

Facility:	Sequoyah	Scenario No.:	1	Op Test No.:	2013-301
Examiners:			Operators:		
Initial Conditions:	Unit 1 is in MODE 1 76%, BOL				
Turnover:	Unit 1 is in MODE 1 76%, BOL raise power to 100%. D RCW pump is OOS for maintenance. PT-3-1A is in Maintenance Bypass				
Target CTs:	Manually trip the main turbine prior to the completion of E-0. Isolate AFW flow into the ruptured (#1) SG by closing FCV-3-164 and 3-174 before a transition to ECA-3.1 occurs. Establish cooldown and maintain RCS temperature so that transition from E3 does not occur because the RCS temperature causes an extreme (red-path) or a severe (orange-path) challenge to the subcriticality and/or the integrity CSF. (As required.)				
Event No.	Malf. No.	Event Type*	Event Description		
1.	RX05A	I-ATC/SRO TS-SRO	The controlling pressurizer level channel LT 68-339 will fail high resulting in charging flow decreasing and energizing Pressurizer backup heaters. The ATC will remove the channel from service and restore Pressurizer heaters using AOP-I.04. The SRO will address Tech Specs and determines the instrument is INOPERABLE.		
2.	CC01	C BOP/SRO	A small leak develops on the Component Cooling Water system (CCS) with a failure of the CCS Surge Tank Makeup valve to AUTO open. The BOP manually opens the CCS Surge Tank Makeup valve.		
3.	TH05A	C- ATC/SRO TS-SRO	A small Steam Generator Tube Leak develops, the crew will respond using AOP-R.01. The ATC will raise Charging flow to maintain Pressurizer Level on program. The SRO will enter LCO 3.4.6.2.c, Action a.		
4.		R ATC N SRO/BOP	The crew will reduce power using AOP-C.03, Rapid Power Reduction in response to the SGTL.		
5.	FW11A	C-SRO/BOP	At approximately 70% power, Main Feed Pump 1A develops an oil leak. The BOP trips the A MFWPT using ARP 1-AR-M3-B MAIN FEEDWATER PUMPS.		
6.	TH05A	M-All	The tube leak will degrade to a SGTR, the crew will trip the reactor enter E-0.		
7.	TC11ALL TC12ALL	C-BOP	The Main Turbine will fail to trip when the Reactor Trips, the BOP will manually trip the Main Turbine.		
8.	MS12A	M-All	When the reactor trips, the ruptured SG Atmospheric Dump will open, the crew will transition through E-2, E-3, and eventually to ECA-3.1.		
(N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor					

## **2013-301 NRC Scenario 1 Summary**

**EVENT 1** - When directed by the lead examiner, the controlling pressurizer level channel LT 68-339 will fail high resulting in charging flow decreasing and energizing Pressurizer backup heaters. The ATC will remove the channel from service and restore Pressurizer heaters using AOP-I.04. The SRO will address Tech Specs and determines the instrument is INOPERABLE and enters LCO 3.3.1.1 Action 6; and LCO 3.3.3.7 Action 2a.

**EVENT 2** - When directed by the lead examiner, A small leak develops on the Component Cooling Water system (CCS) with a failure of the CCS Surge Tank Makeup valve to AUTO open. The BOP manually opens the CCS Surge Tank Makeup valve.

**EVENT 3** - When directed by the lead examiner, a 15 gpm SG Tube Leak develops on the #1 S/G. The ATC will manually increase charging flow and subsequently isolate letdown using AOP-R.01 STEAM GENERATOR TUBE LEAK. The SRO addresses Tech Specs and determines entry into LCO 3.4.6.2.c Action a is required.

**EVENT 4** - The crew initiates a power reduction using AOP-C.03 RAPID SHUTDOWN OR LOAD REDUCTION due to the SGTL.

**EVENT 5** - When directed by the lead examiner, at approximately 70% power, Main Feed Pump 1A develops an oil leak. The BOP trips the A MFWPT using ARP 1-AR-M3-B MAIN FEEDWATER PUMPS.

**EVENT 6** - The tube leak will degrade to a SGTR, the crew will trip the reactor enter E-0 REACTOR TRIP OR SAFETY INJECTION.

**EVENT 7** - The Main Turbine will fail to trip when the Reactor Trips, the BOP will manually trip the Main Turbine.

**EVENT 8** - When the reactor trips, the ruptured SG Atmospheric Dump will open, the crew will transition through E-2 FAULTED STEAM GENERATOR ISOLATION, E-3 STEAM GENERATOR TUBE RUPTURE, and eventually to ECA-3.1, SGTR AND LOCA - SUBCOOLED RECOVERY.

The scenario may be terminated when the crew transitions to ECA-3.1.

EOP flow: E-0, E-2, E-3, ECA-3.1.


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Event Description: Controlling Pzr Lvl Transmitter Fails High (LT 68-339)

Time	Position	Applicant's Actions or Behavior
<b>Direct the Simulator Operator to initiate Event 1 Controlling Pzr Lvl Transmitter Fails High (LT 68-339)</b>		
<b>Indications/Alarms</b> <b>Annunciator:</b> <b>1-M-5</b> <ul style="list-style-type: none"> <li>5B C-3, "FS-62-1 REAC COOL PMPS SEAL WATER FLOW LO"</li> <li>6A A-5, "LS-68-339A PRESSURIZER HIGH WATER LEVEL"</li> </ul> <b>Indications:</b> <b>1-M-4</b> <ul style="list-style-type: none"> <li>1-LI-68-339 RCS PZR LEVEL indicates increasing level</li> <li>Pressurizer Backup Heaters ON</li> </ul>		
		<div style="border: 1px solid black; padding: 5px; text-align: center;"> <b>FS-62-1 REAC COOL PMPS SEAL WATER FLOW LO</b> </div> <p>[1] CHECK seal water flow to each pump on flow indicators on 1-M-5 or locally in 880 penetration room.</p> <p>[2] IF all seal water supply flows are low, THEN CONSIDER the following:</p> <p>[a] ADJUST [1-PCV-62-89] as necessary.</p> <p>[b] IF [1-PCV-62-89] has failed, THEN ADJUST seal flows as necessary using the manual isolations and/or bypass valves in accordance with 1-SO-62-1.</p>
	BOP	Responds to ARP 1-AR-M5B C-3.
	ATC	May adjust HIC-62-89A, Charging Seal Water Flow Controller to maintain seal injection flow alarms clear.
		<div style="border: 1px solid black; padding: 5px; text-align: center;"> <b>LS-68-339A PRESSURIZER HIGH WATER LEVEL</b> </div> <p>[1] IF reactor trips THEN GO TO E-0, Reactor Trip or Safety Injection.</p> <p>[2] IF reactor trip criteria met with no trip, THEN</p> <p>[a] TRIP the reactor, AND</p> <p>[b] GO TO E-0, Reactor Trip or Safety Injection.</p> <p>[3] IF level channel failed, THEN GO TO AOP-I.04, Pressurizer Instrument Malfunction.</p>
<b>Examiner Note:</b> Several steps, notes, and cautions in the Annunciator response procedure do not apply to this failure. Only those that are applicable are listed in this event guide.		

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Event Description: Controlling Pzr Lvl Transmitter Fails High (LT 68-339)

Time	Position	Applicant's Actions or Behavior						
	BOP	Responds to ARP 1-AR-M6A A-5.						
	SRO	Transitions to AOP I.04, PRESSURIZER INSTRUMENT AND CONTROL MALFUNCTIONS						
<p>1. <b>DIAGNOSE</b> the failure:</p> <table border="1"> <tr> <td>IF...</td><td>GO TO SECTION</td><td>PAGE</td></tr> <tr> <td>Pressurizer Level Instrument Malfunction</td><td>2.4</td><td>20</td></tr> </table>			IF...	GO TO SECTION	PAGE	Pressurizer Level Instrument Malfunction	2.4	20
IF...	GO TO SECTION	PAGE						
Pressurizer Level Instrument Malfunction	2.4	20						
<p>2.4 Pressurizer Level Instrument Malfunction</p> <p><b>CAUTION</b> Chemistry sampling of PZR Liquid Space may result in additional bistables actuating due to impact on 1-LT-68-320 or 2-LT-68-335.</p> <p><b>NOTE</b> Appendix M shows layout of PZR level control for operator reference.</p>								
	ATC	<p>1. <b>CHECK</b> LI-68-339 NORMAL.</p> <p><b>PERFORM</b> the following:</p> <ol style="list-style-type: none"> <li><b>ENSURE</b> LEVEL CONTROL CHANNEL SELECTOR switch XS-68-339E in LT-68-335 &amp; 320.</li> <li><b>ENSURE</b> LEVEL REC CHANNEL SELECTOR switch XS-68-339B in LT-68-320 or LT-68-335.</li> <li><b>GO TO</b> Step 4.</li> </ol> 						
	ATC	Places LEVEL CONTROL CHANNEL SELECTOR switch XS-68-339E in LT-68-335 & 320.						
	ATC	4. <b>CHECK</b> letdown IN SERVICE.						
	SRO	<p>5. <b>EVALUATE</b> the following Tech Specs for applicability:</p> <ul style="list-style-type: none"> <li>3.3.1.1 (3.3.1), Reactor Trip System Instrumentation</li> <li>3.3.3.7 Accident Monitoring Instrumentation</li> </ul>						

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Event Description: Controlling Pzr Lvl Transmitter Fails High (LT 68-339)

Time	Position	Applicant's Actions or Behavior
		<p><u>LIMITING CONDITION FOR OPERATION</u></p> <p>3.3.1.1 As a minimum, the reactor trip system instrumentation channels and interlocks of Table 3.3-1 shall be OPERABLE.</p> <p><u>APPLICABILITY:</u> As shown in Table 3.3-1.</p> <p><u>ACTION:</u></p> <p>As shown in Table 3.3-1.</p> <p>11. Pressurizer Water Level— 3 2 2 1, 2 6 High</p> <p>ACTION 6 - With the number of OPERABLE channels one less than the Total Number of Channels, STARTUP and/or POWER OPERATION may proceed provided the following conditions are satisfied:</p> <p>a. The inoperable channel is placed in the tripped condition within 6 hours.</p> <p>3.3.3.7 The accident monitoring instrumentation channels shown in Table 3.3-10 shall be OPERABLE.</p> <p><u>APPLICABILITY:</u> MODES 1, 2 and 3.</p> <p><u>ACTION:</u> As shown in Table 3.3-10</p> <p>7. Pressurizer Level (Wide Range) 3 3 2 (Instrument Loops 68-320,-335,-339)</p> <p>ACTION 2 - NOTE: Also refer to the applicable action requirements from Tables 3.3-1 since it may contain more restrictive actions.</p> <p>a. With the number of channels one less than the minimum channels required, restore the inoperable channel to OPERABLE status within 30 days or be in at least HOT STANDBY within the next 6 hours and in HOT SHUTDOWN within the next 6 hours.</p>

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Event Description: Controlling Pzr Lvl Transmitter Fails High (LT 68-339)

Time	Position	Applicant's Actions or Behavior
	SRO	Enters LCO 3.3.1.1 Action 6 and LCO 3.3.3.7 Action 2
	ATC	6. <b>ENSURE</b> pressurizer heaters restored to service.
<b>CAUTION</b> RCS pressure changes and changes in RCS boron concentration (due to differences between pzr and RCS boron) may impact core reactivity.		
		7. <b>MONITOR</b> reactor power:  a. <b>CHECK</b> reactor in Mode 1 or 2.  b. <b>MONITOR</b> core thermal power for unexpected changes.
<p align="center"><b>NOTE:</b></p> <p>If performing AOP in conjunction with AOP-I.11 for an Eagle LCP failure, then actions to hard trip bistables should be delayed until Eagle system reset is attempted. Actions to hard trip bistables must be completed within 6 hours UNLESS affected loop is restored to operable status by resetting Eagle rack.</p>		
		8. <b>NOTIFY</b> I&C to remove failed pressurizer level channel from service <b>USING</b> appropriate Appendix:  L-68-339 Appendix I
	Crew	Performs a Crew Brief as time allows.
	Crew	Notifications should be addressed as applicable if not specifically addressed by the procedure or in the crew brief.  Operations Management - Typically Shift Manager.  Maintenance Personnel – Typically Maintenance Shift Supervisor (MSS). (Note: Maintenance notification may be delegated to the Shift Manager).
<b>Lead Examiner may cue the next event when Tech Specs have been addressed.</b>		

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Event Description: CCS Leak

**Direct the Simulator Operator to initiate Event 2****Indications/Alarms****Annunciator:****0-M-27B-B**

- 27B-B C-2, "UNIT 1 CCS" SURGE TK LVL LO AUTO MAKEUP INITIATED

**0-M-27B-D**

- 27B-D C-2, "UNIT 2 CCS" SURGE TK LVL LO AUTO MAKEUP INITIATED

**1-M-15B**

- 15B -E3, "LS-59-180A/B DEM WTR ANDCASK DECON SYS ABN CONDITION"

**Indications:****1-1-M-27B-B**

- 1-LI-70-99A and 63A CCS Surge Tank level decreasing

**UNIT 1 CCS  
SURGE TK LVL LO  
AUTO MAKEUP  
INITIATED**

- [1] CHECK surge tank level by observing [1-LI-70-63A].
- [2] ENSURE 1-LCV-70-63 OPEN.
- [3] DISPATCH operator for local inspection to determine problem.
- [4] VERIFY proper valve alignment in accordance with 1-SO-70-1, *Component Cooling Water System Train A*, and 0-SO-70-1 *Component Cooling Water System Train B*.
- [5] MONITOR level in both surge tanks to determine seal leakage return problems.
- [6] MONITOR level rise in pocket sump for possible CCS leak inside containment.
- [7] IF sufficient level cannot be maintained, THEN GO TO AOP-M.03, *Loss of Component Cooling Water* for emergency makeup instructions. [C.1]

BOP

Responds to ARP 1-AR-M27BB C-2.

ATC

Places 1-HS-70-63A CCS Surge Tank A Inlet Isolation to OPEN.

**Examiner Note:** Several steps, notes, and cautions in the Annunciator response procedure do not apply to this failure. Only those that are applicable are listed in this event guide.

**Lead Examiner may cue the next event when level in the CCS Surge Tank makeup valve has been opened.**

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Event Description:		Steam Generator Tube Leak							

Time	Position	Applicant's Actions or Behavior
<b>Direct the Simulator Operator to initiate Event 3, #1 SG Tube Leakage of ~15 gpm</b>		
<b>Indications available:</b>  <b>Annunciators:</b> <b>0-M-12</b> <ul style="list-style-type: none"> <li>0-XA-55-12A Window D-3, "1-RA-90-99A, CNDS VAC PMP LO RNG AIR EXH MON HIGH RAD"</li> <li>0-XA-55-12A Window B-6, "1-RA-120A/121A, STM GEN BLDN LIQ SAMP MON HI RAD" (20 minutes later)</li> </ul>		
<b>Indications available:</b>  Deviations or unexpected indications on any of the following may indicate a steam generator tube leak: <ol style="list-style-type: none"> <li>Charging flow rises to maintain Pressurizer level.</li> <li>Rise in makeup to VCT.</li> <li>Rising activity on:               <ul style="list-style-type: none"> <li>Condenser Vacuum Exhaust Radiation Monitor</li> <li>S/G Blowdown Liquid Radiation Monitor</li> <li>Main Steam Line Monitor</li> </ul> </li> <li>S/G sample results indicating greater than or equal to 5 gallons per day (gpd) on any S/G.</li> </ol>		
<div style="border: 2px solid black; padding: 10px; width: fit-content; margin: 0 auto;"> <b>1-RA-90-99A CNDS VAC PMP LO RNG AIR EXH MON HIGH RAD</b> </div>		



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Event Description:	Steam Generator Tube Leak								

Time	Position	Applicant's Actions or Behavior						
		<p><b>[1] CHECK</b> 1-RR-90-99 rate meter and 1-RR-90-119 on panel 0-M-12 for indications of increased radiation.</p> <p><b>NOTE</b> Alarm validity may be determined based on absence of instrument malfunction alarm, indicated response of the rad monitor, and, if possible, other indications such as blowdown monitor (recognizing the difference in response time due to blowdown transport time).</p> <p><b>[2] IF</b> alarm is valid, <b>THEN</b>  <b>NOTIFY</b> RCL to perform 1-CEM-068-137.5 Primary to Secondary Leakage via Steam Generators.</p> <p><b>[3] IF</b> alarm is valid, <b>THEN</b>  <b>GO TO</b> AOP-R.01, Steam Generator Tube Leak. <b>[C.2]</b></p>						
		<p><b>Examiner Note:</b> Several steps, notes, and cautions in the Annunciator response procedure do not apply to this failure. Only those that are applicable are listed in this event guide.</p>						
	SRO	Transitions to AOP R.01						
		Examiner note if the crew implements section 2.2 go to page 12.						
	SRO	<p><b>1. DIAGNOSE</b> the failure:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 70%;">IF...</th><th style="width: 15%;">GO TO SECTION</th><th style="width: 15%;">PAGE</th></tr> </thead> <tbody> <tr> <td>High Secondary Radiation <b>AND</b> Pressurizer level dropping <b>OR</b> Charging flow rising</td><td style="text-align: center;">2.1</td><td style="text-align: center;">4</td></tr> </tbody> </table>	IF...	GO TO SECTION	PAGE	High Secondary Radiation <b>AND</b> Pressurizer level dropping <b>OR</b> Charging flow rising	2.1	4
IF...	GO TO SECTION	PAGE						
High Secondary Radiation <b>AND</b> Pressurizer level dropping <b>OR</b> Charging flow rising	2.1	4						
	ATC	<p><b>1. MONITOR</b> if Pressurizer level can be maintained:</p> <p style="margin-left: 40px;">a. <b>CONTROL</b> charging flow  <b>USING</b> FCV-62-93 and FCV-62-89  as necessary to maintain pZR level on program.</p> <p style="margin-left: 40px;">b. <b>MONITOR</b> pressurizer level <b>STABLE</b>  or <b>RISING</b>.</p>						
	ATC	Places FCV-62-93 in manual and controls charging flow, may adjust HIC-62-89A to maintain RCP Seal Flow						

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Event Description:		Steam Generator Tube Leak							

Time	Position	Applicant's Actions or Behavior
	ATC	b. <b>MONITOR</b> pressurizer level <b>STABLE</b> or <b>RISING</b> . <div style="float: right;">             b. <b>PERFORM</b> the following:              1) <b>ENSURE</b> letdown isolated:             <ul style="list-style-type: none"> <li>FCV-62-72 CLOSED</li> <li>FCV-62-73 CLOSED</li> <li>FCV-62-74 CLOSED</li> </ul> </div>
	ATC	If pressurizer level is still dropping, places HS-FCV-62-72, FCV-62-73 CLOSED, and FCV-62-74 to CLOSE.
Examiner Note: As the leak degrades, the ATC may take the RNO actions listed above, go to page 37 for additional details..		
		<b>NOTE 1</b> Appendix F or G can be used to estimate leak rate. <b>NOTE 2</b> If letdown was isolated in Step 1, the leak rate may have exceeded the capacity of one CCP in the normal charging alignment (EAL 1.2.2P).
Examiner note; Appendix F starts on page 16		
	SRO	2. <b>EVALUATE</b> EPIP-1, Emergency Plan Classification Matrix.
	ATC	3. <b>MONITOR</b> VCT level: <ul style="list-style-type: none"> <li><b>MAINTAIN</b> VCT level greater than 13% <b>USING</b> auto or manual makeup</li> <li><b>CHECK</b> VCT makeup capability adequate to maintain level.</li> </ul>
	CREW	4. <b>MONITOR</b> indications of leaking S/G: <div style="margin-left: 20px;">             a. <b>NOTIFY</b> Chem Lab to evaluate Primary to Secondary Leakage <b>USING</b> 1(2)-SI-CEM-068-137.5:             <ul style="list-style-type: none"> <li>Method 1, Rapid Identification of Leaking Steam Generators</li> <li>Method 3, Condenser Vacuum Exhaust (CVE) Sampling for Determination of Primary-to-Secondary (P/S) Leakage.</li> </ul> </div>
	CREW	b. <b>NOTIFY</b> Radiation Protection to monitor Turbine Building and site environment: <ul style="list-style-type: none"> <li>Steam lines</li> <li>S/G blowdown</li> </ul>

