE	FREQUENCY
<p><b>SR 3.5.1.9</b>      <u>NOTE</u></p> <p>Not required to be performed until 12 hours after reactor steam pressure and flow are adequate to perform the test.</p> <hr/> <p>Verify, with reactor pressure <math>\leq 165</math> psig, the HPCI pump can develop a flow rate <math>\geq 3400</math> gpm against a system head corresponding to reactor pressure.</p>	<p>In accordance with the Surveillance Frequency Control Program</p>
<p><b>SR 3.5.1.10</b>      <u>NOTE</u></p> <p>1. For the HPCI System, not required to be performed until 12 hours after reactor steam pressure and flow are adequate to perform the test.</p> <p>2. Vessel injection/spray may be excluded.</p> <hr/> <p>Verify each ECCS injection/spray subsystem actuates on an actual or simulated automatic initiation signal.</p>	<p>In accordance with the Surveillance Frequency Control Program</p>
<p><b>SR 3.5.1.11</b>      <u>NOTE</u></p> <p>Valve actuation may be excluded.</p> <hr/> <p>Verify the ADS actuates on an actual or simulated automatic initiation signal.</p>	<p>In accordance with the Surveillance Frequency Control Program</p>
<p><b>SR 3.5.1.12</b>      Verify each LPCI motor operated valve independent power supply inverter capacity is adequate to supply and maintain in OPERABLE status the required emergency loads for the design duty cycle.</p>	<p>In accordance with the Surveillance Frequency Control Program</p>

(continued)



**SURVEILLANCE REQUIREMENTS (continued)**

<b>SURVEILLANCE</b>		<b>FREQUENCY</b>
<b>SR 3.5.1.13</b>	<b>Verify each required ADS valve is capable of being opened.</b>	<b>In accordance with the Inservice Testing Program</b>

**AC Sources – Operating  
3.8.1**

**3.8 ELECTRICAL POWER SYSTEMS**

**3.8.1 AC Sources-Operating**

**LCO 3.8.1**      The following AC electrical power sources shall be OPERABLE:

- a. Two qualified circuits between the offsite transmission network and the plant Class 1E AC Electrical Power Distribution System; and
- b. Two emergency diesel generator (EDG) subsystems.

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

**ACTIONS**

-----**NOTE**-----  
 LCO 3.0.4.b is not applicable to EDG subsystems.  
 -----

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One offsite circuit inoperable.	A.1 Perform SR 3.8.1.1 for OPERABLE offsite circuit.	1 hour
	<b>AND</b>	<b>AND</b>
	A.2 Declare required feature(s) with no offsite power available inoperable when the redundant required feature(s) are inoperable.	Once per 8 hours thereafter
	<b>AND</b>	24 hours from discovery of no offsite power to one division concurrent with inoperability of redundant required feature(s)
		(continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. (continued)	A.3 Restore offsite circuit to OPERABLE status.	7 days <u>AND</u> 21 days from discovery of failure to meet LCO
B. One EDG subsystem inoperable.	B.1 Perform SR 3.8.1.1 for OPERABLE offsite circuit(s).	1 hour <u>AND</u> Once per 8 hours thereafter
	<u>AND</u>	
	B.2 Declare required feature(s), supported by the inoperable EDG subsystem, inoperable when the redundant required feature(s) are inoperable.	4 hours from discovery of Condition B concurrent with inoperability of redundant required feature(s)
	<u>AND</u>	
	B.3.1 Determine OPERABLE EDG subsystem is not inoperable due to common cause failure.	24 hours
	<u>OR</u>	
	B.3.2 Perform SR 3.8.1.2 for OPERABLE EDG subsystem.	24 hours
	<u>AND</u>	
		(continued)

### AC Sources – Operating

## ACTIONS

[illegible]

(1) For the "A" EDG subsystem only, the Completion Time that the subsystem can be inoperable as specified by Required Action B.4 may be extended beyond the "14 days AND 21 days from discovery of failure to meet LCO" up to "17 days AND 21 days from discovery of failure to meet LCO", to support repair and restoration of the 93EDG-C rotor. Upon Completion of the repair and restoration, this footnote is no longer applicable and will expire at 1015 on June 12, 2009.