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Time	Position	Applicant's Actions or Behavior
	CREW	<p>c. <b>IDENTIFY</b> leaking S/G(s) <b>USING</b> any of the following:</p> <ul style="list-style-type: none"> <li>• Unexpected rise in any S/G narrow range level</li> </ul> <p><b>OR</b></p> <ul style="list-style-type: none"> <li>• S/G sample results</li> </ul> <p><b>OR</b></p> <ul style="list-style-type: none"> <li>• Radiation Protection survey of main steamlines and S/G blowdown lines</li> </ul> <p><b>OR</b></p> <ul style="list-style-type: none"> <li>• High radiation on any main steamline radiation monitor.</li> </ul>
	CREW	Identifies SGTL on S/G # 1.
Examiner Note: SRO may refer to Operations Chemistry Information Sheet in turnover package.		
	SRO	<p>5. <b>EVALUATE</b> the following Tech Specs for applicability:</p> <ul style="list-style-type: none"> <li>• 3.4.6.2, Operational Leakage</li> <li>• 3.7.1.4, Secondary Coolant Activity</li> </ul>
		<p><u>LIMITING CONDITION FOR OPERATION</u></p> <hr/> <p>3.4.6.2 Reactor Coolant System leakage shall be limited to:</p> <ul style="list-style-type: none"> <li>a. No PRESSURE BOUNDARY LEAKAGE,</li> <li>b. 1 GPM UNIDENTIFIED LEAKAGE,</li> <li>c. 150 gallons per day of primary-to-secondary leakage through any one steam generator, and</li> <li>d. 10 GPM IDENTIFIED LEAKAGE from the Reactor Coolant System.</li> </ul> <p><u>APPLICABILITY:</u> MODES 1, 2, 3 and 4</p> <p><u>ACTION:</u></p> <ul style="list-style-type: none"> <li>b. With any Reactor Coolant System leakage greater than any one of the above limits, excluding PRESSURE BOUNDARY LEAKAGE or primary-to-secondary leakage, reduce the leakage rate to within limits within 4 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.</li> </ul>
	SRO	Enters 3.4.6.2.c, Operational Leakage action a.
		<p><b>NOTE</b> Initiating shutdown required by Tech Specs requires 4 hour NRC notification per SPP-3.5, Regulatory Reporting Requirements.</p>


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Event Description:		Steam Generator Tube Leak							

Time	Position	Applicant's Actions or Behavior
	CREW	<p>6. <b>INITIATE</b> rapid shutdown by performing the following:</p> <ul style="list-style-type: none"> <li>a. <b>ANNOUNCE</b> S/G tube leak on PA system.</li> <li>b. <b>PERFORM</b> rapid shutdown <b>USING</b> AOP-C.03 <b>WHILE</b> continuing in this section.</li> <li>c. <b>ENSURE</b> power reduced to less than 50% within one hour.</li> <li>d. <b>ENSURE</b> unit in Mode 3 within the following 2 hours.</li> </ul>
	SRO	Transitions to AOP-C.03
Examiner note AOP-C.03 actions start on page 18.		
	CRO	Continues with performance of AOP-R.01
	BOP	<p>7. <b>MINIMIZE</b> Spread of contamination:</p> <ul style="list-style-type: none"> <li>a. <b>IF</b> tube leak identified on S/G #1 <b>AND</b> S/G #4 is intact, <b>THEN</b> <b>PERFORM</b> the following: <ul style="list-style-type: none"> <li>1) <b>EVALUATE</b> LCO 3.7.1.2.</li> <li>2) <b>CLOSE</b> FCV-1-15 TDAFWP steam supply from S/G #1.</li> <li>3) <b>ENSURE</b> FCV-1-16 TDAFWP steam supply from S/G #4 <b>OPEN</b>.</li> </ul> </li> </ul>
	BOP	Manually closes FCV-1-15 TDAFWP steam supply from S/G #1 and opens FCV-1-16 TDAFWP steam supply from S/G #4

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Event Description:		Steam Generator Tube Leak							

Time	Position	Applicant's Actions or Behavior
	BOP	<p>b. <b>PERFORM</b> EA-0-3, Minimizing Secondary Plant Contamination.</p> <p>c. <b>IF</b> S/G blowdown is aligned to the river, <b>THEN</b> <b>TERMINATE</b> S/G Blowdown to river:</p> <p>1) <b>ENSURE</b> S/G blowdown flow control FCV-15-43 <b>CLOSED</b>.</p> <p>2) <b>DISPATCH</b> operator to perform EA-15-1, Realigning S/G Blowdown to Cond DI.</p> <p>3) <b>WHEN</b> EA-15-1 completed, <b>THEN</b> <b>ADJUST</b> FCV-15-43 to establish desired blowdown flow.</p>
		<p>7. d. <b>NOTIFY</b> Chem Lab to determine release rate for condenser vacuum exhaust <b>USING</b> 0-SI-CEM-030-415.0 and 0-SI-CEM-030-407.2.</p> <p>e. <b>NOTIFY</b> Chem Lab to evaluate rerouting steam generator sample drain lines to FDCT <b>USING</b> 0-TI-CEM-000-016.4.</p>

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Time	Position	Applicant's Actions or Behavior
	BOP	<p>f. <b>WHEN</b> notified by Chemistry to bypass Condensate DI, <b>THEN</b> <b>DISPATCH</b> AUO to bypass polishers on affected unit:</p> <ul style="list-style-type: none"> <li>• <u>Unit 1 Only:</u> <b>PLACE</b> 1-HS-14-3, Condensate Polisher Bypass Valve to OPEN. [Cond DI Bldg]</li> <li>• <u>Unit 2 Only:</u> <b>PLACE</b> 2-HS-14-3, Condensate Polisher Bypass Valve to OPEN. [Cond DI Bldg]</li> </ul> <p>g. <b>EVALUATE</b> Appendix C, Contingency Plan for Control and Processing of Large Volumes of Contaminated Water [C.5].</p>
Examiner note Section 2.2 starts here.		
<p><b>NOTE</b> This section provides steps to monitor primary to secondary leakage and directs unit shutdown if leakage limits are exceeded. Entry into this section is required when secondary radiation monitors indicate a rise in primary-to-secondary leakage or when Chemistry determines S/G leak rate exceeds 5 gal. per day (gpd).</p>		
	ATC	<p>1. <b>MONITOR</b> charging flow and Pressurizer level STABLE.</p> <p><b>IF</b> Charging flow rising <b>OR</b> Pressurizer level dropping due to S/G tube leak, <b>THEN</b> <b>GO TO</b> Section 2.1.</p> 
	SRO	2. <b>EVALUATE</b> EPIP-1, Emergency Plan Classification Matrix.
	SRO	Directs SM to evaluate EPIP-1.

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Event Description:		Steam Generator Tube Leak							


Time	Position	Applicant's Actions or Behavior
	ATC	<p>3. <b>EVALUATE</b> the following Tech Specs for applicability:</p> <ul style="list-style-type: none"> <li>• 3.4.6.2, Operational Leakage</li> <li>• 3.7.1.4, Secondary Coolant Activity</li> </ul>
	SRO	Enters 3.4.6.2.c, Operational Leakage action a.
<p><b>NOTE</b> Lower containment rad monitor count rate rising concurrently with secondary rad monitors may indicate a sudden fuel defect, which could give a false indication of S/G tube leak. Threshold values for correlating RM-90-99/119 count rate to S/G tube leakage must be recalculated if RCS activity has changed significantly.</p>		
	CREW	<p>4. <b>INITIATE</b> sampling to confirm S/G leak:</p> <ul style="list-style-type: none"> <li>a. <b>CHECK</b> lower containment rad monitor count rate STABLE or DROPPING.</li> <li>b. <b>PERFORM</b> Appendix E, Chemistry Sampling Actions.</li> </ul>
<p><b>CAUTION:</b> The clock starts for power reduction or shutdown in Step 6 when any valid indication is available that the applicable leak rate threshold is exceeded. Required time limits for power reduction or shutdown should NOT be exceeded due to delays in confirming leak rate.</p> <p><b>NOTE 1:</b> Based on monitor sensitivity, condenser vacuum exhaust rad monitor (RM-90-99 or -119) is preferred indication for leak rate monitoring. Other secondary rad monitors (if available) and/or S/G sampling should be used for confirmation. Confirmation time should be kept to a minimum.</p> <p><b>NOTE 2:</b> Rad Monitor values (cpm) must be converted to a gallons per day (gpd) equivalency to determine leakrate. Correlation of RM-90-99/119 responses to Primary - Secondary leak rates and limits are provided by Chemistry in turnover package.</p> <p><b>NOTE 3:</b> Steady State conditions (less than 10% power change per hour) are required to accurately correlate cpm readings with gpd leakage.</p>		

Op Test No.: NRC 2013-301 Scenario # 1 Event # 3 Page 14 of 64Event Description: Steam Generator Tube Leak

Time	Position	Applicant's Actions or Behavior
	SRO	<p>5. <b>MONITOR</b> primary-to-secondary leak rate:</p> <p>a. <b>PERFORM</b> Appendix A, Radiation Monitor Trending Data every 15 min. <b>USING</b> available rad monitors.</p> <p>b. <b>VERIFY</b> rise in count rate validated by at least one of the following:</p> <ul style="list-style-type: none"> <li>sample results confirming rise in S/G activity</li> </ul> <p><b>OR</b></p> <ul style="list-style-type: none"> <li>two independent secondary rad monitors showing rise in count rate.</li> </ul> <p>c. <b>REFER TO</b> Appendix B, Summary of Action Levels for S/G Tube Leak.</p>
<p><b>NOTE 1</b> When monitoring leakage using radiation monitors, primary to secondary leakage should be monitored over several minutes to ensure that rise in leakage is not a temporary spike.</p> <p><b>NOTE 2</b> Leakage action levels apply to leak rate from a single S/G. If unable to determine leakage from individual S/Gs, total leakage should be assumed to be coming from one S/G.</p>		
	BOP	<p>6. <b>MONITOR</b> shutdown requirements:</p> <p>a. <b>CHECK</b> condenser vacuum exhaust rad monitor RM-90-99 or RM-90-119 OPERABLE.</p>
<p><b>NOTE</b> If leak rate exceeds 75 gal per day (Action Level 3) based upon condenser vacuum exhaust rad monitor and NO S/G blowdown rad monitor is available to validate leak, required actions to shut down shall be initiated based upon the one available rad monitor.</p>		



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Event Description:		Steam Generator Tube Leak							

Time	Position	Applicant's Actions or Behavior
	BOP	<div style="display: flex; justify-content: space-between;"> <div style="width: 48%;"> <p>6. b. <b>CHECK</b> Primary to Secondary leak rate in affected S/G(s) less than 75 gal per <u>day</u>.</p> </div> <div style="width: 48%;"> <p>b. <b>IF</b> leak rate in affected S/G(s) greater than or equal to 75 gal per <u>day</u>, <b>THEN</b> <b>PERFORM</b> the following:</p> <p>1) <b>ENSURE</b> power less than 50% <u>within 1 hr</u> and unit in Mode 3 <u>within next 2 hrs</u> (total of 3 hrs).</p> <p>2) <b>GO TO</b> Section 2.1 to shut down.</p> <div style="text-align: right; margin-top: 10px;">  </div> </div> </div>
<p>Examiner Note: crew should realize leak is sufficient and transitions to section 2.1, page 7 Step 6 RNO</p>		

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Event Description:		Steam Generator Tube Leak							

<b>SQN</b>	<b>STEAM GENERATOR TUBE LEAK</b>	<b>AOP-R.01 Rev. 26</b>
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### APPENDIX F ESTIMATING RCS LEAK RATE USING CVCS FLOW BALANCE

**NOTE 1** This method is recommended when leak requires rise in charging flow greater than ~10 gpm. Appendix G is more accurate for smaller leak rates.

**NOTE 2** This appendix assumes RCS temperature and charging flow are approximately constant.

	INITIAL	FINAL	CHANGE
PZR Level			[1] (negative for level decrease)
Time			[2]
Charging Flow		[3]	
Letdown Flow		[4]	
Total RCP Seal Return Flow		[5]	

#### Pressurizer Level Conversion

$$\begin{array}{ccccccc}
 \text{Pressurizer level change} & & \text{conversion factor} & & \text{Time Change} & & \text{Pzr Level Rate of Change} \\
 \% & \times & 62 \text{ gal} / \% & \div & \text{min} & = & \text{(positive for level rising)} \\
 \text{step [1] above} & & & & \text{step [2] above} & & \text{[6]} \\
 & & & & & & \text{gpm}
 \end{array}$$

#### Leak Rate Calculation

$$\begin{array}{ccccccc}
 \text{Charging Flow} & & \text{Letdown Flow} & & \text{Seal Return Flow} & & \text{Pzr Level Rate of Change} \\
 & - & & - & & - & \\
 \text{step [3] above} & & \text{step [4] above} & & \text{step [5] above} & & \text{step [6] above} \\
 & & & & & + & 3 \text{ gpm} \\
 & & & & & = & \text{RCS Leak Rate} \\
 & & & & & & \text{gpm}
 \end{array}$$

Op Test No.:	NRC 2013-301	Scenario #	1	Event #	3	Page	17	of	64
Event Description:		Steam Generator Tube Leak							

<b>SQL</b>	<b>STEAM GENERATOR TUBE LEAK</b>	<b>AOP-R.01</b> Rev. 26
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### APPENDIX G

#### ESTIMATING RCS LEAK RATE USING VCT AND PZR LEVEL

**CAUTION** This appendix CANNOT be used during VCT makeup, boration, or dilution.

**NOTE** This appendix assumes RCS temperature is approximately constant.

	VCT LEVEL (%)	PZR LEVEL (%)	TIME (min)
INITIAL			
FINAL			
CHANGE	[1] (positive for level decrease)	[2] (positive for level decrease)	[3]

#### VCT Level Conversion

VCT level change		conversion factor		Time Change		VCT Level Rate of Change (positive for level lowering)
_____ %	X	20 gal / %	÷	_____ min	=	_____ gpm
step [1] above				step [3] above		[4]

#### Pressurizer Level Conversion

Pressurizer level change		conversion factor		Time Change		Pzr Level Rate of Change (positive for level lowering)
_____ %	X	62 gal / %	÷	_____ min	=	_____ gpm
step [2] above				step [3] above		[5]

#### Leak Rate Calculation

VCT Level Rate of Change		Pzr Level Rate of Change		RCS Leak Rate
_____	+	_____	=	_____ gpm
step [4] above		step [5] above		

Op Test No.: 2013-301 Scenario # 1 Event # 4 Page 18 of 64  
 Event Description: Rapid Power Reduction

Time	Position	Applicant's Actions or Behavior
<b>No action required for Event 4, Rapid Power reduction</b>		
	SRO	Directs performance of AOP-C.03 RAPID SHUTDOWN OR LOAD REDUCTION.
	SRO	1. <b>ENSURE</b> crew has been briefed on reactivity management expectations <b>USING</b> Appendix A.

#### APPENDIX A

#### REACTIVITY MANAGEMENT BRIEFING

**NOTE** This appendix should be used in addition to event-based brief.

[1] **ENSURE** crew has been briefed on the following:

- Reason for Rapid Shutdown or Load Reduction
- Load Reduction Rate: \_\_\_\_\_
- Desired final power level: \_\_\_\_\_
- Reactivity Management expectations:
  - Unit Supervisor shall concur with all reactivity manipulations
  - Ensure reactor responding as expected using diverse indications
  - Tav<sub>g</sub>-T<sub>ref</sub> Mismatch requirements:
    - 3°F control band
    - 5°F reactor trip criteria
  - Crew focus will be on reducing power in a controlled and conservative manner.
  - OATC will monitor rod insertion limits and AFD limit
  - Boration source: \_\_\_\_\_
- Crew will monitor reactor trip and turbine trip criteria using App. B
- CRO will stop secondary plant equipment using App. C.
- Termination Criteria (conditions requiring Reactor Trip, Turbine Trip, or condition no longer requiring rapid load reduction):

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_


Op Test No.: 2013-301 Scenario # 1 Event # 4 Page 19 of 64  
 Event Description: Rapid Power Reduction

Time	Position	Applicant's Actions or Behavior
	SRO	Chooses a power reduction rate of 1% final power level of 20% and BAT as the boration source. (1% to 3% acceptable.)
	CREW	2. <b>MONITOR</b> reactor/turbine trip NOT required <b>USING</b> Appendix B, <i>Reactor and Turbine Trip Criteria</i> . (two extra copies provided for UOs)
	CREW	3. <b>CHECK VALVE POSITION LIMIT</b> light DARK on EHC panel. [M-2]
Examiner note: Appendix B reactor and turbine trip criteria see page 31		
<b>NOTE:</b> Step 4 should be handed off to opposite unit or extra operator (if available). If NO operator is available, notifications should be performed concurrently with subsequent steps (when time permits).		
	CREW	4. <b>ENSURE</b> following personnel notified of rapid shutdown or load reduction: [C.1] <ul style="list-style-type: none"> <li>Balancing Authority (Load Coordinator) (751-7547).</li> <li>Chemistry</li> <li>Radiation Protection</li> <li>Plant Management</li> </ul>
	CREW	Makes notifications as required.
<b>NOTE:</b> Boration volumes and flowrates listed in this procedure are recommendations and may be adjusted as necessary.		
	ATC	5. <b>INITIATE</b> boration: <ul style="list-style-type: none"> <li>a. <b>CHECK</b> rod control AVAILABLE:             <ul style="list-style-type: none"> <li>Control Bank D rods capable of being moved</li> <li>NO dropped or misaligned rods in Control Bank D.</li> </ul> </li> </ul>

Op Test No.: 2013-301 Scenario # 1 Event # 4 Page 20 of 64  
 Event Description: Rapid Power Reduction

Time	Position	Applicant's Actions or Behavior								
	ATC	5. b. <b>CHECK</b> Control Bank D group position greater than 200 steps.  c. <b>CHECK</b> boration capability from BAT AVAILABLE.								
Examiner Note: The SRO addresses step 5b as no, but does not implement the RNO since a Turbine Runback has not occurred.										
	SRO	d. <b>DETERMINE</b> recommended boration volume from BAT:  • ~800 gal to reduce power from 100% to 20%  <b>OR</b>  • 10 gal for each 1% power reduction (from current power level)  <b>OR</b>  • volume recommended by Reactor Engineering.								
	SRO	Determines ~550 gal as required to reduce power from 76% to 20%.								
	SRO	5. e. <b>DETERMINE</b> recommended boration flowrate from table below or from Reactor Engineering: <table><thead><tr><th>LOAD REDUCTION RATE(%/min)</th><th>BORATION FLOWRATE</th></tr></thead><tbody><tr><td>1%</td><td>~15 gpm</td></tr><tr><td>2%</td><td>~30 gpm</td></tr><tr><td>3%</td><td>~45 gpm</td></tr></tbody></table>	LOAD REDUCTION RATE(%/min)	BORATION FLOWRATE	1%	~15 gpm	2%	~30 gpm	3%	~45 gpm
LOAD REDUCTION RATE(%/min)	BORATION FLOWRATE									
1%	~15 gpm									
2%	~30 gpm									
3%	~45 gpm									
	SRO	Chooses a 1% load reduction rate. (1% to 3% acceptable.)								
	ATC	f. <b>ENSURE</b> concurrence obtained from STA for boration volume and flowrate.								

Op Test No.: 2013-301 Scenario # 1 Event # 4 Page 21 of 64  
 Event Description: Rapid Power Reduction

Time	Position	Applicant's Actions or Behavior
	ATC	<p>g. CHECK status of charging and letdown:</p> <ul style="list-style-type: none"> <li>normal letdown flow ESTABLISHED</li> <li>charging flow control HIC-62-93A in AUTO.</li> </ul> <p>g. IF auto VCT makeup capability is needed due to RCS leakage or loss of letdown, THEN</p> <ol style="list-style-type: none"> <li>INITIATE emergency boration USING Appendix I.</li> <li>GO TO Substep 5.J (AER column).</li> </ol> 

Examiner Note: If the SRO addresses step 5g RNO as required, Emergency Boration using Appendix I will be implemented, and the crew will go to step 5J go to page 24 for details.

	ATC	<p>h. DETERMINE if normal boration will be used:</p> <ul style="list-style-type: none"> <li>desired load reduction rate is <u>less than</u> 4% per minute</li> <li>time is available for normal boration.</li> </ul>
	ATC	<p>i. INITIATE normal boration USING Appendix H.</p>

Examiner note: Appendix H Actions are listed in the following steps.

### APPENDIX H NORMAL BORATION

	ATC	<p>[1] RECORD desired boration volume and flowrate: <input type="checkbox"/></p> <p>Volume (gal) _____</p> <p>Flowrate (gpm) _____</p>
	ATC	Records ≈550 gal as required at 15 to 45 gpm
	ATC	<p>[2] PLACE [HS-62-140A] Makeup Control to STOP position. <input type="checkbox"/></p>
	ATC	Places HS-62-140A to STOP.
	ATC	<p>[3] PLACE [HS-62-140B] Makeup mode selector switch in BORATE position. <input type="checkbox"/></p>
	ATC	Places HS-62-140B to BORATE

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 Event Description: Rapid Power Reduction

Time	Position	Applicant's Actions or Behavior
<b>NOTE</b> Boric Acid controller setting is twice the desired flow rate. Maximum Boric Acid flow is ~45 gpm.		
	ATC	<b>[4] ADJUST [FC-62-139]</b> BA flow controller setpoint for desired flow rate. <input type="checkbox"/>
	ATC	Places FIC-62-139 to 15 to 45 gpm.
	ATC	<b>[5] ADJUST [FQ-62-139]</b> BA integrator (batch counter) to desired boric acid volume. <input type="checkbox"/>
	ATC	Places FQ-62-139 to ~550 gal.
	ATC	<b>[6] PLACE [HS-62-140A]</b> Makeup Control Switch mode selector switch to START. <input type="checkbox"/>
	ATC	Places HS-62-140A to START
	ATC	<b>[7] ENSURE</b> boric acid transfer pump aligned to blender in FAST speed. <input type="checkbox"/>
	ATC	<b>[8] IF</b> desired boric acid flow rate NOT obtained, <b>THEN</b> <b>ADJUST</b> one or both of the following as necessary: <ul style="list-style-type: none"> <li><b>[FC-62-139]</b> BA flow controller <input type="checkbox"/></li> <li>recirculation valve for BAT aligned to blender. <input type="checkbox"/></li> </ul>
	ATC	Adjusts FIC-62-139 as required.
	ATC	<b>[9] ENSURE</b> desired boric acid flow indicated on FI-62-139. <input type="checkbox"/>
	ATC	<b>[10] RECORD</b> time when boration flow established: <input type="checkbox"/> Time: _____
	ATC	Records time boration initiated.
	ATC	<b>[11] WHEN</b> required boric acid volume has been added <b>AND</b> control rods are above low-low insertion limit, <b>THEN</b> <b>PERFORM</b> the following: <ul style="list-style-type: none"> <li><b>[a] PLACE [HS-62-140A]</b>, Makeup Control to STOP position. <input type="checkbox"/></li> </ul>
	ATC	Places HS-62-140A to STOP.




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 Event Description: Rapid Power Reduction

Time	Position	Applicant's Actions or Behavior
	ATC	<b>[b] ENSURE [FC-62-142]</b> , Primary Water to Blender Flow Controller in AUTO with dial indicator set at 35%. <input type="checkbox"/>
	ATC	<b>[c] ADJUST [FC-62-139]</b> , Boric Acid Flow Controller to desired blend solution <b>USING</b> TI-44 Boron Tables. <input type="checkbox"/>
	ATC	Places FIC-62-139 to 27.
	ATC	<b>[d] PLACE [HS-62-140B]</b> , Makeup Mode Selector Switch in AUTO position. <input type="checkbox"/>
	ATC	Places HS-62-140B to AUTO.
	ATC	<b>[e] PLACE [HS-62-140A]</b> , Makeup Control to START. <input type="checkbox"/>
	ATC	Places HS-62-140A to START.
	ATC	<b>[f] ENSURE</b> boric acid transfer pumps running in SLOW speed. <input type="checkbox"/>
	ATC	Places HS-62-230A BA Transfer Pump 1A to STOP Places HS-62-230A BA Transfer Pump 1A to START.
	ATC	Places HS-62-232A to BA Transfer Pump 1B to STOP Places HS-62-232A to BA Transfer Pump 1B to START.
<b>APPENDIX I</b>		
<b>EMERGENCY BORATION</b>		
	ATC	<b>[1] RECORD</b> desired boration volume and flowrate: <input type="checkbox"/> Volume (gal) _____ Flowrate (gpm) _____
	ATC	Records ≈550 gal as required at 15 to 45 gpm
	ATC	<b>[2] ENSURE</b> boric acid transfer pump aligned to blender in FAST speed. <input type="checkbox"/>
	ATC	Places HS-62-230D BA Transfer Pump 1A Speed Sel and or HS-62-232D BA Transfer Pump 1B Speed Sel to FAST AND Places HS-62-230A BA Transfer Pump 1A and or HS-62-232A BA Transfer Pump 1A


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 Event Description: Rapid Power Reduction

Time	Position	Applicant's Actions or Behavior
	ATC	<b>[3] ADJUST [FCV-62-138]</b> Emergency Borate Valve to establish desired boric acid flow. <input type="checkbox"/>
	ATC	Adjusts FCV-62-138 to between 30 to 45 gpm.
	ATC	<b>[4] RECORD</b> the following: <input type="checkbox"/> Boration flow: _____ Time: _____
	ATC	Records the flow and time boration initiated.
	ATC	<b>[5] NOTIFY</b> Unit Supervisor when boration flow established. <input type="checkbox"/>
	ATC	<b>[6] IF</b> Unit Supervisor directs changing boration flowrate, <b>THEN RECORD</b> the following: <input type="checkbox"/> Boration flow: _____ Time: _____
Examiner Note: The crew continues actions to lower plant power using AOP-C.03 RAPID SHUTDOWN OR LOAD REDUCTION here.		
		<b>5. INITIATE</b> boration:  J. <b>CONTROL</b> boration flow as required to inject desired boric acid volume.
<b>CAUTION:</b> If borating from the RWST, Turbine Load Reduction Rate greater than 2% per minute could result in violating Rod Insertion Limit.		
	BOP	<b>6. INITIATE</b> load reduction as follows:  a. <b>ADJUST</b> load rate to desired value: <ul style="list-style-type: none"> <li>between 1% and 4% per minute if borating via FCV-62-138</li> </ul> <b>OR</b> <ul style="list-style-type: none"> <li>between 1% and 3% per minute if borating via normal boration (App. H)</li> </ul> <b>OR</b> <ul style="list-style-type: none"> <li>2% per minute if borating from RWST.</li> </ul>
	BOP	Adjusts load rate approx 1% to 3% per minute

Op Test No.: 2013-301 Scenario # 1 Event # 4 Page 25 of 64  
 Event Description: Rapid Power Reduction

Time	Position	Applicant's Actions or Behavior				
	BOP	<p>b. <b>ADJUST</b> setter for desired power level:</p> <table><tr><th>DESIRED RX POWER LEVEL</th><th>RECOMMENDED SETTER VALUE</th></tr><tr><td>20% or less</td><td>15</td></tr></table>	DESIRED RX POWER LEVEL	RECOMMENDED SETTER VALUE	20% or less	15
DESIRED RX POWER LEVEL	RECOMMENDED SETTER VALUE					
20% or less	15					
	BOP	Adjusts setter to approx. 15				
	BOP	<p>6. c. <b>VERIFY</b> boration flow established.</p> <p>d. <b>INITIATE</b> turbine load reduction by depressing GO pushbutton.</p>				
	BOP	Depresses GO pushbutton.				
	BOP	e. <b>CONTROL</b> turbine load reduction as necessary to reduce power to desired level.				
	ATC	<p>7. <b>MONITOR</b> T-avg/T-ref mismatch:</p> <div><p>a. <b>CHECK</b> T-ref indication AVAILABLE.</p><p>a. <b>PERFORM</b> the following:</p><ol style="list-style-type: none"><li>1) <b>MONITOR</b> Program T-avg for current reactor power <b>USING</b> TI-28 Figure 3 or ICS (NSSS / BOP, Program Reactor Average Temperature).</li><li>2) <b>USE</b> program T-avg in place of T-ref.</li><li>3) <b>MAINTAIN</b> T-avg within 3°F of program T-avg <b>USING</b> manual rod control.</li><li>4) <b>ADJUST</b> turbine load rate as necessary.</li><li>5) <b>IF</b> mismatch between T-avg and program value <b>CANNOT</b> be maintained less than 5°F, <b>THEN</b> <b>TRIP</b> the reactor and <b>GO TO</b> E-0, Reactor Trip or Safety Injection.</li></ol></div> 				

Op Test No.: 2013-301 Scenario # 1 Event # 4 Page 26 of 64  
 Event Description: Rapid Power Reduction

Time	Position	Applicant's Actions or Behavior
		<p>7. b. <b>MONITOR</b> automatic rod control maintaining T-avg/T-ref mismatch less than 3°F.</p> <p>b. <b>IF</b> auto rod control is functional <b>AND</b> situation allows slowing down load reduction, <b>THEN</b> <b>PERFORM</b> the following:</p> <p>1) <b>REDUCE</b> turbine load rate to allow auto rod control to restore T-avg/T-ref mismatch.</p> <p>2) <b>WHEN</b> T REF T AUCTION HIGH LOW alarm (M-5A, C-6) is clear, <b>THEN</b> <b>RESTORE</b> turbine load rate to desired value.</p> <p><b>IF</b> any of the following conditions met:</p> <ul style="list-style-type: none"> <li>• auto rod control NOT functional</li> </ul> <p><b>OR</b></p> <ul style="list-style-type: none"> <li>• turbine load rate adjustment is NOT effective in reducing mismatch</li> </ul> <p><b>OR</b></p> <ul style="list-style-type: none"> <li>• situation does NOT allow slowing down load reduction,</li> </ul> <p><b>THEN</b> <b>RESTORE</b> T-avg to within 3°F of T-ref <b>USING</b> manual rod control as necessary.</p> <p><b>IF</b> T-avg/T-ref mismatch CANNOT be maintained less than 5°F, <b>THEN</b> <b>TRIP</b> the reactor and <b>GO TO</b> E-0, Reactor Trip or Safety Injection.</p> 
	ATC	Coordinates with the BOP to maintain T-avg/Program T-ref mismatch less than 3°F using the TI-28 figure 3 or ICS.
	BOP	8. <b>MONITOR</b> automatic control of MFW pump speed AVAILABLE.
	BOP	9. <b>STOP</b> secondary plant equipment <b>USING</b> Appendix C, Secondary Plant Equipment.
Examiner Note: Appendix C, Secondary Plant Equipment starts at page 32.		
<p><b>NOTE:</b> If LEFM thermal power (U2118) is inoperable, rod insertion limit curve must be raised by 3 steps. Rod insertion limit alarms and ICS display are NOT automatically adjusted when LEFM is inoperable.</p>		

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 Event Description: Rapid Power Reduction

Time	Position	Applicant's Actions or Behavior
	CREW	10. <b>MONITOR</b> control rods above low-low insertion limit <b>USING</b> ICS or COLR.
<b>NOTE:</b> Initiating plant shutdown required by Tech Specs requires 4 hour NRC notification per NPG-SPP-03.5, <i>Regulatory Reporting Requirements</i> .		
	CREW	11. <b>EVALUATE</b> Tech Specs/TRM for applicability: <ul style="list-style-type: none"> <li>• 3.2.1, Axial Flux Difference</li> <li>• 3.1.1.1, Shutdown Margin</li> <li>• 3.1.3.6, Rod Insertion Limits</li> <li>• TRM 3.1.2.2, Boration Flowpaths</li> <li>• 3.5.5, RWST.</li> </ul>
	CREW	12. <b>EVALUATE</b> EPIP-1, <i>Emergency Plan Initiating Conditions Matrix</i> .
	ATC	13. <b>PERFORM</b> the following to reduce boron concentration difference between pzs and RCS loops: <ul style="list-style-type: none"> <li>a. <b>CHECK</b> at least one normal spray valve AVAILABLE.</li> <li>b. <b>ENSURE</b> at least one backup heater group ENERGIZED.</li> <li>c. <b>ENSURE</b> spray valve(s) responds to control RCS pressure.</li> </ul>
	ATC	Places Pressurizer Backup Heaters to ON, as required.

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 Event Description: Rapid Power Reduction

Time	Position	Applicant's Actions or Behavior
	CREW	<p>14. <b>WHEN</b> reactor power change exceeds 15% within one hour,  <b>THEN</b>  <b>NOTIFY</b> Chemistry to initiate sampling as required by the following:</p> <ul style="list-style-type: none"> <li>• 0-SI-CEM-000-050.2</li> <li>• 0-SI-CEM-030-407.2</li> <li>• 0-SI-CEM-030-415.0.</li> </ul>
		<p>15. <b>MONITOR</b> if turbine load reduction can be stopped:</p> <p>a. <b>CHECK</b> the following conditions met:</p> <ul style="list-style-type: none"> <li>• reactor shutdown is NOT needed</li> <li>• turbine shutdown is NOT needed</li> <li>• turbine load at desired power level (further load reduction NOT needed)</li> </ul> <p>b. <b>ENSURE</b> turbine load reduction STOPPED.</p> <p>c. <b>WHEN</b> control rods are above the low-low insertion limit,  <b>THEN</b>  <b>ENSURE</b> boration flow STOPPED.</p> <p>d. <b>NOTIFY</b> Chem Lab to sample RCS for boron concentration.</p> <p>e. <b>MAINTAIN</b> T-avg within 3°F of T-ref  <b>USING</b> one of the following:</p> <ul style="list-style-type: none"> <li>• AUTO or MANUAL rod control  OR</li> <li>• dilution or boration  <b>USING</b> 0-SO-62-7  OR</li> <li>• additional turbine load reduction.</li> </ul>

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 Event Description: Rapid Power Reduction

- |  |   |
|--|---|
|  | <p>15. f. CHECK reactor power greater than 50%.</p> <p>g. DETERMINE Tech Spec AFD limits for current power level<br/> <b>USING</b> ICS (Primary Mimics, Doghouse Display) or COLR.</p> <p>h. CHECK AFD within Tech Spec limits on at least three operable power range NIS channels.</p> <p>i. IF AFD is outside target band,<br/> <b>THEN</b><br/> <b>INITIATE</b> 0-SI-NUC-000-044.0,<br/> <i>Axial Flux Difference.</i></p> <p>15. J. <b>INITIATE</b> performance of<br/>         0-SI-OPS-092-078.0, Power Range<br/>         Neutron Flux Channel Calibration<br/>         By Heat Balance Comparison.</p> <p>k. CHECK C-7 LOSS OF LOAD<br/>         INTERLOCK [M-4A window E-5]<br/>         DARK.</p> |
|--|---|

**NOTE:** Time in core life, expected Xenon changes, and planned power changes should be considered when evaluating need for boration or dilution.  
 If dilution is required, Reactor Engineering Data Sheet provides recommended dilution volume for first hour following downpower.

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 Event Description: Rapid Power Reduction

- L. **CONSULT** Reactor Engineering and STA regarding  $\Delta I$  control and compensating for Xe changes.
- m. **PERFORM** the following as necessary to control  $\Delta I$  and maintain T-avg on program:
- **INITIATE** boration or dilution as necessary **USING** 0-SO-62-7, *Boron Concentration Control*
  - OR
  - **ADJUST** control rod position as necessary.
15. n. **CHECK** at least one normal pwr spray valve OPERABLE.
- o. **DETERMINE** appropriate procedure based upon power level and cause of rapid shutdown:
- Other applicable AOP
  - OR
  - 0-GO-5, *Normal Power Operation* (if greater than approximately 30% power)
  - OR
  - 0-GO-4, *Power Ascension from Less than 5% to 30% Power* (if less than approximately 30%)
- p. **GO TO** appropriate plant instruction.



Examiner Note: When the crew has sufficiently reduced power the Lead Examiner may go to the next event starting at page 35.



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 Event Description: Rapid Power Reduction

## APPENDIX B

## REACTOR AND TURBINE TRIP CRITERIA

REACTOR TRIP CRITERIA	TURBINE TRIP CRITERIA
Turbine trip required or imminent with reactor power greater than P-9 (50%)	Turbine vibration exceeding 14 mils with one of the following:
Uncontrolled rod movement which CANNOT be stopped by placing rods in MANUAL (AOP-C.01)	<ul style="list-style-type: none"> <li>high vibration on multiple bearings OR</li> <li>abnormal noise/vibration apparent</li> </ul>
Loss of S/G level control: level dropping or rising toward trip setpoint and level CANNOT be restored (AOP-S.01)	
More than one dropped rod (AOP-C.01)	
T-avg/T-ref mismatch CANNOT be maintained less than 5°F (refer to Step 7 or App. E)	
≥ 30% turbine load: Condenser Pressure > 2.7 psia AND CANNOT be restored within 5 minutes (AOP-S.02)	< 30% turbine load: Condenser Pressure > 1.72 psia (AOP-S.02)
Any automatic reactor trip setpoint reached OR automatic trip imminent: <ul style="list-style-type: none"> <li>Turbine trip above P-9 (50%)</li> <li>Safety injection</li> <li>Power Range high flux 109%</li> <li>Power Range flux rate <math>\pm 5\%</math> in 2 seconds</li> <li>Pressurizer high level 92%</li> <li>Pressurizer pressure low 1970 psig</li> <li>Pressurizer pressure high 2385 psig</li> <li>RCS low flow 90%</li> <li>RCP undervoltage 5.022 kilovolts</li> <li>RCP underfrequency 56.0 Hz</li> <li>OTΔT 115% (variable)</li> <li>OPΔT 108.7% (variable)</li> <li>S/G low level 10.7% [15% EAM]</li> <li>SSPS general warning in both trains</li> </ul>	Any automatic turbine trip setpoint reached OR automatic trip imminent: <ul style="list-style-type: none"> <li>High Stator Cooling Water temp 90°C OR Stator D/P 12 psig below normal</li> <li>Both MFPT's tripped</li> <li>Low Auto Stop Oil pressure 45 psig</li> <li>High S/G level 81% narrow range</li> <li>Main Turb Bearing Oil low pressure 7 psig</li> <li>Thrust Bearing Oil high pressure 60 psig</li> <li>Turbine Overspeed 1980 rpm</li> <li>Loss of EHC pressure</li> <li>Unit 1 Only: Generator PCBs tripped.</li> <li>Unit 2 Only: Generator Circuit Breaker (GCB) tripped OR 161KV PCBs 924 and 928 tripped.</li> </ul>

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 Event Description: Rapid Power Reduction

## APPENDIX C

## SECONDARY PLANT EQUIPMENT

[1] **ENSURE** plant announcement(s) made on the following:

- starting rapid shutdown (or load reduction) due to (reason) ☐
- stopping secondary plant equipment ☐

**NOTE 1** If reactor power will be reduced below 50%, AUO should be on station at #3 heater drain tank (if possible) when 60% power is reached.