**AC Sources – Operating  
3.8.1**

**ACTIONS (continued)**

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. (continued)	D.2      Restore EDG subsystem to OPERABLE status.	12 hours
E. Two EDG subsystems inoperable.	E.1      Restore one EDG subsystem to OPERABLE status.	2 hours
F. Required Action and associated Completion Time of Condition A, B, C, D, or E not met.	F.1      Be in MODE 3.	12 hours
	<u>AND</u> F.2      Be in MODE 4.	36 hours
G. Three or more AC sources inoperable.	G.1      Enter LCO 3.0.3.	Immediately

**SURVEILLANCE REQUIREMENTS**

SURVEILLANCE	FREQUENCY
SR 3.8.1.1      Verify correct breaker alignment and indicated power availability for each offsite circuit.	In accordance with the Surveillance Frequency Control Program

(continued)

**SURVEILLANCE REQUIREMENTS (continued)**

SURVEILLANCE	FREQUENCY
<p><b>SR 3.8.1.2</b> ----- NOTE-----  All EDG subsystem starts may be preceded by an engine prelube period and followed by a warmup period prior to loading.  -----</p> <p>Verify each EDG subsystem starts from standby conditions, force parallels, and achieves:</p> <ul style="list-style-type: none"> <li>a. In <math>\leq 10</math> seconds, voltage <math>\geq 3900</math> V and frequency <math>\geq 58.8</math> Hz; and</li> <li>b. Steady state voltage <math>\geq 3900</math> V and <math>\leq 4400</math> V and frequency <math>\geq 58.8</math> Hz and <math>\leq 61.2</math> Hz.</li> </ul>	<p>In accordance with the Surveillance Frequency Control Program</p>
<p><b>SR 3.8.1.3</b> ----- NOTE-----</p> <ul style="list-style-type: none"> <li>1. EDG loadings may include gradual loading as recommended by the manufacturer.</li> <li>2. Momentary transients outside the load range do not invalidate this test.</li> <li>3. This Surveillance shall be conducted on only one EDG subsystem at a time.</li> <li>4. This SR shall be preceded by and immediately follow, without shutdown, a successful performance of SR 3.8.1.2.</li> </ul> <p>-----</p> <p>Verify each EDG subsystem is paralleled with normal, reserve, or backfeed power and each EDG is loaded and operates for <math>\geq 60</math> minutes at a load <math>\geq 2340</math> kW and <math>\leq 2600</math> kW.</p>	<p>In accordance with the Surveillance Frequency Control Program</p>

(continued)

**SURVEILLANCE REQUIREMENTS (continued)**

<b>SURVEILLANCE</b>		<b>FREQUENCY</b>
SR 3.8.1.4	Verify each day tank contains $\geq 327$ gal of fuel oil.	In accordance with the Surveillance Frequency Control Program
SR 3.8.1.5	Check for and remove accumulated water from each day tank.	In accordance with the Surveillance Frequency Control Program
SR 3.8.1.6	Verify that each EDG fuel oil transfer system operates to automatically transfer fuel oil from its storage tank to the associated day tank.	In accordance with the Surveillance Frequency Control Program
SR 3.8.1.7	<p>----- NOTE -----</p> <p>Only required to be met for each offsite circuit that is not energizing its respective 4.16 kV emergency bus.</p> <p>-----</p> <p>Verify automatic and manual transfer of plant power supply from the normal station service transformer to each offsite circuit.</p>	In accordance with the Surveillance Frequency Control Program
SR 3.8.1.8	<p>----- NOTE -----</p> <p>If performed with the EDG subsystem paralleled with normal, reserve, or backfeed power, it shall be performed within the power factor limit. However, if grid conditions do not permit, the power factor limit is not required to be met. Under this condition, the power factor shall be maintained as close to the limit as practicable.</p> <p>-----</p> <p>Verify each EDG subsystem rejects a load greater than or equal to its associated single largest post-accident load, and following load rejection, the frequency is <math>\leq 66.75</math> Hz.</p>	In accordance with the Surveillance Frequency Control Program

(continued)

**SURVEILLANCE REQUIREMENTS (continued)**

SURVEILLANCE	FREQUENCY
<p><b>SR 3.8.1.9</b> ----- NOTE-----  All EDG subsystem starts may be preceded by an engine prelube period.  -----</p> <p>Verify on an actual or simulated loss of power signal:</p> <ul style="list-style-type: none"> <li>a. De-energization of emergency buses;</li> <li>b. Load shedding from emergency buses; and</li> <li>c. EDG subsystem auto-starts from standby condition, force parallels, and: <ul style="list-style-type: none"> <li>1. energizes permanently connected loads in <math>\leq 11</math> seconds,</li> <li>2. energizes auto-connected shutdown loads,</li> <li>3. maintains steady state voltage <math>\geq 3900</math> V and <math>\leq 4400</math> V,</li> <li>4. maintains steady state frequency <math>\geq 58.8</math> Hz and <math>\leq 61.2</math> Hz, and</li> <li>5. supplies permanently connected and auto-connected shutdown loads for <math>\geq 5</math> minutes.</li> </ul> </li> </ul>	<p>In accordance with the Surveillance Frequency Control Program</p>