**NOTE 2** Dispatching of AUO in Steps [2] and [3] may be performed out of sequence.

[2] **IF** reactor power will be reduced below 50%,  
**THEN**  
**DISPATCH** AUO with Appendix J (Unit 1) or K (Unit 2)  
 to #3 Heater Drain Tank. ☐

[3] **IF** one MFP will be shutdown using this appendix,  
**THEN**  
**DISPATCH** AUO to **OPEN** MFWP recirc manual Isolation valve  
 for MFWP to be removed from service: (N/A valves NOT opened)

UNIT	MFWP	VALVE	LOCATION	OPEN <input checked="" type="checkbox"/>
1	1A	1-VLV-3-576	TB el. 706, Northeast corner of 1A condenser	<input type="checkbox"/>
	1B	1-VLV-3-577	TB el. 706, Northeast corner of 1A condenser	<input type="checkbox"/>
2	2A	2-VLV-3-576	TB el. 706, Southeast corner of 2A condenser	<input type="checkbox"/>
	2B	2-VLV-3-577	TB el. 706, Southeast corner of 2A condenser	<input type="checkbox"/>

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 Event Description: Rapid Power Reduction

## APPENDIX C

**[4] IF BOTH** of the following conditions are met:

- power is being reduced as directed by AOP-S.01 (Main Feedwater Malfunctions) or AOP-S.04 (Condensate or Heater Drain Malfunctions)
- leaving secondary pumps in service is desired,

**THEN**

**GO TO** Step [8].



**[5] WHEN** turbine impulse pressure is approximately 80% or less,  
**THEN**  
**PERFORM** the following:

**[a] ENSURE** one Cond Demin Booster Pump STOPPED.



**[b] ENSURE** associated suction valve CLOSED:

COND DEMIN BOOSTER PUMP	SUCTION VALVE	CLOSED ✓
A	FCV-2-290	<input type="checkbox"/>

**OR**

B	FCV-2-285	<input type="checkbox"/>
---	-----------	--------------------------

**OR**

C	FCV-2-280	<input type="checkbox"/>
---	-----------	--------------------------

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Event Description: Rapid Power Reduction

- [6] **WHEN** turbine impulse pressure is approximately 70-75%,  
**THEN**  
**PERFORM** the following:

[a] **ENSURE** one Condensate Booster Pump STOPPED. ☐

[b] **ENSURE** associated CBP suction valve CLOSED:

CONDENSATE BOOSTER PUMP	SUCTION VALVE	CLOSED ✓
A	FCV-2-94	<input type="checkbox"/>

OR

B	FCV-2-87	<input type="checkbox"/>
---	----------	--------------------------

OR

C	FCV-2-81	<input type="checkbox"/>
---	----------	--------------------------

- [c] **PERFORM** applicable procedure to adjust seal injection water pressure on stopped CBP to prevent water intrusion in oil:  
(may be assigned to another operator or delayed if necessary)

- 1-SO-2/3-1 Section 7.2 ☐

OR

- 2-SO-2/3-1 Section 7.3 ☐

Op Test No.: 2013-301 Scenario # 1 Event # 5 Page 35 of 64

Event Description: 1A MFW Pump Oil Leak


Time	Position	Applicant's Actions or Behavior						
<b>Direct the Simulator Operator to initiate Event 5, 1A MFW Pump Oil Leak</b>								
<b>Indications/Alarms</b>  <b>Annunciator:</b>  <b>1-M-5</b> <ul style="list-style-type: none"> <li>3B A-1, "MAIN FEEDWATER PUMP TURBINE 1A ABNORMAL"</li> <li>3B A-3, "TURBINE OR PMP BEARING OIL PRESSURE LOW"</li> </ul> <b>Indications:</b>  <b>1-M-5</b> <ul style="list-style-type: none"> <li>PI-46-12 Bearing Oil Pressure.</li> </ul>								
<div style="border: 1px solid black; padding: 10px; text-align: center; margin: 10px auto; width: 200px;"> <b>TURBINE OR PMP BEARING OIL PRESSURE LOW</b> </div> <p>[1] IF MFP has tripped, <b>THEN</b> GO TO AOP-S.01, <i>Loss of Normal Feedwater</i>.</p> <p>[2] IF MFP has <u>NOT</u> tripped, <b>THEN</b></p> <p>[a] <b>CHECK</b> window 1 (A-1) or 8 (B-1) LIT to determine affected pump.</p> <p>[b] <b>CHECK</b> indicated bearing oil pressure on affected pump (PI-46-12 or PI-46-39).</p> <p>[c] IF indicated bearing oil pressure &lt; 10 psig, <b>THEN</b> TRIP affected MFP, <b>AND</b> GO TO AOP-S.01, <i>Loss of Normal Feedwater</i>.</p> <p>[d] <b>VERIFY</b> EOP running alarm LIT (window A-7) and red oil pressure light on.</p>								
<b>Examiner Note:</b> Several steps, notes, and cautions in the Annunciator response procedure do not apply to this failure. Only those that are applicable are listed in this event guide.								
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%;">IF...</th><th style="width: 25%;">GO TO SECTION</th><th style="width: 25%;">PAGE</th></tr> </thead> <tbody> <tr> <td>Main Feedwater Pump Trip Below 76% (Unit 1) or 77% (Unit 2) Turbine Load</td><td style="text-align: center;">2.4</td><td style="text-align: center;">20</td></tr> </tbody> </table>			IF...	GO TO SECTION	PAGE	Main Feedwater Pump Trip Below 76% (Unit 1) or 77% (Unit 2) Turbine Load	2.4	20
IF...	GO TO SECTION	PAGE						
Main Feedwater Pump Trip Below 76% (Unit 1) or 77% (Unit 2) Turbine Load	2.4	20						
	BOP	Responds to ARP 1-AR-M3B A-3.						
	BOP	Places HS-46-9A 1A MFP RESET/TRIP to TRIP.						
	SRO	Transitions to AOP-S.01, Section 2.4						

Op Test No.: 2013-301 Scenario # 1 Event # 5 Page 36 of 64

Event Description: 1A MFW Pump Oil Leak

Time	Position	Applicant's Actions or Behavior
	SRO	Directs actions of AOP-S.01, Section 2.4
	BOP	1. <b>MONITOR</b> at least one MFW pump RUNNING.
	BOP	2. <b>ENSURE</b> running MFW pump loads as required.
	BOP	3. <b>CHECK</b> feedwater flow greater than steam flow.
	BOP	4. <b>MONITOR</b> steam generator levels returning to program level. <b>PERFORM</b> the following: <ul style="list-style-type: none"> <li>a. <b>IF</b> manual control of MFWP speed or MFW Reg valve position is needed, <b>THEN</b> <b>PERFORM</b> the following as necessary:               <ul style="list-style-type: none"> <li>• <b>ADJUST</b> running MFWP speed</li> <li>OR</li> <li>• <b>ADJUST</b> MFW Reg valve position.</li> </ul> </li> </ul>
	Crew	Performs a Crew Brief as time allows.
	Crew	Notifications should be addressed as applicable if not specifically addressed by the procedure or in the crew brief. Operations Management - Typically Shift Manager. Maintenance Personnel – Typically Maintenance Shift Supervisor (MSS). (Note: Maintenance notification may be delegated to the Shift Manager).
<b>Lead Examiner may cue the next event when desired.</b>		

Op Test No.: 2013-301 Scenario # 1 Event # 6, 7, 8 Page 37 of 64  
 Event Description: #1 S/G SGTR/#1 S/G ADV Fail Open

Time	Position	Applicant's Actions or Behavior
<b>Simulator Operator: When directed, initiate Event 6</b>		
<b>Indications available:</b> <ul style="list-style-type: none"> <li>• RCS pressure lowering rapidly</li> <li>• Numerous radiation monitor alarms</li> <li>• RCS pressure lowering.</li> <li>• #1 SG Level increasing</li> </ul>		
Examiner Note: The following steps come from AOP-R.01, STEAM GENERATOR TUBE LEAK and may be performed as the SGTL degrades.		
	ATC	<p>1. <b>MONITOR</b> if Pressurizer level can be maintained:</p> <p>b. <b>MONITOR</b> pressurizer level STABLE or RISING.</p> <p>b. <b>PERFORM</b> the following:</p> <p>1) <b>ENSURE</b> letdown isolated:</p> <ul style="list-style-type: none"> <li>• FCV-62-72 CLOSED</li> <li>• FCV-62-73 CLOSED</li> <li>• FCV-62-74 CLOSED</li> </ul> <p>2) <b>IF</b> pwr level continues to drop, <b>THEN</b> <b>START</b> additional CCP as necessary.</p> <p><b>IF</b> pwr level CANNOT be maintained greater than 5% <b>OR</b> loss of pwr level is imminent, <b>THEN</b> <b>PERFORM</b> the following:</p> <p>1) <b>TRIP</b> the reactor.</p> <p>2) <b>WHEN</b> reactor is tripped, <b>THEN</b> <b>INITIATE</b> Safety Injection.</p> <p>3) <b>GO TO</b> E-0, Reactor Trip or Safety Injection.</p> 
	ATC	If pressurizer level is still dropping, places HS-FCV-62-72, FCV-62-73 CLOSED, and FCV-62-74 to CLOSE. (If not already performed.)
	ATC	May place HS-62-108A 1A Charging Pump to START.
	SRO	Transitions to E-0. Reactor Trip or Safety Injection
Examiner Note: following IOA performance, prior to Steps 1-4 immediate action verification, ATC/BOP surveys MCBs for any expected automatic system response that failed to occur. Upon discovery, they may take manual action(s) to align plant systems as expected for the event in progress. (Ref. EPM-4, Prudent Operator Actions)		

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Event Description: #1 S/G SGTR/#1 S/G ADV Fail Open

Time	Position	Applicant's Actions or Behavior
<p>Examiner Note: MONITOR status trees, the crew will implement status tree monitoring via ICS. When a RED or ORANGE path status tree is observed, the SRO will designate one of the Board operators (typically the BOP) to verify status tree conditions using 1-FR-0, UNIT 1 STATUS TREES. Once verified, the SRO should direct the crew to transition to the appropriate RED and/or ORANGE path procedure(s).</p>		
	CREW	Performs the first four steps of E-0 unprompted.
	ATC	Manually trips the Reactor
	ATC	Manually initiates Safety Injection.
	SRO	Directs performance of E-0, Reactor Trip Or Safety Injection.
<p><b>NOTE 1</b> Steps 1 through 4 are immediate action steps.</p>		
<p><b>NOTE 2</b> This procedure has a foldout page.</p>		
	ATC	<p>1. <b>VERIFY</b> reactor TRIPPED:</p> <ul style="list-style-type: none"> <li>Reactor trip breakers OPEN</li> <li>Reactor trip bypass breakers DISCONNECTED or OPEN</li> <li>Rod bottom lights LIT</li> <li>Rod position indicators less than or equal to 12 steps.</li> <li>Neutron flux DROPPING</li> </ul>
	BOP	<p>2. <b>VERIFY</b> turbine TRIPPED:</p> <ul style="list-style-type: none"> <li>Turbine stop valves CLOSED.</li> </ul>
<b>CRITICAL TASK</b>	BOP	Places HS-47-24 Turbine Trip to TRIP.
	BOP	<p>3. <b>VERIFY</b> at least one 6.9KV shutdown board ENERGIZED on this unit.</p>
	ATC	<p>4. <b>DETERMINE</b> if SI actuated:</p> <ul style="list-style-type: none"> <li>ECCS pumps RUNNING.</li> <li>Any SI alarm LIT [M-4D].</li> </ul>
	BOP	<p>5. <b>PERFORM</b> ES-0.5, Equipment Verifications WHILE continuing in this procedure.</p>



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Event Description: #1 S/G SGTR/#1 S/G ADV Fail Open

Time	Position	Applicant's Actions or Behavior
	SRO/ATC	Continue with the performance of E-0 REACTOR TRIP OR SAFETY INJECTION
	BOP	Performs ES-0.5, Equipment Verifications go to page 49 for details
	SRO	Addresses foldout page.

### FOLDOUT PAGE

#### RCP TRIP CRITERIA

IF any of the following conditions occurs:

- RCS pressure less than 1250 psig **AND** at least one CCP or SI pump running

**OR**

- Phase B isolation,

**THEN**

**STOP** all RCPs.

#### EVENT DIAGNOSTICS

- IF any S/G pressure is dropping uncontrolled, **THEN** **PERFORM** the following:
  - a. **CLOSE** MSIVs and MSIV bypass valves.
  - b. IF any S/G pressure continues to drop uncontrolled, **THEN** **PERFORM** the following:
    - 1) **ENSURE** SI actuated.
    - 2) IF at least one S/G is intact (S/G pressure controlled or rising), **THEN** **ISOLATE** AFW to faulted S/G(s):
      - **CLOSE** AFW level control valves for faulted S/G(s)
      - IF any AFW valve for faulted S/G CANNOT be CLOSED, **THEN** **PERFORM** Appendix E, Isolating AFW to Faulted S/G.
    - 3) **ENSURE** at least one of the following conditions met:
      - total AFW flow greater than 440 gpm
  - OR**
  - Narrow Range level greater than 10% [25% ADV] in at least one intact S/G.
- IF both trains of shutdown boards de-energized, **THEN** **GO TO** ECA-0.0, Loss of All AC Power.

#### TANK SWITCHOVER SETPOINTS

- IF CST level less than 5%, **THEN** **ALIGN** AFW suction to ERCW.
- IF RWST level less than 27%, **THEN** **GO TO** ES-1.3, Transfer to RHR Containment Sump.


Op Test No.: 2013-301 Scenario # 1 Event # 6, 7, 8 Page 40 of 64  
 Event Description: #1 S/G SGTR/#1 S/G ADV Fail Open

Time	Position	Applicant's Actions or Behavior
	ATC	<p>6. <b>DETERMINE</b> if secondary heat sink available:</p> <p>a. <b>CHECK</b> total AFW flow greater than 440 gpm.</p> <p>b. <b>CHECK</b> narrow range level greater than 10% [25% ADV] in at least one S/G.</p> <p>b. <b>MAINTAIN</b> total feed flow greater than 440 gpm UNTIL narrow range level greater than 10% [25% ADV] in at least one S/G.</p> <p>c. <b>CONTROL</b> feed flow to maintain narrow range level between 10% [25% ADV] and 50% in intact or ruptured S/Gs.</p>
	ATC/BOP	Manually controls AFW flow to maintain total AFW flow greater than 440 gpm until S/G are greater than 10% NR in at least 1 S/G.
	ATC	<p>7. <b>CHECK</b> if main steam lines should be isolated:</p> <p>a. <b>CHECK</b> if any of the following conditions have occurred:</p> <ul style="list-style-type: none"> <li>Any S/G pressure less than 600 psig</li> </ul> <p><b>OR</b></p> <ul style="list-style-type: none"> <li>Any S/G pressure dropping UNCONTROLLED</li> </ul> <p><b>OR</b></p> <ul style="list-style-type: none"> <li>Phase B actuation.</li> </ul> <p>b. <b>ENSURE</b> MSIVs and MSIV bypass valves CLOSED.</p> <p>c. <b>ENSURE</b> applicable Foldout Page actions COMPLETED.</p>
Examiner Note: The crew may take action using the Foldout Page (FOP) to isolate the #1 Steam Generator now.		
	ATC/BOP	Places HS-1-4A, 1-11A, 1-22A and 1-29A MSIV's to CLOSE.
<b>Critical Task</b>	ATC/BOP	Places HS-3 164A 1A-A AFP LCV to S/G #1 to RAMP CLOSE until valve indicates closed.
<b>Critical Task</b>	ATC/BOP	Places HS-3 174A S/G 1 Turbine AFP LCV to CLOSE and PTL.

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 Event Description: #1 S/G SGTR/#1 S/G ADV Fail Open

Time	Position	Applicant's Actions or Behavior	
	ATC	8. <b>CHECK</b> RCP trip criteria: a. <b>CHECK</b> the following: <ul style="list-style-type: none"> <li>RCS pressure less than 1250 psig</li> </ul> <b>AND</b> <ul style="list-style-type: none"> <li>At least one CCP <b>OR</b> SI pump <b>RUNNING</b>.</li> </ul> b. <b>STOP</b> RCPs.	
	ATC/BOP	9. <b>MONITOR</b> RCS temperatures: <ul style="list-style-type: none"> <li><b>IF</b> any RCP running, <b>THEN</b> <b>CHECK</b> T-avg stable at or trending to between 547°F and 552°F.</li> <li><b>OR</b></li> <li><b>IF</b> RCPs stopped, <b>THEN</b> <b>CHECK</b> T-cold stable at or trending to between 547°F and 552°F.</li> </ul> <b>IF</b> temperature less than 547°F and dropping, <b>THEN</b> <b>PERFORM</b> the following: a. <b>ENSURE</b> steam dumps and atmospheric reliefs <b>CLOSED</b> . b. <b>IF</b> cooldown continues, <b>THEN</b> <b>CONTROL</b> total feed flow: 1) <b>ENSURE</b> total AFW flow less than or equal to 600 gpm. 2) <b>MAINTAIN</b> total AFW flow greater than 440 gpm UNTIL narrow range level is greater than 10% [25% ADV] in at least one S/G. c. <b>IF</b> cooldown continues after AFW flow is controlled, <b>THEN</b> <b>CLOSE</b> MSIVs and MSIV bypass valves.	

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 Event Description: #1 S/G SGTR/#1 S/G ADV Fail Open


Time	Position	Applicant's Actions or Behavior	
	ATC/BOP	Manually controls AFW flow to maintain total AFW flow greater than 440 gpm and less than 600 gpm until at least one S/G level is greater than 10% NR.	
	ATC	<div>10. <b>CHECK</b> pressurizer PORVs, safeties, and spray valves:<div>a. Pressurizer PORVs CLOSED.</div><div>b. Pressurizer safety valves CLOSED.</div></div> <div>10. <div>c. Normal spray valves CLOSED.</div><div>d. Power to at least one block valve AVAILABLE.</div><div>e. At least one block valve OPEN.</div></div>	
	ATC	<div>11. <b>DETERMINE</b> if S/G secondary pressure boundaries are INTACT:<div><div>• <b>CHECK</b> all S/G pressures CONTROLLED or RISING.</div><div>• <b>CHECK</b> all S/G pressures greater than 140 psig.</div></div></div>	<div><b>PERFORM</b> the following:<div>a. <b>MONITOR</b> status trees.</div><div>b. <b>GO TO E-2, Faulted Steam Generator Isolation.</b></div></div> <div></div>
<b>Examiner Note:</b> <b>MONITOR</b> status trees, the crew will implement status tree monitoring via SPDS. When a RED or ORANGE path status tree is observed, the SRO will designate one of the Board operators (typically the BOP) to verify status tree conditions using <b>1-FR-0, UNIT 1 STATUS TREES</b> . Once verified, the SRO should direct the crew to transition to the appropriate RED and/or ORANGE path procedure(s).			
	SRO	Transitions to E-2 FAULTED STEAM GENERATOR ISOLATION	
<b>CAUTION</b> Unisolating a faulted S/G or secondary break should NOT be considered UNLESS needed for RCS cooldown.			
	SRO	Directs actions from E-2 FAULTED STEAM GENERATOR ISOLATION	
		<div>1. <b>CHECK</b> MSIVs and MSIV bypass valves CLOSED.</div>	
<b>Critical Task</b>	ATC/BOP	Places HS-1-4A, 1-11A, 1-22A and 1-29A MSIV's to CLOSE. (If not already performed.)	

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Event Description: #1 S/G SGTR/#1 S/G ADV Fail Open

Time	Position	Applicant's Actions or Behavior
		<p>2. <b>CHECK ANY S/G secondary pressure boundary INTACT:</b></p> <ul style="list-style-type: none"> <li>Any S/G pressure CONTROLLED or RISING.</li> </ul>
		<p>3. <b>IDENTIFY Faulted S/G(s):</b></p> <p>a. <b>CHECK S/G pressures:</b></p> <ul style="list-style-type: none"> <li>Any S/G pressure DROPPING in an uncontrolled manner.</li> </ul> <p><b>OR</b></p> <ul style="list-style-type: none"> <li>Any S/G pressure less than 140 psig.</li> </ul>
	CREW	Identifies #1 S/G is faulted.
<p><b>CAUTIONS</b></p> <ul style="list-style-type: none"> <li><b>Secondary heat sink requires at least one S/G available.</b></li> <li><b>If the TD AFW pump is the only source of feed flow, isolating both steam supplies will result in loss of secondary heat sink.</b></li> </ul>		
		<p>4. <b>ISOLATE Faulted S/G(s):</b></p> <p>a. <b>ENSURE MFW isolated to faulted S/G(s) by any of the following:</b></p> <ul style="list-style-type: none"> <li>feedwater isolation valve CLOSED [M-4]</li> </ul> <p><b>OR</b></p> <ul style="list-style-type: none"> <li>feedwater regulating valve and bypass valve CLOSED [M-3].</li> </ul>
		<p>b. <b>ENSURE AFW isolated to faulted S/G(s):</b></p> <ul style="list-style-type: none"> <li><b>CLOSE MD AFW LCV</b></li> <li><b>CLOSE TD AFW LCV and PLACE in PULL TO LOCK.</b></li> </ul>

Op Test No.: 2013-301 Scenario # 1 Event # 6, 7, 8 Page 44 of 64  
 Event Description: #1 S/G SGTR/#1 S/G ADV Fail Open

Time	Position	Applicant's Actions or Behavior
<b>Critical Task</b>	ATC/BOP	Places HS-3 164A 1A-A AFP LCV to S/G #1 to RAMP CLOSE until valve indicates closed. (If not already performed.)
<b>Critical Task</b>	ATC/BOP	Places HS-3 174A S/G 1 Turbine AFP LCV to CLOSE and PTL. (If not already performed.)
	ATC/BOP	<p>c. <b>CHECK</b> S/G #1 or #4 faulted.</p> <p>d. <b>CLOSE</b> TD AFW pump steam supply from faulted S/G FCV-1-15 (S/G #1) or FCV-1-16 (S/G #4).</p>
	ATC/BOP	Places HS-1-15A TDAFWP steam supply from S/G #1 to CLOSE and HS-1-16A TDAFWP steam supply from S/G #4 to OPEN. (If not already performed.)
		e. <b>VERIFY</b> S/G blowdown valves CLOSED.
		<p>f. <b>VERIFY</b> atmospheric relief CLOSED.</p> <p>f. <b>CLOSE</b> atmospheric relief.</p> <p>IF Faulted S/G(s) atmospheric relief CANNOT be closed,  <b>THEN</b>  <b>DISPATCH</b> personnel to close atmospheric relief <b>USING</b> EA-1-2, Local Control of S/G PORVs.</p>
		5. <b>CHECK</b> CST level greater than 5%.
		<p>6. <b>VERIFY</b> secondary radiation NORMAL:</p> <p>a. <b>CHECK</b> secondary radiation NORMAL <b>USING</b> Appendix A, Secondary Rad Monitors. (App. A also contained in ES-0.5)</p> <p>IF secondary radiation is high,  <b>THEN</b>  <b>GO TO</b> E-3, Steam Generator Tube Rupture.</p> 
	SRO	SRO determines S/G #1 is ruptured and transitions to E-3, Steam Generator Tube Rupture.
	SRO	Direct performance of E-3, Steam Generator Tube Rupture
<b>NOTE</b> This procedure has a foldout page.		
	SRO	Addresses foldout page, see next page for details.

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Event Description: #1 S/G SGTR/#1 S/G ADV Fail Open									

**FOLDOUT PAGE****SI REINITIATION CRITERIA**

**IF** SI has been terminated **AND** either of the following conditions occurs:

- RCS subcooling based on core exit T/Cs less than 40°F
- OR**
- Pressurizer level **CANNOT** be maintained greater than 10% [20% ADV],

**THEN**

- a. **ESTABLISH** ECCS flow by performing one or both of the following:
  - **ESTABLISH** CCPIT flow as necessary **USING** Appendix C
  - **START** CCPs or SI pumps manually as necessary.
- b. **GO TO** ECA-3.1, SGTR and LOCA - Subcooled Recovery.

**EVENT DIAGNOSTICS**


- **IF** both trains of shutdown boards deenergized,  
**THEN**  
**GO TO** ECA-0.0, Loss of All AC Power.
- **IF** any S/G pressure dropping in an uncontrolled manner or less than 140 psig  
**AND** S/G NOT isolated **AND** S/G NOT needed for RCS cooldown,  
**THEN**  
**GO TO** E-2, Faulted Steam Generator Isolation.
- **IF** any Intact S/G has level rising in an uncontrolled manner  
**OR** has abnormal radiation,  
**THEN**  
**STOP** any deliberate RCS cooldown or depressurization and  
**GO TO** E-3 Step 1.

**TANK SWITCHOVER SETPOINTS**

- **IF** CST level less than 5%,  
**THEN**  
**ALIGN** AFW suction to ERCW.
- **IF** RWST level less than 27%,  
**THEN**  
**GO TO** ES-1.3, Transfer to RHR Containment Sump.

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Event Description: #1 S/G SGTR/#1 S/G ADV Fail Open


Time	Position	Applicant's Actions or Behavior
	ATC	1. <b>MONITOR</b> at least one RCP RUNNING.
	ATC	2. <b>MONITOR</b> RCP trip criteria: <div style="display: flex; justify-content: space-between; align-items: flex-start;"> <div style="width: 60%;">             a. <b>CHECK</b> the following:             <ul style="list-style-type: none"> <li>RCS pressure less than 1250 psig</li> </ul> <p style="text-align: center;"><b>AND</b></p> <ul style="list-style-type: none"> <li>At least one CCP <b>OR</b> SI pump RUNNING.</li> </ul> </div> <div style="width: 35%;">             a. <b>GO TO</b> Step 3.              </div> </div> <p>b. <b>STOP</b> RCPs.</p>
	Crew	3. <b>MONITOR</b> indications of Ruptured S/G(s): <div style="margin-left: 20px;">             a. <b>IDENTIFY</b> Ruptured S/G(s) as indicated by any of the following:             <ul style="list-style-type: none"> <li>Unexpected rise in any S/G narrow range level.</li> </ul> <p style="text-align: center;"><b>OR</b></p> <ul style="list-style-type: none"> <li>High radiation from any S/G sample.</li> </ul> <p style="text-align: center;"><b>OR</b></p> <ul style="list-style-type: none"> <li>RADCON survey of main steam lines and S/G blowdown lines.</li> </ul> <p style="text-align: center;"><b>OR</b></p> <ul style="list-style-type: none"> <li>High radiation on any main steamline radiation monitor.</li> </ul> </div>
	CREW	Determines SG 1 IS RUPTURED
<b>CAUTION</b> If the TD AFW pump is the only source of feed flow, isolating both steam supplies will result in loss of secondary heat sink.		



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 Event Description: #1 S/G SGTR/#1 S/G ADV Fail Open

Time	Position	Applicant's Actions or Behavior
	ATC/BOP	<p>4. <b>ISOLATE</b> flow from Ruptured S/G(s):</p> <p>a. <b>ADJUST</b> Ruptured S/G(s) atmospheric relief controller setpoint to 87% in AUTO. (1040 psig)</p>
	ATC/BOP	Places PIC-1-6A setpoint to 87%
	ATC/BOP	<p>b. <b>CHECK</b> Ruptured S/G(s) atmospheric relief hand switch in P-AUTO and valve(s) CLOSED.</p> <p>b. <b>WHEN</b> Ruptured S/G(s) pressure less than 1040 psig,  <b>THEN</b>  <b>PERFORM</b> the following:</p> <p>1) <b>VERIFY</b> atmospheric relief CLOSED.</p> <p>2) <b>IF</b> atmospheric relief NOT closed,  <b>THEN</b>  <b>CLOSE</b> atmospheric relief.</p> <p><b>IF</b> Ruptured S/G(s) atmospheric relief CANNOT be closed,  <b>THEN</b>  <b>DISPATCH</b> personnel to close atmospheric relief <b>USING</b> EA-1-2, Local Control of S/G PORVs.</p>
		c. <b>CHECK</b> S/G #1 or #4 ruptured.
	SRO	Determines SG 1 IS RUPTURED
		d. <b>CLOSE</b> TD AFW pump steam supply from Ruptured S/G FCV-1-15 (S/G #1) or FCV-1-16 (S/G #4).
	ATC/BOP	Places HS-1-15A TDAFWP steam supply from S/G #1 to CLOSE and HS-1-16A TDAFWP steam supply from S/G #4 to OPEN. (If not already performed.)
	ATC/BOP	e. <b>VERIFY</b> Ruptured S/G(s) blowdown isolation valves CLOSED.
	ATC/BOP	4. f. <b>CLOSE</b> Ruptured S/G(s) MSIV and MSIV bypass valve.
<b>Critical Task</b>	ATC/BOP	Places HS-1-4A MSIV to CLOSE (If not already performed.)

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 Event Description: #1 S/G SGTR/#1 S/G ADV Fail Open

Time	Position	Applicant's Actions or Behavior
	ATC/BOP	<p>5. <b>MONITOR</b> Ruptured S/G(s) level:</p> <p>a. <b>CHECK</b> ruptured S/G narrow range level greater than 10% [25% ADV].</p> <p>b. <b>ENSURE</b> AFW isolated to ruptured S/G:</p> <p>1) <b>CLOSE</b> AFW LCVs for ruptured S/G.</p> <p>2) <b>PLACE</b> Turbine Driven AFW LCV for ruptured S/G in CLOSE PULL TO LOCK.</p>
<b>Critical Task</b>	ATC/BOP	Places HS-3 164A 1A-A AFP LCV to S/G #1 to RAMP CLOSE until valve indicates closed. (If not already performed.)
<b>Critical Task</b>	ATC/BOP	Places HS-3 174A S/G 1 Turbine AFP LCV to CLOSE and PTL. (If not already performed.)
	ATC/BOP	<p>6. <b>VERIFY</b> Ruptured S/G ISOLATED from Intact S/G(s):</p> <p>a. <b>CHECK</b> either of the following conditions SATISFIED:</p> <ul style="list-style-type: none"> <li>Ruptured S/G MSIVs and MSIV bypass valves CLOSED</li> </ul> <p><b>OR</b></p> <ul style="list-style-type: none"> <li>MSIV(s) and MSIV bypass valve(s) CLOSED on Intact S/G(s) to be used for RCS cooldown.</li> </ul> <p>b. <b>CHECK</b> S/G #1 or #4 ruptured.</p> <p>c. <b>CHECK</b> TDAFW pump steam supply from ruptured S/G ISOLATED:</p> <ul style="list-style-type: none"> <li>FCV-1-15 (S/G #1) or FCV-1-16 (S/G #4) CLOSED</li> </ul>
	SRO	<p>7. <b>CHECK</b> Ruptured S/G pressure greater than 550 psig (Unit 1) or 425 psig (Unit 2).</p> <p><b>GO TO ECA-3.1, SGTR and LOCA - Subcooled Recovery.</b></p> 

**Examiner Note: If #1 S/G is NOT 550 psig or below go to page 55 for additional E-3 steps.**

**Scenario may be terminated when the SRO transitions to ECA-3.1 or earlier, at discretion of Lead Examiner**


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 Event Description: Equipment Verifications

Time	Position	Applicant's Actions or Behavior
<b>ES-0.5 Actions</b>		
	BOP	1. <b>VERIFY</b> D/Gs RUNNING.
	BOP	2. <b>VERIFY</b> D/G ERCW supply valves OPEN.
	BOP	3. <b>VERIFY</b> at least four ERCW pumps RUNNING.
	BOP	4. <b>VERIFY</b> CCS pumps RUNNING: <ul style="list-style-type: none"> <li>• Pump 1A-A (2A-A)</li> <li>• Pump 1B-B (2B-B)</li> <li>• Pump C-S.</li> </ul>
	BOP	5. <b>VERIFY</b> EGTS fans RUNNING.
	BOP	6. <b>CHECK</b> main generator output breaker(s): <ul style="list-style-type: none"> <li>a. <u>Unit 1 Only</u>: <b>VERIFY</b> main generator PCBs OPEN. [M-1]</li> </ul>
	BOP	7. <b>NOTIFY</b> at least two AUOs to report to MCR to be available for local actions.
	BOP	8. <b>VERIFY</b> AFW pumps RUNNING: <ul style="list-style-type: none"> <li>a. MD AFW pumps</li> <li>b. TD AFW pump.</li> </ul>
<b>NOTE</b> AFW level control valves should NOT be repositioned if manual action has been taken to control S/G levels, to establish flow due to failure, or to isolate a faulted S/G.		

Op Test No.: NRC 2013-301 Scenario # 1 Event # ES-0.5 Page 50 of 64  
 Event Description: Equipment Verifications

Time	Position	Applicant's Actions or Behavior
	BOP	9. <b>CHECK</b> AFW valve alignment: a. <b>VERIFY</b> MD AFW LCVs in AUTO.  b. <b>VERIFY</b> TD AFW LCVs OPEN.  c. <b>VERIFY</b> MD AFW pump recirculation valves FCV-3-400 and FCV-3-401 CLOSED.
	BOP	10. <b>VERIFY</b> MFW Isolation: a. <b>CHECK</b> MFW pumps TRIPPED.  b. <b>ENSURE</b> the following: <ul style="list-style-type: none"> <li>• MFW regulating valves CLOSED</li> <li>• MFW regulating bypass valve controllers in MANUAL with output ZERO</li> <li>• MFW isolation valves CLOSED.</li> </ul>
	BOP	11. <b>MONITOR</b> ECCS operation: a. <b>VERIFY</b> ECCS pumps RUNNING: <ul style="list-style-type: none"> <li>• CCPs</li> <li>• RHR pumps</li> <li>• SI pumps</li> </ul> b. <b>VERIFY</b> CCP flow through CCPIT. c. <b>CHECK</b> RCS pressure less than 1500 psig.


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 Event Description: Equipment Verifications

Time	Position	Applicant's Actions or Behavior
		<p>d. <b>VERIFY</b> SI pump flow.</p> <p>e. <b>CHECK</b> RCS pressure less than 300 psig.</p> <p>e. <b>GO TO</b> Step 12.</p>  <p>f. <b>VERIFY</b> RHR pump flow.</p>
	BOP	<p>12. <b>VERIFY</b> ESF systems <b>ALIGNED</b>:</p> <p>a. Phase A <b>ACTUATED</b>:</p> <ul style="list-style-type: none"> <li>• PHASE A TRAIN A alarm LIT [M-6C, B5].</li> <li>• PHASE A TRAIN B alarm LIT [M-6C, B6].</li> </ul> <p>b. Cntmt Vent Isolation <b>ACTUATED</b>:</p> <ul style="list-style-type: none"> <li>• CNTMT VENT ISOLATION TRAIN A alarm LIT [M-6C, C5].</li> <li>• CNTMT VENT ISOLATION TRAIN B alarm LIT [M-6C, C6].</li> </ul> <p>c. Status monitor panels:</p> <ul style="list-style-type: none"> <li>• 6C DARK</li> <li>• 6D DARK</li> <li>• 6E LIT OUTSIDE outlined area</li> <li>• 6H DARK</li> <li>• 6J LIT.</li> </ul> <p>d. Train A status panel 6K:</p> <ul style="list-style-type: none"> <li>• CNTMT VENT GREEN</li> <li>• PHASE A GREEN</li> </ul> <p>e. Train B status panel 6L:</p> <ul style="list-style-type: none"> <li>• CNTMT VENT GREEN</li> <li>• PHASE A GREEN</li> </ul>

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 Event Description: Equipment Verifications

Time	Position	Applicant's Actions or Behavior
	BOP	<p>13. <b>MONITOR</b> for containment spray and Phase B actuation:</p> <p>a. <b>CHECK</b> for any of the following:</p> <ul style="list-style-type: none"> <li>Phase B ACTUATED</li> </ul> <p><b>OR</b></p> <ul style="list-style-type: none"> <li>Containment pressure greater than 2.8 psig.</li> </ul> <p>b. <b>VERIFY</b> containment spray INITIATED:</p> <ol style="list-style-type: none"> <li>Containment spray pumps RUNNING.</li> <li>Containment spray header isolation valves FCV-72-39 and FCV-72-2 OPEN.</li> <li>Containment spray recirculation valves to RWST FCV-72-34 and FCV-72-13 CLOSED.</li> <li>Containment spray header flow greater than 4750 gpm per train.</li> <li>Panel 6E LIT.</li> </ol> <p>c. <b>VERIFY</b> Phase B ACTUATED:</p> <ul style="list-style-type: none"> <li>PHASE B TRAIN A alarm LIT [M-6C, A5].</li> <li>PHASE B TRAIN B alarm LIT [M-6C, A6].</li> </ul> <p>d. <b>ENSURE</b> RCPs STOPPED.</p> <p>e. <b>VERIFY</b> Phase B valves CLOSED:</p> <ul style="list-style-type: none"> <li>Panel 6K PHASE B GREEN.</li> <li>Panel 6L PHASE B GREEN.</li> </ul> <p>f. <b>WHEN</b> 10 minutes have elapsed, <b>THEN</b> <b>ENSURE</b> containment air return fans RUNNING.</p>

Op Test No.: NRC 2013-301 Scenario # 1 Event # ES-0.5 Page 53 of 64  
 Event Description: Equipment Verifications

Time	Position	Applicant's Actions or Behavior
<b>NOTE</b> The continuous action in Step 14 remains applicable if containment pressure rises above 1.5 psig after ES-0.5 is completed.		
	BOP	14. <b>MONITOR</b> if containment vacuum relief isolation valves should be closed: a. <b>CHECK</b> containment pressure greater than 1.5 psig.      a. <b>GO TO</b> Step 15. 
	BOP	15. <b>CHECK</b> secondary and containment rad monitors <b>USING</b> the following: <ul style="list-style-type: none"> <li>• Appendix A, Secondary Rad Monitors</li> <li>• Appendix B, Containment Rad Monitors.</li> </ul>
		<p style="text-align: center;"><b>APPENDIX A</b></p> <p style="text-align: center;"><b>SECONDARY RAD MONITORS</b></p> <p>1. <b>IF</b> SI occurred on <u>Unit 1</u>,  <b>THEN</b>  <b>CHECK</b> following rad monitors including available trends prior to isolation:</p> <ul style="list-style-type: none"> <li>• Condenser exhaust recorder 1-RR-90-119</li> <li>• S/G blowdown recorder 1-RR-90-120</li> <li>• Unit 1 Main steam line rad monitors [1-M-30]</li> <li>• Post-Accident rad recorder 1-RR-90-268B points 3 (blue), 4 (violet), 5 (black), and 6 (turquoise). [1-M-31 (back of 1-M-30)]</li> </ul> <p>3. <b>NOTIFY</b> Unit Supervisor whether secondary radiation is NORMAL or HIGH.</p>

Op Test No.: NRC 2013-301 Scenario # 1 Event # ES-0.5 Page 54 of 64  
 Event Description: Equipment Verifications

Time	Position	Applicant's Actions or Behavior
		<p style="text-align: center;"><b>APPENDIX B</b></p> <p style="text-align: center;"><b>CONTAINMENT RAD MONITORS</b></p> <p>1. <b>IF</b> SI occurred on <u>Unit 1</u>,  <b>THEN</b>  <b>CHECK</b> following rad monitors:</p> <ul style="list-style-type: none"> <li>Upper containment post-accident rad monitors  1-RM-90-271A and 1-RM-90-272A NORMAL [1-M-30]</li> <li>Lower containment post-accident rad monitors  1-RM-90-273A and 1-RM-90-274A NORMAL [1-M-30]</li> <li>Containment rad recorders 1-RR-90-112 and 1-RR-90-106  NORMAL [0-M-12] (prior to isolation).</li> </ul>
	BOP	<p>16. <b>WHEN</b> directed by E-0,  <b>THEN</b>  <b>PERFORM</b> Appendix D, Hydrogen Mitigation Actions.</p>
	BOP	<p>17. <b>CHECK</b> pocket sump pumps STOPPED:  [M-15, upper left corner]</p> <ul style="list-style-type: none"> <li>HS-77-410, Rx Bldg Aux Floor and Equipment Drain Sump pump A</li> <li>HS-77-411, Rx Bldg Aux Floor and Equipment Drain Sump pump B.</li> </ul>
	BOP	<p>18. <b>DISPATCH</b> personnel to perform EA-0-1, Equipment Checks Following ESF Actuation.</p>
	BOP	<p>19. <b>ENSURE</b> plant announcement has been made regarding Reactor Trip and SI.</p>
	BOP	<p>20. <b>PERFORM</b> Appendix E, Spent Fuel Cooling Actions, as time permits.</p>



Op Test No.: NRC 2013-301 Scenario # 1 Event # Critical Task Page 55 of 64  
 Event Description: E-3 Steps if #1 S/G Pressure is Above 550 psig.