(continued)



**SURVEILLANCE REQUIREMENTS (continued)**

SURVEILLANCE	FREQUENCY
<p><b>SR 3.8.1.10</b> ----- NOTE-----  All EDG subsystem starts may be preceded by an engine prelube period.  -----</p> <p>Verify on an actual or simulated Emergency Core Cooling System (ECCS) initiation signal each EDG subsystem auto-starts from standby condition, force parallels, and:</p> <ul style="list-style-type: none"> <li>a. In <math>\leq 10</math> seconds after auto-start and during tests, achieves voltage <math>\geq 3900</math> V, frequency <math>\geq 58.8</math> Hz;</li> <li>b. Achieves steady state voltage <math>\geq 3900</math> V and <math>\leq 4400</math> V and frequency <math>\geq 58.8</math> Hz and <math>\leq 61.2</math> Hz;</li> <li>c. Operates for <math>\geq 5</math> minutes;</li> <li>d. Permanently connected loads remain energized from the offsite power system; and</li> <li>e. Emergency loads are auto-connected in the prescribed sequence from the offsite power system.</li> </ul>	<p>In accordance with the Surveillance Frequency Control Program</p>

(continued)

**SURVEILLANCE REQUIREMENTS (continued)**

SURVEILLANCE	FREQUENCY
<p><b>SR 3.8.1.11</b> ----- NOTE-----</p> <p>Momentary transients outside the load and power factor ranges do not invalidate this test.</p> <p>If grid conditions do not permit, the power factor limit is not required to be met. Under this condition, the power factor shall be maintained as close to the limit as practicable.</p> <p>-----</p> <p>Verify each EDG subsystem operating within the power factor limit operates for <math>\geq 8</math> hours:</p> <ul style="list-style-type: none"> <li>a. For <math>\geq 2</math> hours each EDG loaded <math>\geq 2730</math> kW and <math>\leq 2860</math> kW; and</li> <li>b. For the remaining hours of the test each EDG loaded <math>\geq 2340</math> kW and <math>\leq 2600</math> kW.</li> </ul>	<p>In accordance with the Surveillance Frequency Control Program</p>

(continued)

**SURVEILLANCE REQUIREMENTS (continued)**

SURVEILLANCE	FREQUENCY
<p><b>SR 3.8.1.12</b> ----- NOTE----- All EDG subsystem starts may be preceded by an engine prelube period. -----</p> <p>Verify, on an actual or simulated loss of power signal in conjunction with an actual or simulated ECCS initiation signal:</p> <ul style="list-style-type: none"> <li>a. De-energization of emergency buses;</li> <li>b. Load shedding from emergency buses; and</li> <li>c. EDG subsystem auto-starts from standby condition, force parallels, and: <ul style="list-style-type: none"> <li>1. energizes permanently connected loads in <math>\leq 11</math> seconds,</li> <li>2. energizes auto-connected emergency loads in the prescribed sequence,</li> <li>3. achieves steady state voltage <math>\geq 3900</math> V and <math>\leq 4400</math> V,</li> <li>4. achieves steady state frequency <math>\geq 58.8</math> Hz and <math>\leq 61.2</math> Hz, and</li> <li>5. supplies permanently connected and auto-connected emergency loads for <math>\geq 5</math> minutes.</li> </ul> </li> </ul>	<p>In accordance with the Surveillance Frequency Control Program</p>
<p><b>SR 3.8.1.13</b> Verify interval between each sequenced load block is greater than or equal to the minimum design load interval.</p>	<p>In accordance with the Surveillance Frequency Control Program</p>

## **2.0 LIQUID EFFLUENTS**

### **2.1 Liquid Effluent Monitors**

#### **2.1.1 Limiting Conditions For Operation**

##### **a. Applicability**

Applies to the instrumentation required for monitoring radioactive liquid effluent discharges to the environment as specified in Table 2.1-1.

##### **b. Objective**

To ensure that radioactive liquid effluent discharges are properly monitored and recorded during release.

##### **c. Specifications**

1. The limiting conditions for operation of the instruments that monitor radioactive liquid effluents are given in Table 2.1-1. With a radioactive liquid effluent monitoring instrumentation channel alarm/trip set point less conservative than required by the ODCM (Part 2, Section 3.3), without delay suspend the release of radioactive liquid effluents monitored by the affected channel, or declare the channel inoperable, or change the set point so it is acceptably conservative.
2. With less than the minimum number of radioactive liquid effluent monitoring instrumentation channels operable, take the action shown in Table 2.1-1. Take corrective actions to return the instruments to operable status within 30 days and, if unsuccessful, explain in the next Radioactive Effluent Release Report why the inoperability was not corrected in a timely manner.