Time	Position	Applicant's Actions or Behavior						
E-3 Actions if ECA-3.1 is NOT entered.								
<div>NOTE</div> <ul style="list-style-type: none"><li>Blocking low steamline pressure SI as soon as pressurizer pressure is less than 1960 psig will prevent an inadvertent MSIV closure and keep the condenser available for steam dump.</li><li>After the low steamline pressure SI signal is blocked, main steamline isolation will occur if the high steam pressure rate setpoint is exceeded.</li><li>The 1250 psig RCP trip criterion is NOT applicable after RCS cooldown is initiated in the following step.</li></ul>								
	ATC/BOP	<div>8. INITIATE RCS cooldown:</div> <div>a. DETERMINE target core exit T/C temperature based on Ruptured S/G pressure:</div> <table><thead><tr><th>Lowest Ruptured S/G pressure (psig)</th><th>Target Core Exit T/C Temp (°F)</th></tr></thead><tbody><tr><td>600 - 649</td><td>428</td></tr><tr><td>550 - 599</td><td>419</td></tr></tbody></table>	Lowest Ruptured S/G pressure (psig)	Target Core Exit T/C Temp (°F)	600 - 649	428	550 - 599	419
Lowest Ruptured S/G pressure (psig)	Target Core Exit T/C Temp (°F)							
600 - 649	428							
550 - 599	419							
	SRO/ATC	Determine target cooldown temperature of approx 420 to 430 deg F.						
		<div>8. b. WHEN RCS pressure less than 1960 psig, THEN PERFORM the following:</div> <div>1) BLOCK low steamline pressure SI.</div> <div>2) CHECK STEAMLINE PRESS ISOL/SI BLOCK RATE ISOL ENABLE permissive LIT. [M-4A, A4]</div>						
	BOP	Places HS-63-135A and 135B LO STM LINE PRESS SIS BLOCK to BLOCK, as required.						
		<div>c. DUMP steam to condenser from Intact S/G(s) at maximum achievable rate:</div> <div>c. IF steam dumps NOT available, THEN OPEN atmospheric relief valves for Intact S/G(s)</div>						

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Event Description: E-3 Steps if #1 S/G Pressure is Above 550 psig.

Time	Position	Applicant's Actions or Behavior
	BOP	Raises output on PIC-1-13A, 24A, and 31A ATM Relief Control to open three ATM Relief Valves.
		<p>8. d. <b>WHEN</b> core exit T/Cs less than target temperature determined in Substep 8.a, <b>THEN</b> <b>PERFORM</b> the following:</p> <p>1) <b>CLOSE</b> steam dumps or S/G atmospheric reliefs.</p> <p>2) <b>REDUCE</b> total AFW flow to less than 600 gpm to stop cooldown.</p> <p><b>MAINTAIN</b> total feed flow greater than 440 gpm UNTIL level greater than 10% [25% ADV] in at least one Intact S/G.</p> <p>3) <b>MAINTAIN</b> core exit T/Cs less than target temperature <b>USING</b> steam dumps or atmospheric reliefs.</p>
<b>CRITICAL TASK</b>	BOP	Reduces output on PIC-1-13A, 24A, and 31A ATM Relief Control to 0 when target temperature is reached.

Op Test No.: NRC 2013-301 Scenario # 1 Event # Critical Task Page 57 of 64

Event Description: E-3 Steps if #1 S/G Pressure is Above 550 psig.

Time	Position	Applicant's Actions or Behavior
		9. <b>MAINTAIN</b> Intact S/G narrow range levels:  a. Greater than 10% [25% ADV]          b. Between 20% [25% ADV] and 50%.
	ATC	10. <b>MONITOR</b> pressurizer PORVs and block valves:  a. Power to block valves AVAILABLE    b. Pressurizer PORVs CLOSED  c. At least one block valve OPEN.
	ATC	11. <b>RESET</b> SI signal.
	ATC	Depresses HS-63-134A and 134B SIS RESET TRAIN A & B
	BOP	12. <b>MONITOR</b> AC busses energized from start busses.
	ATC	13. <b>ENSURE</b> Phase A and Phase B RESET.
	ATC	Depresses HS-30-63D and 63E Phase A Isol Reset Train A & Train B

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Event Description: E-3 Steps if #1 S/G Pressure is Above 550 psig.

Time	Position	Applicant's Actions or Behavior
	ATC	<p>14. <b>CHECK</b> control air established to containment: [Panel 6K and 6L]</p> <ul style="list-style-type: none"> <li>• 1-FCV-32-80 (2-FCV-32-81) Train A essential air OPEN</li> <li>• 1-FCV-32-102 (2-FCV-32-103) Train B essential air OPEN</li> <li>• 1-FCV-32-110 (2-FCV-32-111) non-essential air OPEN.</li> </ul>
		<p>15. <b>DETERMINE</b> if RHR pumps should be stopped:</p> <p>a. <b>CHECK</b> RHR pump suction aligned from RWST.</p> <p>b. <b>CHECK</b> RCS pressure greater than 300 psig.</p> <p>c. <b>STOP</b> RHR pumps and <b>PLACE</b> in A-AUTO.</p> <p>d. <b>MONITOR</b> RCS pressure greater than 300 psig.</p>
	ATC	Places HS-74-10A and 20A RHR Pumps 1A and 1B to STOP

Op Test No.: NRC 2013-301 Scenario # 1 Event # Critical Task Page 59 of 64

Event Description: E-3 Steps if #1 S/G Pressure is Above 550 psig.

Time	Position	Applicant's Actions or Behavior
	BOP	<p>16. <b>CHECK</b> if RCS cooldown should be stopped:</p> <p>a. <b>CHECK</b> core exit T/Cs less than target temperature determined in Substep 8.a.</p> <p>b. <b>CLOSE</b> steam dumps or atmospheric reliefs.</p> <p>c. <b>REDUCE</b> total AFW flow to less than 600 gpm to stop cooldown.</p> <p><b>MAINTAIN</b> total feed flow greater than 440 gpm UNTIL level greater than 10% [25% ADV] in at least one Intact S/G.</p> <p>d. <b>MAINTAIN</b> core exit T/Cs less than target temperature <b>USING</b> steam dumps or atmospheric reliefs.</p>
<b>CRITICAL TASK</b>	BOP	Reduces output on PIC-1-13A, 24A, and 31A ATM Relief Control to 0 when target temperature is reached.
	BOP	17. <b>MONITOR</b> Ruptured S/G(s) pressure STABLE or RISING.
	ATC	18. <b>CHECK</b> RCS subcooling based on core exit T/Cs greater than 60°F.


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Event Description: E-3 Steps if #1 S/G Pressure is Above 550 psig.

Time	Position	Applicant's Actions or Behavior
		<p>19. <b>DEPRESSURIZE</b> RCS to minimize break flow and to refill pressurizer:</p> <p>a. <b>CHECK</b> normal pressurizer spray AVAILABLE.</p> <p>b. <b>INITIATE</b> maximum available pressurizer spray.</p> <p>c. <b>CHECK</b> depressurization rate ADEQUATE.</p> <p>d. <b>REDUCE</b> RCS pressure UNTIL any of the following conditions (also listed on handout page) are met:</p> <ul style="list-style-type: none"><li>Both of the following:<ul style="list-style-type: none"><li>1) RCS pressure less than Ruptured S/G(s) pressure</li></ul><p><b>AND</b></p><li>2) Pressurizer level greater than 10% [20% ADV].</li></li></ul> <p><b>OR</b></p> <ul style="list-style-type: none"><li>Pressurizer level greater than 65%.</li></ul> <p><b>OR</b></p> <ul style="list-style-type: none"><li>RCS subcooling based on core exit T/Cs less than 40°F.</li></ul>

Op Test No.: NRC 2013-301 Scenario # 1 Event # Critical Task Page 61 of 64

Event Description: E-3 Steps if #1 S/G Pressure is Above 550 psig.

Time	Position	Applicant's Actions or Behavior
		<p>e. <b>CLOSE</b> spray valve(s):</p> <p>1) Normal spray valves.</p> <p>2) Auxiliary spray valve.</p> <p>f. <b>GO TO</b> Caution prior to Step 22.</p> 
	ATC	Places PIC-68-340A PZR PRESSURE CONTROL to MANUAL and raises output.
	ATC	Reduces PIC-68-340A PZR PRESSURE CONTROL output when depressurization criteria is met.
<b>CAUTION</b> Any delay in terminating SI after termination criteria are met may cause Ruptured S/G(s) overfill.		

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Event Description: E-3 Steps if #1 S/G Pressure is Above 550 psig.

Time	Position	Applicant's Actions or Behavior
	ATC	<p>22. <b>CHECK</b> if ECCS flow should be terminated:</p> <p>a. RCS subcooling based on core exit T/Cs greater than 40°F.</p> <p>b. Secondary heat sink:</p> <ul style="list-style-type: none"> <li>Narrow range level in at least one Intact S/G greater than 10% [25% ADV]</li> </ul> <p><b>OR</b></p> <ul style="list-style-type: none"> <li>Total feed flow to S/Gs greater than 440 gpm AVAILABLE.</li> </ul> <p>c. RCS pressure STABLE or RISING.</p> <p>d. Pressurizer level greater than 10% [20% ADV].</p>
	ATC	<p>23. <b>STOP</b> the following ECCS pumps:</p> <p>a. <b>STOP</b> SI pumps and <b>PLACE</b> in A-AUTO.</p> <p>b. <b>CHECK</b> offsite power supplying shutdown boards.</p> <p>c. <b>STOP</b> all BUT one CCP and <b>PLACE</b> in A-AUTO.</p>
	ATC	Places HS-63-10A and 15A SI Pump 1A and 1B to STOP



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Event Description: E-3 Steps if #1 S/G Pressure is Above 550 psig.

Time	Position	Applicant's Actions or Behavior
	ATC	24. <b>ISOLATE</b> CCPIT:  a. <b>CLOSE</b> inlet isolation valves FCV-63-39 and FCV-63-40.  b. <b>CLOSE</b> outlet isolation valves FCV-63-26 and FCV-63-25.
	ATC	Places HS-63-39A and 40A CCPIT inlet isolation valves to CLOSE
	ATC	Places HS-63-25A and 26A CCPIT outlet isolation valves to CLOSE
Scenario may be terminated when the CCPIT is isolated or earlier, at discretion of Lead Examiner.		

Op Test No.: NRC 2013-301 Scenario # 1 Event # Critical Task Page 64 of 64  
Event Description: Critical Tasks

Critical Tasks:	Critical Task Statement
1	Manually trip the main turbine prior to the completion of E-0.
2	Isolate AFW flow into the ruptured (#1) SG by closing FCV-3-164 and 3-174 before a transition to ECA-3.1 occurs.
As required.	Establish cooldown and maintain RCS temperature so that transition from E3 does not occur because the RCS temperature causes an extreme (red-path) or a severe (orange-path) challenge to the subcriticality and/or the integrity CSF. (As required.)

Facility:	Sequoyah	Scenario No.:	3	Op Test No.:	2013-301
Examiners:	_____	Operators:	_____		
	_____		_____		
	_____		_____		
Initial Conditions:	Unit 1 is in MODE 2, ~4% Reactor Power, A Main Feedwater Pump I/S				
Turnover:	Continue Plant Startup. Currently at 0-GO-4, Section 5.1 Step 4. Place Feed Regulating valves in AUTO, then increase power to 13-15%.  D RCW pump is OOS for maintenance.  PT-3-1A is in Maintenance Bypass				
Target CTs:	Manually initiate a Phase B isolation prior to completing ES-0.5 step 13.				
	Isolate AFW Flow to #4 Steam Generator Prior to completing E-2 step 4.				
Event No.	Malf. No.	Event Type*	Event Description		
1.	N/A	R-ATC	Continue Power Increase from ~4%.		
1.a	N/A	N-BOP/SRO	Place feed Reg Valves in AUTO using 0-GO-4. Section 5.1 Step 4.		
2.	IMF NI04B	I-ATC/SRO TS-SRO	IR Channel N-36 fails higher than normal, the crew will place N36 Level Trip switch in BYPASS using AOP-I.01. The SRO will address Tech Specs and enter LCO 3.3.1.1 Action 3b and 3.3.3.7, Action 1a.		
3.	IMF CC11A Pre-insert IMF CC21B	C-BOP/SRO	The 1A Thermal Barrier Booster Pump breaker trips and the 1B Thermal Barrier Booster Pump fails to AUTO Start. The BOP manually starts the 1B Thermal Barrier Booster Pump using the ARP and AOP M.03, LOSS OF COMPONENT COOLING WATER.		
4.	RX31AUTO	C-ATC/SRO TS-SRO	PIC-68-340A Pressurizer Master Controller fails with maximum output. The ATC will take manual control of PIC-68-340 to close the Pressurizer Spray valves and energize Pressurizer heaters. The SRO will address Tech Specs and enter LCO 3.2.5 action.		
5.	IMF SI11D	TS-SRO	RWST level indicator LT-63-53 fails low, the crew will respond using AOP-I.09 RWST LEVEL INSTRUMENT MALFUNCTION. The SRO will address Tech Specs and enter LCO 3.3.1.1 Action 18.		
6.	FW23A	M-All	A Feed line break will develop on the #4 Steam Generator inside containment, the crew will initiate a Reactor Trip and Safety Injection and transitions to E-0.		
7.	Pre-insert RP07	C-ATC	During the performance of E-0, the Hi-Hi Containment pressure logic to initiate Phase B containment isolation fails. The ATC will manually initiate a Phase B using prudent operator actions.		
8.	Pre-insert ZDIHS6523A	C-BOP	The EGTS fans fail to AUTO-START, the BOP will manually start the EGTS fans using Prudent Operator Actions or guidance from ES-0.5.		
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor					

**2013-301 Scenario 3 Summary**

**EVENT 1 –** The crew will assume the shift, place the feed reg valves in AUTO using 0-GO-4. Section 5.1 Step 4 and continue the power increase.

**EVENT 2 -** When directed by the lead examiner, IR Channel N-36 fails higher than normal, the crew will place N36 Level Trip switch in BYPASS using AOP-I.01 NUCLEAR INSTRUMENT MALFUNCTION. The SRO will enter LCO 3.3.1.1 Action 3b and LCO 3.3.3.7, Action 1a.

**EVENT 3 -** When directed by the lead examiner, the 1A Thermal Barrier Booster Pump breaker trips and the 1B Thermal Barrier Booster Pump fails to AUTO Start. The BOP manually starts the 1B Thermal Barrier Booster Pump using the ARP and AOP M.03, LOSS OF COMPONENT COOLING WATER.

**EVENT 4 -** When directed by the lead examiner, PIC-68-340A Pressurizer Master Controller fails with maximum output. The ATC will take manual control of PIC-68-340 to close the Pressurizer Spray valves and energize Pressurizer heaters. The SRO will address Tech Specs and enter LCO 3.2.5 action.

**EVENT 5 –** When directed by the lead examiner, RWST level indicator LT-63-53 fails low, the crew will respond using AOP-I.09 RWST LEVEL INSTRUMENT MALFUNCTION. The SRO will address Tech Specs and enter LCO 3.3.1.1 Action 18.

**EVENT 6 –** When directed by the lead examiner, a Feed line break will develop on the #4 Steam Generator inside containment, the crew will initiate a Reactor Trip and Safety Injection and transitions to E-0 REACTOR TRIP OR SAFETY INJECTION. The crew will transition to E-2, FAULTED STEAM GENERATOR ISOLATION and ultimately ES-1.1, SI TERMINATION. When status tree monitoring commences, the crew will identify an orange path condition and implement FR-Z.1 for High Containment Pressure.

**EVENT 7 -** During the performance of E-0, the Hi-Hi Containment pressure logic to initiate Phase B containment isolation fails. The ATC will manually initiate a Phase B using prudent operator actions.

**EVENT 8 -** During performance of the EOP's, the EGTS fans fail to AUTO-START, the BOP will manually start the EGTS fans using Prudent Operator Actions or guidance in ES-0.5, EQUIPMENT VERIFICATIONS.

The scenario terminates as directed by the Lead Examiner upon transition to ES-1.1, SI TERMINATION.

EOP flow: E-0, FR-Z.1, E-2, ES-1.1

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Event Description: Raise plant power to 13-15% RTP

Time	Position	Applicant's Actions or Behavior
<b>Booth Operator: No action required for event 1</b>		
<b>Examiner Note:</b> The crew will shift Feed Reg Valves to AUTO using 0-GO-4, Section 5.1 Actions To Be Performed Prior To Raising Reactor Power.		
<b>5.1 Actions To Be Performed Prior To Raising Reactor Power (continued)</b>		
<div style="border: 1px solid black; padding: 10px; margin: 10px auto; width: 80%;"> <p style="text-align: center;"><b>NOTES</b></p> <p>1) MFW Bypass valves will be using single element control, which means the desired SG level setpoint will be compared to the actual SG level until adequate steam and feedwater flow are available. Single Element to Three Element control transition occurs at ~13% RTP (.494E6 LBM/HR steam flow per loop).</p> <p>2) MFW Reg valves may have a positive deviation if reactor power is in the upper range of the control band (1-4%) in the following step.</p> </div>		
	BOP	<p>[4] <b>PERFORM</b> the following:</p> <p>[4.1] <b>ENSURE</b> four MFW Bypass Reg valves in <b>AUTO</b>.</p> <p>[4.2] <b>ENSURE</b> MFW Reg. valves have minimal controller deviation.</p> <p>[4.3] <b>ENSURE</b> MFW Reg. valves are <b>CLOSED</b></p> <p>[4.4] <b>PLACE</b> MFW Reg. valves in <b>AUTO</b>.</p> <p>[4.5] <b>ENSURE</b> MFW valve control mode in "3 Element Enabled" (click target located in the center of each screen under the appropriate "Loop # Control" button)</p>
	BOP	Depresses AUTO pushbutton for FIC-3-35, 48, 90 and 103.
	SRO	Direct a load increase in accordance with 0-GO-4, Reactor Power Ascension To Between 13% And 15% RTP, Section 5.2, and 0-SO-62-7 Boron Concentration Control, Section 6.1 or Section 6.2.

Op Test No.: NRC 2013-301 Scenario # 3 Event # 1 Page 2 of 48

Event Description: Raise plant power to 13-15% RTP

Time	Position	Applicant's Actions or Behavior
<p style="text-align: center;"><b>NOTES</b></p> <p>1) Actions effecting reactivity are directed in the following step. 0-SO-62-7 requirements shall be adhered to for reactivity changes (i.e. reactivity balance, amounts of boric acid or water). All appropriate verifications and peer checks shall be utilized during performance.</p> <p>2) Recommended dilution rate is 50 to 75 gallon batches every 12 to 15 minutes for a steady power rise. Rod movement should be limited to 1/2 step increments approximately every 1 1/2 minutes. Dilution and rod movement rates may be adjusted depending on SG level control stability.</p> <p>3) Control Rod withdrawal and / or dilution requirements may be significantly impacted by the change in core reactivity due to changing Xenon concentration.</p>		
	CREW	[3] <b>INITIATE</b> a methodical and deliberate reactor power ascent by manual adjustment of the control banks or by diluting the RCS.
<b>Examiner Note:</b> The following Steps are from 0-SO-62-7 <i>Boron Concentration Control</i> , Section 6.2, <i>Dilute</i>		
<p><b>CAUTION 1</b> When making an RCS dilution of <math>\geq 3000</math> gallons, it should be done in batches with an RCS boron concentration verification at the halfway point (e.g., 1500 gallons). Allow at least 15 minutes between batches. [C.5] [C.7]</p> <p><b>CAUTION 2</b> Returning the Boric Acid Blender to service after unplugging, cleaning, or maintenance on the Boric Acid System could introduce debris, sludge, air or chunks of solidified boron into the CCP suction resulting in pump damage. Extreme care must be exercised to properly flush the Boric Acid Blender system following an outage. [C.2]</p> <p><b>NOTE 1</b> If an excessive amount of dilution is required (plant startup), the pressurizer heaters should be energized to cause pressurizer spray operation for equalizing boron concentration in RCS and pressurizer.</p> <p><b>NOTE 2</b> Dilute mode will be used anytime a long-term positive reactivity addition is desired. The operator should use the normal dilute mode whenever conditions permit.</p>		
<b>Examiner Note:</b> Dilutions will be performed based on the Reactor Engineering provided Reactivity Spreadsheet; based on 0-GO-4 Notes, recommended dilution rate is 50 to 75 gallon batches every 12 to 15 minutes for a steady power increase. During subsequent power escalation, large volume dilutions will be divided evenly over each hour as determined by the crew [i.e.: one-third, one-quarter of the volume over each hour's period (e.g.: ~60 gallons, 4 times per hour for 240 gallons for the first hour)].		
	ATC	[1] <b>ENSURE</b> unit is <u>NOT</u> in a Tech Spec or TRM action that prohibits positive reactivity additions. [C.1]
	<b>NOTE:</b>	HUT level increase of 1% is equal to 1380 gallons (TI-28 fig. 34).

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Event Description: Raise plant power to 13-15% RTP

Time	Position	Applicant's Actions or Behavior									
	ATC	<b>[2] ENSURE</b> sufficient capacity available in the HUT selected to receive expected amounts of CVCS letdown: (N/A if <u>not</u> used)									
		<table border="1"> <thead> <tr> <th>HUT</th><th>LEVEL</th><th>INITIALS</th></tr> </thead> <tbody> <tr> <td>A</td><td>_____ %</td><td>_____</td></tr> <tr> <td>B</td><td>_____ %</td><td>_____</td></tr> </tbody> </table>	HUT	LEVEL	INITIALS	A	_____ %	_____	B	_____ %	_____
HUT	LEVEL	INITIALS									
A	_____ %	_____									
B	_____ %	_____									
	ATC	<b>[3] ENSURE</b> makeup system is aligned for <b>AUTO</b> operation in accordance with Section 5.1.									
	ATC	<b>[4] RECORD</b> the quantity of dilution water required to achieve desired boron concentration using Appendix D. (N/A for minor power changes)									
	<b>NOTE</b>	Due to eyeball interpolation the verified calculation may slightly differ from the initial calculation. The following signoff indicates that any differences in the two results have been discussed and are close enough to be considered validated.									
	ATC	<b>[5] PERFORM</b> Appendix I Independent Verification of Calculation for Amount of Boric Acid or Primary Water. (N/A if App. D was performed by SRO to verify data from Rx Engineering)  <i>(Step not required provided in shift turnover package)</i>									
	ATC	<b>[6] PLACE [HS-62-140A]</b> , Boric Acid Supply to Blender Flow Control Switch to the <b>STOP</b> position.									
	ATC	<b>[7] PLACE [HS-62-140B]</b> , CVCS Makeup Selector Switch to the <b>DILUTE</b> position.									
	ATC	<b>[8] ENSURE [HS-62-140D]</b> , Boric Acid Valve to the Blender is <b>CLOSED</b> (Green light is <b>LIT</b> ).									
	ATC	<b>[9] SET [FQ-62-142]</b> , Batch Integrator for the desired quantity									
	<b>NOTE</b>	Primary Water Flow Controller <b>[FC-62-142]</b> receives its reference signal (70 gpm) from setpoint potentiometer (dial indicator) located on panel M-6. A setpoint of 35% corresponds to a 70 gpm primary water flow rate									
	ATC	<b>[10] ADJUST [FC-62-142]</b> , Primary Makeup Water Flow Controller for the desired flow rate									
	ATC	<b>[11] PLACE [HS-62-140A]</b> , Boric Acid Supply to Blender Flow Control Switch to the <b>START</b> position.									
	ATC	<b>[12] VERIFY</b> the following;									
		<b>[a]</b> Inlet to top of VCT <b>[FCV-62-128]</b> is <b>OPEN</b> .									
		<b>[b]</b> Primary Water flow by <b>[FI-62-142A]</b> OR <b>[FQ-62-142]</b> .									

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Event Description: Raise plant power to 13-15% RTP

Time	Position	Applicant's Actions or Behavior
	<b>NOTE</b>	Alternate dilution in small amounts is acceptable on a regular basis, provided no significant changes in seal water temperature or seal leakoff are indicated. Batches of 5 to 10 gallons may be added through FCV-62-144 on a frequency not to exceed once per 30 minutes. ICS points for No. 1 seal leakoffs and seal water temperatures on the RCPs should be monitored during and after dilution.
	ATC	<b>[13] IF</b> primary water addition to the bottom of the VCT <b>[FCV-62-144]</b> is desired, <b>THEN</b>
	ATC	<b>[a] CLOSE [FCV-62-128]</b> with <b>[HS-62-128]</b> .
	ATC	<b>[b] OPEN [FCV-62-144]</b> with <b>[HS-62-144]</b> .
	ATC	<b>[c] VERIFY</b> Primary Water flow by <b>[FI-62-142A] OR [FQ-62-142]</b> .
	<b>NOTE</b>	It may take approximately 15 minutes before any changes to reactivity are indicated on nuclear instrumentation or RCS temperature indication.
	ATC	<b>[14] MONITOR</b> nuclear instrumentation and reactor coolant temperature to ensure the proper response from dilution.
	ATC	<b>[15] IF [LI-62-129]</b> , Volume Control Tank Level, increases to 63 percent, <b>THEN ENSURE [LCV-62-118]</b> , Volume Control Tank Divert Valve <b>OPENS</b> to divert excess water to the Holdup Tanks.
	ATC	<b>[16] WHEN</b> dilution is complete, <b>THEN</b>
	ATC	<b>[a] PLACE [HS-62-140A]</b> , Boric Acid to Blender Flow Control Switch to the <b>STOP</b> position.
	ATC	<b>[b] IF [FCV-62-144]</b> was previously <b>OPENED</b> , <b>THEN CLOSE [FCV-62-144]</b> with <b>[HS-62-144]</b> .
	ATC	<b>[c] VERIFY</b> no primary water flow on either <b>[FI-62-142A] OR [FQ-62-142]</b> .
	ATC	<b>[d] ENSURE [FCV-62-128]</b> is <b>CLOSED</b>
	ATC	<b>[17] IF</b> power increase in progress and additional dilutions will be required, <b>THEN</b> use this table to re-perform steps <b>[4]</b> through <b>[18]</b> (next page)



Op Test No.: NRC 2013-301 Scenario # 3 Event # 1 Page 5 of 48

Event Description: Raise plant power to 13-15% RTP

Unit

Date \_\_\_\_\_

## 6.2 Dilute (Continued)

**[17]** IF power ascension in progress and additional dilutions will be required, **THEN** use this table to re-perform steps **[4]** through **[18]**.

STEP	1 <sup>st</sup>	2 <sup>nd</sup>	3 <sup>rd</sup>
[4] <b>RECORD</b> the quantity of dilution water required to achieve desired boron concentration using Appendix D.	Quantity	Quantity	Quantity
[5] <b>PERFORM</b> Appendix I, IV of Calculation for amount of BA or PW.	SRO	SRO	SRO
[6] <b>PLACE [HS-62-140A]</b> , Boric Acid Supply to Blender Flow Control Switch to the <b>STOP</b> position.	1 <sup>st</sup> CV	1 <sup>st</sup> CV	1 <sup>st</sup> CV
[7] <b>PLACE [HS-62-140B]</b> , CVCS Makeup Selector Switch to the <b>DILUTE</b> position.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
[8] <b>ENSURE [HS-62-140D]</b> Boric Acid Valve to Blender is <b>CLOSED</b> (Green light LIT).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
[9] <b>SET [FQ-62-142]</b> , Batch Integrator for the desired quantity.	1 <sup>st</sup> / CV	1 <sup>st</sup> / CV	1 <sup>st</sup> / CV
[10] <b>ADJUST [FC-62-142]</b> , Primary Makeup Water Flow Controller for the desired flow rate.	1 <sup>st</sup> / CV	1 <sup>st</sup> / CV	1 <sup>st</sup> / CV
[11] <b>PLACE [HS-62-140A]</b> , BA Supply to Blender Flow Control Switch to <b>START</b> .	1 <sup>st</sup> / CV	1 <sup>st</sup> / CV	1 <sup>st</sup> / CV
[12] <b>VERIFY</b> the following: [a] Inlet to top of VCT [FCV-62-128] is <b>OPEN</b> . [b] Primary Water flow by [FI-62-142A] or [FQ-62-142].	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
[13] <b>IF</b> PW addition to top of VCT [FCV-62-128] is not warranted, but PW addition to the bottom of the VCT [FCV-62-144] is desired, <b>THEN</b> [a] <b>CLOSE [FCV-62-128]</b> with [HS-62-128] [b] <b>OPEN [FCV-62-144]</b> with [HS-62-144]. [c] <b>VERIFY</b> Primary Water flow by [FI-62-142A] or [FQ-62-142].	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
[14] <b>MONITOR</b> nuclear instrumentation and reactor coolant temperature to ensure the proper response from dilution.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
[15] <b>IF [LI-62-129]</b> , VCT level, rises to 63 percent, <b>THEN ENSURE [LCV-62-118]</b> , VCT Divert Valve, <b>OPENS</b> to divert excess water to the HUTs.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
[16] <b>WHEN</b> dilution is complete, <b>THEN</b> [a] <b>PLACE [HS-62-140A]</b> , Boric Acid to Blender Flow Control Switch to <b>STOP</b> [b] <b>IF [FCV-62-144]</b> was previously <b>OPENED</b> , <b>THEN CLOSE [FCV-62-144]</b> with [HS-62-144]. [c] <b>VERIFY</b> no primary water flow on either [FI-62-142A] or [FQ-62-142]. [d] <b>ENSURE [FCV-62-128]</b> is <b>CLOSED</b> .	1 <sup>st</sup> / CV <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	1 <sup>st</sup> / CV <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	1 <sup>st</sup> / CV <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>

**[18]IF** Step [17] will be repeated, **THEN**

**PERFORM** the following:

[a] PLACE **[HS-62-140B]**, CVCS Makeup Selector Switch to the **AUTO** position. \_\_\_\_\_ / \_\_\_\_\_  
1<sup>st</sup> CV

**[b] PLACE [HS-62-140A],** BA to Blender Flow Control Switch to **START** position.

**[c] ENSURE** dilution is logged in Unit Narrative Log.

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Event Description: Raise plant power to 13-15% RTP

Time	Position	Applicant's Actions or Behavior
	ATC	[19] <b>REALIGN</b> the blender controls for <b>AUTO</b> makeup to the CVCS in accordance with Section 5.1.
	ATC	[20] <b>ENSURE</b> dilution(s) is logged in Unit Narrative Log.
	<b>NOTE</b>	Sample may be obtained at normal RCS sample intervals provided the unit is at power and the unit response following the dilution is as expected.
	ATC	[21] <b>IF</b> RCS boron sample is required, <b>THEN NOTIFY</b> Chem Lab to obtain RCS boron sample.

Op Test No.: NRC 2013-301 Scenario # 3 Event # 1 Page 7 of 48

Event Description: Raise plant power to 13-15% RTP

Time	Position	Applicant's Actions or Behavior
		<b>0-GO-4, Section 5.2 Reactor Power Ascension To Between 13% And 15% RTP</b>
		<b>Examiner Note:</b> Crew will coordinate control rod withdrawal and dilutions based on the Reactor Engineering provided Reactivity Spreadsheet and would coordinate rod withdrawal and dilutions observing the guidance of Step 3 NOTES above on page 2.
		<div style="border: 1px solid black; padding: 10px; text-align: center;"> <div style="border: 1px solid black; padding: 5px; display: inline-block;">MODE 1</div> </div>
		<p><b>Examiner Note:</b> Mode change call is made using Loop <math>\Delta T</math> indications on the MCB and ICS, not NIs; NIs may be referred to during the MODE change determination</p> <p>Refer to 0-GO-4 Section 3.1, Precaution C, specifically bullets 2 &amp; 3 (below):</p> <p>C. During startup, NIS power range indication may be reading significantly higher than true power until calibration adjustments are made. The following should be used to determine the most accurate indication for comparison with NIS:</p> <ul style="list-style-type: none"> <li>When reactor power is less than or equal to 15%, use average loop <math>\Delta T</math> (UO485).</li> <li>When reactor power is greater than 15%, use LEFM core thermal power indication (U2118). If LEFM is <b>NOT</b> available, then continue using average loop <math>\Delta T</math> up to 40%. (U1118 will be used above 40% with LEFM unavailable).</li> </ul>
	ATC	[4] <b>WHEN</b> reactor power is above 5%, <b>THEN LOG</b> Mode 1 entry in the Unit Narrative Log.
	SRO	ATC would be monitoring the mode change; any crew member may make the initial identification however the SRO should announce transition to MODE 1 based on Loop $\Delta T$ indication. Normally, both MCB and ICS indications are reviewed for MODE transition verification.  Crew member replaces the MODE 2 sign with MODE 1 sign on 1-M-4 under the clock.
	BOP	[5] <b>MAINTAIN</b> the SG levels on program by periodically adjusting the MFW Bypass controller level setpoints using Appendix B and 1, 2-SO-98-1, <i>Distributed Control System (DCS)</i> .
		<b>Examiner Note:</b> According to turnover information, the crew will not prepare for nor perform MT roll; Step 6 is N/A for this exam.

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Event Description: Raise plant power to 13-15% RTP

Time	Position	Applicant's Actions or Behavior
	N/A	[6] <b>IF</b> Turbine Roll in parallel with power increase is desired, <b>THEN PERFORM</b> Section 5.3 in parallel with the remainder of this section.
	ATC	[7] <b>IF</b> the intermediate range rod stop setpoint is reached before P-10 energizes, <b>THEN</b>
		[7.1] <b>STOP</b> the power escalation.
		[7.2] <b>CONTACT</b> Reactor Engineering to evaluate power range calibration. <b>[C.3]</b>
<b>When the crew has sufficiently raised power the Lead examiner may proceed to Event 2.</b>		

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Event Description: Raise plant power to 13-15% RTP

**Examiner note: The following 4 pages are the guidance for maintaining S/G levels using the DCS (Digital Feed Control) and may or may not be used.**

### 6.1 Changing MFW Bypass Reg Valve Controller Setpoint With Hand Controller Using the JOG Method

#### NOTES

- 1) With the MFW Bypass Reg Valve controller in auto, SG level setpoints are digitally limited to between 30 and 50%. This action prevents an inadvertent setpoint insertion by the operator from causing too much of a level swing.
- 2) MFW Bypass Reg Valve controller setpoint can **NOT** be changed when the Turbine Impulse program is in control. Turbine Impulse program will take control above ~27% during a power rise and reset at less than ~23% for a power reduction.
- 3) SG setpoints can be changed from either the DCS Operator Display monitor or the hand controller station.
- 4) Two handed operation will be required to change the SG controller setpoint, when using the hand controller.
- 5) Setpoint push button will change from gray to red on the Hand Controller and the DCS Operator Display monitor.

[1] **PRESS** and **HOLD** SETPOINT push button for applicable Bypass Reg Valve (N/A valves not operated):

S/G	UNID	INITIALS
1	1-LIC-3-35	_____
2	1-LIC-3-48	_____
3	1-LIC-3-90	_____
4	1-LIC-3-103	_____

Op Test No.: NRC 2013-301 Scenario # 3 Event # 1 Page 10 of 48Event Description: Raise plant power to 13-15% RTP**NOTE**

The following method (JOG method) will cause the setpoint to change in 0.5% increments each time the button is pressed. The push buttons are momentary contact closure type, so continuously holding the push button down will **NOT** change the setpoint. The push button will have to be released and then pressed again to change the setpoint.

- [2] **PRESS** either the raise ( $\gg$ ) or the lower ( $\ll$ ) push buttons to obtain the desired setpoint (N/A valves not operated):

S/G	UNID	INITIALS
1	1-LIC-3-35	_____
2	1-LIC-3-48	_____
3	1-LIC-3-90	_____
4	1-LIC-3-103	_____

- [3] **RELEASE** the SETPOINT push button. (N/A valves not operated).

S/G	UNID	INITIALS
1	1-LIC-3-35	_____
2	1-LIC-3-48	_____
3	1-LIC-3-90	_____
4	1-LIC-3-103	_____

- [4] **REPEAT** Steps 6.1[1]-6.1[3] as necessary to maintain S/G level in desired range.



**End of Section**

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Event Description: Raise plant power to 13-15% RTP

## 8.2 Dampening SG Level Oscillations with MFW Bypass Valves

### NOTES

- 1) Perform adjustments to one SG at a time. Allow Plant Parameters to Stabilize between valve adjustments.
- 2) The wide range level indications may respond to a change in level before the narrow range indicators.
- 3) The associated Main Reg valve for the loop to be dampened will be taken to manual. This is to ensure a bumpless transfer on the return to normal.

[1] **ENSURE** turbine load is less than ~22%. ☐

[2] **IF** the associated MFW Reg valve controller is in **AUTO**, **THEN**

**PLACE** the Reg valve controller in **MANUAL**.

SG-1	SG-2	SG-3	SG-4
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

[3] **IF** the MFW Bypass controller is in **AUTO**, **THEN**

**PLACE** the Bypass controller in **MANUAL**.

SG-1	SG-2	SG-3	SG-4
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

[4] **ADJUST** valve demand position less than 10 percent in the opposite direction of SG level change.

SG-1	SG-2	SG-3	SG-4
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

[5] **IF** the MFW Bypass controller is to be placed in **AUTO**, **THEN**

[5.1] **PLACE** the Bypass valve controller in **AUTO**.

SG-1	SG-2	SG-3	SG-4
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

[5.2] **PLACE** the Reg valve controller in **AUTO**.

SG-1	SG-2	SG-3	SG-4
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Op Test No.: NRC 2013-301 Scenario # 3 Event # 1 Page 12 of 48

Event Description: Raise plant power to 13-15% RTP

**8.2 Dampening SG Level Oscillations with MFW Bypass Valves  
(continued)**

[6] **MONITOR** MFW Bypass controller operation and system parameters.

☐

[7] **IF** another SG Loop requires dampening, **THEN**

**GO TO** 8.2[1].

**SG-1**

☐

**SG-2**

☐

**SG-3**

☐

**SG-4**

☐

End of Section



Op Test No.: NRC 2013-301 Scenario # 3 Event # 2 Page 13 of 48

Event Description: IR Channel B Instrument N-36 Fails

Time	Position	Applicant's Actions or Behavior						
<b>At 6% NI power during a control rod withdrawal, direct the Simulator Operator to initiate Event 2 IR Channel N-36 Fails.</b>								
<b>Indications available:</b> <ul style="list-style-type: none"> <li>4B B2 IPRS NIS Intermediate Range HI FLUX LVL ROD WITHDRAWAL STOP</li> <li>Control Rod motion stops, if in progress.</li> <li>Intermediate Range Instrument N-36 is greater than N-35</li> </ul>								
<div style="border: 1px solid black; padding: 10px; text-align: center;"> <b>IRS INTERMED RANGE HI FLUX LVL ROD WITHDRAWAL STOP</b> </div> <p><b>NOTE</b> Control rods will not withdraw in manual or automatic.</p> <p><b>Corrective Actions</b></p> <ul style="list-style-type: none"> <li>[1] CHECK reactor power level.</li> <li>[2] REDUCE reactor power to &lt; 20%.</li> <li>[3] BLOCK intermediate range high flux trip and power range high flux trip (low setpoint).</li> <li>[4] IF Intermediate Range channel failed, THEN GO TO AOP-I.01, Nuclear Instrument Malfunction.</li> </ul>								
<b>Examiner Note:</b> Several steps, notes, and cautions in the Annunciator response procedure do not apply to this failure. Only those that are applicable are listed in this event guide.								
	ATC	Responds to alarm using ARP 1-AR-M4B, B2						
	SRO	Transitions to AOP-I.01, Nuclear Instrument Malfunction.						
		1. <b>DIAGNOSE</b> the failure: <table border="1" style="margin-left: 40px;"> <thead> <tr> <th>IF...</th> <th>GO TO SECTION</th> <th>PAGE</th> </tr> </thead> <tbody> <tr> <td>Intermediate Range Failure</td> <td>2.2</td> <td>9</td> </tr> </tbody> </table>	IF...	GO TO SECTION	PAGE	Intermediate Range Failure	2.2	9
IF...	GO TO SECTION	PAGE						
Intermediate Range Failure	2.2	9						
	SRO	Directs actions using AOP-I.01, Nuclear Instrument Malfunction.						