**2.1.2 Surveillance Requirements****a. Applicability**

Applies to the instrumentation for monitoring radioactive liquid effluent discharges.

**b. Objective**

To ensure that instrumentation required for radioactive liquid effluent discharges are maintained and calibrated.

**c. Specifications**

1. The alarm/trip set points of these channels shall be determined and adjusted in accordance with the methodology and parameters in the ODCM (Part 2, Section 3.3).
2. The surveillance requirements for the radioactive liquid effluent monitoring instrumentation is shown on Table 2.1-2.

**2.1.3 Bases**

The radioactive liquid effluent instrumentation is provided to monitor and control the releases of radioactive materials in liquid effluents during planned or unplanned releases. The alarm/trip set points for these instruments shall be calculated in accordance with methods in the ODCM (Part 2, Section 3.3) to ensure that the alarm/trip will occur prior to exceeding Part 1, Section 2.2.1.c.1 limits. The operability and use of this instrumentation is consistent with the requirements of 10 CFR 50, Appendix A, General Design Criteria 60, 63, and 64.

TABLE 2.1-1

## RADIOACTIVE LIQUID EFFLUENT MONITORING INSTRUMENTATION

Instrument	Minimum Channels Operable	Action
Gross radioactivity monitors providing alarm and automatic termination of release		
Liquid radwaste effluent line	1	(a)
Gross beta or gamma radioactivity monitors providing alarm but not providing automatic termination of release		
Service water system effluent line	1	(b)
Flow rate measurement devices		
Liquid radwaste effluent line	1	(c)

## NOTES FOR TABLE 2.1-1

- (a) With the number of operable channels less than the required minimum number, effluent releases may continue provided that prior to initiating a release:

1. Two independent samples are analyzed;
2. Two technically qualified members of the facility staff verify the discharge line valving;

Otherwise, suspend release of radioactive effluents via this pathway.

- (b) With the number of operable channels less than the required minimum number, effluent releases in this pathway may continue provided that, at least once per 12 hours, grab samples are collected and analyzed for principal gamma emitters at a limit of detection of at least  $5 \times 10^{-7}$  microcuries/ml. The principal gamma emitters for which the LLD specification applies exclusively are described in Note (c) to Table 2.2-1.
- (c) With the number of operable channels less than the required minimum number, effluent releases via this pathway may continue provided the flow rate is estimated at least once per four hours during actual releases. Pump curves or tank level decreases generated in situ may be used to estimate flow.

TABLE 2.1-2

**MINIMUM TEST AND CALIBRATION FREQUENCY  
FOR RADIATION MONITORING SYSTEMS<sup>(a)</sup>**

Instrument Channels	Channel Check(b)	Channel Functional Test(g)	Channel Calibration (g)	Logic System Functional Test (f)
Liquid Radwaste Discharge Monitor/ Isolation (c)(d)(e)(f)	Daily When Discharging	---	Quarterly	Once per 24 months
Liquid Radwaste Discharge Radioactivity Recorder(d)	Daily	Quarterly	Once per 18 months	---
Liquid Radwaste Discharge Flow Rate Measuring Devices(d)	Daily	Quarterly	Once per 18 months	---
Normal Service Water Effluent	Daily	---	Quarterly	---

NOTES FOR TABLE 2.1-2

- (a) Functional tests, calibrations and Channel Checks need not be performed when these instruments are not required to be operable or are tripped.
- (b) Channel Checks shall be performed at least once per day during these periods when the instruments are required to be operable.
- (c) A Source Check shall be performed prior to each release.
- (d) Liquid radwaste effluent line instrumentation surveillance requirements need not be performed when the instruments are not required as the result of the discharge path not being utilized.
- (e) An instrument Channel Calibration shall be performed with known radioactive sources standardized on plant equipment which has been calibrated with NIST traceable standards.
- (f) Simulated automatic actuation shall be performed once per 24 months. Simulated automatic action means applying a simulated signal to the sensor to actuate the circuit.
- (g) A successful test of the required contact(s) of a channel relay may be performed by the verification of the change of state of a single contact of the relay. This clarifies what is an acceptable Channel Functional Test of a relay. This is acceptable because all of the other required contacts of the relay are verified by other Technical Specifications and non-Technical Specification tests at least once per refueling interval with the applicable extension.