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Event Description: IR Channel B Instrument N-36 Fails

Time	Position	Applicant's Actions or Behavior
<p><b>CAUTION 1</b> If reactor power is below P-6 (<math>10^{-4}</math> %), Tech Specs require restoring inoperable channel prior to raising power above P-6.</p> <p><b>CAUTION 2</b> If reactor power is above P-6 but below 5% power, Tech Specs require restoring inoperable channel prior to raising power above 5%.</p> <p><b>NOTE 1</b> If Intermediate Range channel is failed high, reducing reactor power to less than P-10 (10%) will result in a reactor trip. If control power is available, this condition will be corrected when the channel is bypassed in Step 6.</p> <p><b>NOTE 2</b> If any IR channel has failed high, then automatic re-enabling of Source Range indication may be disabled. (SRMs may require manual reinstating in ES-0.1.)</p> <p><b>NOTE 3</b> Failure of Intermediate Range Channel may affect associated Source Range Channel.</p>		
	SRO	<p>1. <b>IF</b> unit is in Mode 2, <b>THEN</b> <b>STABILIZE</b> reactor power at current level.</p>
	SRO	<p>2. <b>EVALUATE</b> the following Tech Specs for applicability:</p> <ul style="list-style-type: none"> <li>3.3.1.1 (3.3.1), Reactor Trip System Instrumentation</li> <li>3.3.3.5, Remote Shutdown Instrumentation</li> <li>3.3.3.7, Accident Monitoring Instrumentation</li> <li>3.9.2, Refueling Operations Instrumentation</li> </ul>

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Event Description: IR Channel B Instrument N-36 Fails

Time	Position	Applicant's Actions or Behavior																				
		<div>LIMITING CONDITION FOR OPERATION</div> <div>3.3.1.1 As a minimum, the reactor trip system instrumentation channels and interlocks of Table 3.3-1 shall be OPERABLE.</div> <div>APPLICABILITY: As shown in Table 3.3-1.</div> <div>ACTION:</div> <div>As shown in Table 3.3-1.</div> <div>REACTOR TRIP SYSTEM INSTRUMENTATION</div> <table><thead><tr><th>FUNCTIONAL UNIT</th><th>TOTAL NO. OF CHANNELS</th><th>CHANNELS TO TRIP</th><th>MINIMUM CHANNELS OPERABLE</th><th>APPLICABLE MODES</th><th>ACTION</th></tr></thead><tbody><tr><td>5. Intermediate Range, Neutron Flux</td><td>2</td><td>1</td><td>2</td><td>1, 2, and *</td><td>3, 17</td></tr></tbody></table> <div>ACTION 3 -<div>With the number of channels OPERABLE one less than required by the Minimum Channels OPERABLE requirement and with the THERMAL POWER level:<div>b. Above the P-6 (Block of Source Range Reactor Trip) setpoint, but below 5% of RATED THERMAL POWER, restore the inoperable channel to OPERABLE status prior to increasing THERMAL POWER above 5% of RATED THERMAL POWER.</div><div>c. Above 5% of RATED THERMAL POWER, POWER OPERATION may continue.</div></div></div> <div>22. Reactor Trip System Interlocks<div>A. Intermediate Range Neutron Flux, P-6<div>21</div><div>2</div><div>1</div><div>2</div><div>2, and*</div><div>8a</div></div></div> <div>ACCIDENT MONITORING INSTRUMENTATION</div> <div>LIMITING CONDITION FOR OPERATION</div> <div>3.3.3.7 The accident monitoring instrumentation channels shown in Table 3.3-10 shall be OPERABLE.</div> <div>APPLICABILITY: MODES 1, 2 and 3.</div> <div>ACTION: As shown in Table 3.3-10</div> <div>ACCIDENT MONITORING INSTRUMENTATION</div> <table><thead><tr><th>INSTRUMENT</th><th>TOTAL NO. OF CHANNELS</th><th>MINIMUM CHANNELS REQUIRED</th><th>ACTION</th></tr></thead><tbody><tr><td>17. Neutron Flux</td><td></td><td></td><td></td></tr></tbody></table>	FUNCTIONAL UNIT	TOTAL NO. OF CHANNELS	CHANNELS TO TRIP	MINIMUM CHANNELS OPERABLE	APPLICABLE MODES	ACTION	5. Intermediate Range, Neutron Flux	2	1	2	1, 2, and *	3, 17	INSTRUMENT	TOTAL NO. OF CHANNELS	MINIMUM CHANNELS REQUIRED	ACTION	17. Neutron Flux			
FUNCTIONAL UNIT	TOTAL NO. OF CHANNELS	CHANNELS TO TRIP	MINIMUM CHANNELS OPERABLE	APPLICABLE MODES	ACTION																	
5. Intermediate Range, Neutron Flux	2	1	2	1, 2, and *	3, 17																	
INSTRUMENT	TOTAL NO. OF CHANNELS	MINIMUM CHANNELS REQUIRED	ACTION																			
17. Neutron Flux																						


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Event Description: IR Channel B Instrument N-36 Fails

Time	Position	Applicant's Actions or Behavior									
		b. Intermediate Range (Instrument Loops 92-5003,-5004) 2 2 1									
	SRO	Enters LCO 3.3.1.1 Action 3 and 3.3.3.7, Action 1.									
	ATC	3. <b>CHECK</b> at least one Intermediate Range channel OPERABLE.									
<b>CAUTIONS:</b> <ul style="list-style-type: none"> <li>Loss of instrument OR control power will cause a single channel reactor trip signal.</li> <li>For loss of control power only, the reactor trip signal cannot be bypassed. Reducing reactor power below P-10 will result in a reactor trip.</li> </ul>											
<b>NOTE:</b> The following table lists Intermediate Range NIS power supplies: <table border="1"> <thead> <tr> <th>NIS CHANNEL</th><th>INSTRUMENT POWER</th><th>CONTROL POWER</th></tr> </thead> <tbody> <tr> <td>N-35</td><td>VIPB 1-I (2-I) Bkr 3</td><td>VIPB 1-I (2-I) Bkr 4</td></tr> <tr> <td>N-36</td><td>VIPB 1-II (2-II) Bkr 3</td><td>VIPB 1-II (2-II) Bkr 4</td></tr> </tbody> </table>			NIS CHANNEL	INSTRUMENT POWER	CONTROL POWER	N-35	VIPB 1-I (2-I) Bkr 3	VIPB 1-I (2-I) Bkr 4	N-36	VIPB 1-II (2-II) Bkr 3	VIPB 1-II (2-II) Bkr 4
NIS CHANNEL	INSTRUMENT POWER	CONTROL POWER									
N-35	VIPB 1-I (2-I) Bkr 3	VIPB 1-I (2-I) Bkr 4									
N-36	VIPB 1-II (2-II) Bkr 3	VIPB 1-II (2-II) Bkr 4									
	ATC	4. <b>CHECK</b> power available to failed Intermediate Range channel: [M-13] <ul style="list-style-type: none"> <li>INSTRUMENT POWER ON indicator LIT</li> </ul> <b>AND</b> <ul style="list-style-type: none"> <li>CONTROL POWER ON indicator LIT</li> </ul>									
	ATC	5. <b>IF</b> required to monitor IR channel on NR-45 recorder, <b>THEN ENSURE</b> OPERABLE IR channel selected on NR-45 Recorder. [M-4]									
	ATC	6. <b>PLACE</b> Level Trip switch for failed channel in BYPASS [M-13, N35/N36].									
	ATC	Places N-36 Trip Level Bypass switch to BYPASS.									

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Event Description: IR Channel B Instrument N-36 Fails

Time	Position	Applicant's Actions or Behavior
		<p>7. <b>IF</b> control power is available, <b>THEN</b> <b>PERFORM</b> the following:</p> <p>a. <b>VERIFY</b> NIS TRIP BYPASS annunciator LIT [M-6A, A-1].</p> <p>b. <b>VERIFY</b> appropriate annunciator LIT:</p> <ul style="list-style-type: none"> <li>• INTERMEDIATE RANGE TRIP BYPASS CHANNEL I [M-4A, A-2]</li> </ul> <p><b>OR</b></p> <ul style="list-style-type: none"> <li>• INTERMEDIATE RANGE TRIP BYPASS CHANNEL II [M-4A, B-2]</li> </ul>
		8. <b>CHECK</b> associated Source Range Channel NOT affected.
		<p>9. <b>GO TO</b> appropriate plant procedure.</p> 
	Crew	<b>Performs a Crew Brief</b> as time allows.
	Crew	<p><b>Notifications</b> should be addressed as applicable if not specifically addressed by the procedure or in the crew brief.</p> <p><u>Operations Management</u> - Typically Shift Manager.</p> <p><u>Maintenance Personnel</u> – Typically Maintenance Shift Supervisor (MSS). (<b>Note:</b> Maintenance notification may be delegated to the Shift Manager).</p>
<b>Lead Examiner may cue next event when N-36 Trip Level switch has been placed in bypass.</b>		

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Event Description: 1A Thermal Barrier Booster Pump Breaker Trips

Time	Position	Applicant's Actions or Behavior
<b>Direct the Simulator Operator to initiate Event 3, 1A Thermal Barrier Booster Pump Trip</b>		
<b>Indications available:</b>  <b>0-M-27-B-A Annunciators:</b> <ul style="list-style-type: none"> <li>0-XA-27-B-A Window B-1: RC PUMPS THRM BARRIER RETURN HEADER FLOW LOW</li> <li>0-XA-27-B-A Window B-2: RC PUMP 1 BARRIER Outlet FLOW LOW</li> <li>0-XA-27-B-A Window B-3: RC PUMP 2 BARRIER Outlet FLOW LOW</li> <li>0-XA-27-B-A Window B-4: RC PUMP 3 BARRIER Outlet FLOW LOW</li> <li>0-XA-27-B-A Window B-5: RC PUMP 4 BARRIER Outlet FLOW LOW</li> </ul>		
<div style="border: 1px solid black; padding: 10px; margin: 10px auto; width: 30%;"> <p style="text-align: center;"><b>RC PUMPS THRM BARRIER RETURN HEADER FLOW LOW</b></p> </div> <p>[1] CHECK CCS thermal barrier return header flow by observing [1-FI-70-81A].</p> <p>[2] IF pressure on CCS dictates, THEN</p> <p style="padding-left: 20px;">[a] START standby CCS pump.</p> <p style="padding-left: 20px;">[b] VERIFY CCS thermal barrier booster pumps operating.</p> <p>[3] IF 0-XA-55-12A Window B-1 "1-RA-90-123A CCS LIQ EFF MON HIGH RAD" is alarming, THEN</p> <p style="padding-left: 20px;">REFER to 0-AR-M12-A. [C.1]</p> <p>[4] VERIFY CCS thermal barrier isolation valves 1-FCV-70-90, 1-FCV-70-133, 1-FCV-70-87, and 1-FCV-70-134 are OPEN.</p> <p style="padding-left: 20px;">[a] IF CCS to RCP thermal barrier cooling coils has isolated, THEN</p> <p style="padding-left: 40px;">ENSURE Unit 1 CCS thermal barrier booster pump handswitches are in the stop PULL TO LOCK position AND GO TO AOP-M.03, <i>Loss of Component Cooling Water</i>, for a loss of Component Cooling Thermal Barrier Booster Pump(s). [C.1]</p>		
	BOP	Responds to ARP 0-AR-M27B-A B-1.
	BOP	May place HS-70-130A Thermal Barrier Booster Pump 1B-B to START and HS-70-131A Thermal Barrier Booster Pump 1A-A to STOP based on prudent operator actions.
<b>Examiner Note:</b> Several steps, notes, and cautions in the Annunciator response procedure do not apply to this failure. Only those that are applicable are listed in this event guide.		
	SRO	Transitions to AOP-M.03 Loss Of Component Cooling Water section 2.2


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Event Description: 1A Thermal Barrier Booster Pump Breaker Trips

Time	Position	Applicant's Actions or Behavior						
<b>1. DIAGNOSE</b> the failure:								
<table border="1"> <tr> <td>IF...</td> <td>GO TO SECTION</td> <td>PAGE</td> </tr> <tr> <td>CCS Thermal Barrier Booster Pump trip or failure</td> <td>2.2</td> <td>13</td> </tr> </table>			IF...	GO TO SECTION	PAGE	CCS Thermal Barrier Booster Pump trip or failure	2.2	13
IF...	GO TO SECTION	PAGE						
CCS Thermal Barrier Booster Pump trip or failure	2.2	13						
<b>NOTE</b> If RCP seal injection flow is lost concurrently with loss of thermal barrier cooling, then AOP-M.09 ( <i>Loss of Charging</i> ) takes precedence over AOP-M.03.								
	BOP	1. <b>IDENTIFY</b> and <b>LOCK OUT</b> affected Thermal Barrier Booster Pump.						
	BOP	Places HS-70-131A Thermal Barrier Booster Pump 1A-A to STOP PTL.						
	BOP	2. <b>CHECK</b> Thermal Barrier isolation valves OPEN: <ul style="list-style-type: none"> <li>• FCV-70-87</li> <li>• FCV-70-90</li> <li>• FCV-70-133</li> <li>• FCV-70-134</li> </ul>						
	BOP	3. <b>ENSURE</b> standby Thermal Barrier Booster Pump starts.						
	BOP	Places HS-70-130A Thermal Barrier Booster Pump 1B-B to START if not already done.						
	BOP	4. <b>ENSURE</b> proper RCP seal injection: <ul style="list-style-type: none"> <li>• Flow between 8 gpm and 13 gpm</li> <li>• VCT outlet temperature less than or equal to 130°F</li> </ul>						
	BOP	5. <b>MONITOR</b> RCP Seal and Lower Bearing temperatures less than or equal to 225°F.						

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Event Description: 1A Thermal Barrier Booster Pump Breaker Trips

Time	Position	Applicant's Actions or Behavior
	BOP	<p>6. <b>MONITOR</b> CCS radiation levels <b>STABLE</b> or <b>DROPPING</b>:</p> <ul style="list-style-type: none"> <li>• RA-90-123A, CCS Liquid Effluent Monitor</li> <li>• Chemistry Sample</li> </ul>
	SRO	<p>7. <b>NOTIFY</b> SM to evaluate OPDP-9, <i>Emergent Issue Response</i>.</p> <p>8. <b>INITIATE</b> Maintenance as required.</p>
<b>CAUTION</b> Automatic isolation of the thermal barrier can be caused by a heat exchanger tube leak. Realignment of the thermal barrier may cause additional leakage.		
	BOP	9. <b>CHECK</b> thermal barrier cooling in service to affected unit.
	SRO	<p>10. <b>GO TO</b> appropriate plant procedure.</p>  <p><b>END OF SECTION</b></p>
	Crew	<b>Performs a Crew Brief</b> as time allows.
	Crew	<p>Notifications should be addressed as applicable if not specifically addressed by the procedure or in the crew brief.</p> <p>Operations Management - Typically Shift Manager.</p> <p>Maintenance Personnel – Typically Maintenance Shift Supervisor (MSS). (Note: Maintenance notification may be delegated to the Shift Manager).</p>
<b>Evaluator Note: Proceed to the next event when ready</b>		



Op Test No.: NRC 2013-301 Scenario # 3 Event # 4 Page 21 of 48  
 Event Description: Pressurizer Master Controller Fails With Maximum Output

Time	Position	Applicant's Actions or Behavior
<b>Direct the Simulator Operator to initiate Event 4 Pressurizer Master Controller Fails With Maximum Output</b>		
<b>Alarms</b> <b>1-M-5</b> <ul style="list-style-type: none"> <li>5A B-3 "PS 68 340F/G PRESSURIZER PRESS ABOVE REF SET POINT"</li> </ul>		
<b>Indications</b> <b>1-M-4</b> <ul style="list-style-type: none"> <li>RCS Pressurizer Main Spray Valves OPEN</li> <li>1-PI-68-334, 323, 322 RCS PZR PRESS indicators decreasing</li> </ul>		
Time	Position	Applicant's Actions or Behavior
<div style="border: 1px solid black; padding: 10px; margin: 10px auto; width: 30%;"> <p style="text-align: center;"><b>PS-68-340F/G PRESSURIZER PRESS ABOVE REF SET POINT</b></p> </div> <p>[1] CHECK pressurizer pressure.</p> <p>[2] IF channel failed, THEN GO TO AOP-I.04, Pressurizer Instrument Malfunction.</p> <p>[3] IF pressurizer pressure high, THEN PERFORM the following:</p> <p style="padding-left: 20px;">[a] ENSURE pressurizer heaters OFF.</p> <p style="padding-left: 20px;">[b] ENSURE pressurizer spray valves OPEN.</p> <p style="padding-left: 20px;">[c] ADJUST plant parameters as necessary.</p> <p>[4] EVALUATE TS 3.3.1, 3.3.2, 3.3.3.5.</p>		
<b>Examiner Note:</b> Several steps, notes, and cautions in the Annunciator response procedure do not apply to this failure. Only those that are applicable are listed in this event guide.		
	ATC	Responds to alarm using ARP 1-AR-M5A, B3
	ATC	Places PIC-68-340A, Master Pressure Controller in MANUAL and lowers output.  OR Places PZR Spray controllers PIC-68-340D (Loop 1) and PIC-68-340B (Loop 2) and lowers output.  Using immediate operator actions (IOAs)

Op Test No.: NRC 2013-301 Scenario # 3 Event # 4 Page 22 of 48  
 Event Description: Pressurizer Master Controller Fails With Maximum Output

Time	Position	Applicant's Actions or Behavior						
	SRO	Transitions to AOP-I.04 Pressurizer Instrument And Control Malfunctions.						
<p><b>NOTE:</b> If spray valve is open due to pressure instrument failure, then Section 2.3 is the appropriate entry point.</p> <p>1. <b>DIAGNOSE</b> the failure:</p> <table border="1"> <thead> <tr> <th>IF...</th><th>GO TO SECTION</th><th>PAGE</th></tr> </thead> <tbody> <tr> <td>Pressurizer Pressure Instrument OR Controller Malfunction</td><td>2.3</td><td>11</td></tr> </tbody> </table> <p><b>NOTE</b> Step 1 is an IMMEDIATE ACTION.</p>			IF...	GO TO SECTION	PAGE	Pressurizer Pressure Instrument OR Controller Malfunction	2.3	11
IF...	GO TO SECTION	PAGE						
Pressurizer Pressure Instrument OR Controller Malfunction	2.3	11						
	SRO	<p>1. <b>CHECK</b> normal spray valves CLOSED.</p> <p><b>IF</b> RCS pressure is less than 2260 psig, <b>THEN</b> <b>CLOSE</b> affected spray valve(s) <b>USING</b> the following:</p> <ul style="list-style-type: none"> <li>PIC-68-340A, Master Pressure Controller.</li> </ul> <p><b>OR</b></p> <ul style="list-style-type: none"> <li>PZR Spray controllers PIC-68-340D (Loop 1) and/or PIC-68-340B (Loop 2).</li> </ul>						
	ATC	Places Master Pressure Controller in MANUAL OR Spray controllers PIC-68-340D (Loop 1) and PIC-68-340B (Loop 2) in MANUAL if not already performed during IOA's.						
	ATC	<p>2. <b>MONITOR</b> pressurizer pressure stable or trending to desired pressure.</p> <p><b>RESTORE</b> pressurizer pressure <b>USING</b> manual control of the following:</p> <ul style="list-style-type: none"> <li>PIC-68-340A, Master Pressure Controller.</li> </ul> <p><b>OR</b></p> <ul style="list-style-type: none"> <li>PZR Spray controllers PIC-68-340D (Loop 1) and/or PIC-68-340B (Loop 2)</li> </ul> <p><b>OR</b></p> <ul style="list-style-type: none"> <li>Pressurizer Heaters.</li> </ul>						
	ATC	May energize additional Pressurizer heaters.						

Op Test No.: NRC 2013-301 Scenario # 3 Event # 4 Page 23 of 48

Event Description: Pressurizer Master Controller Fails With Maximum Output

Time	Position	Applicant's Actions or Behavior
<b>NOTE:</b> Appendix L shows layout of PZR pressure control for operator reference.		
	ATC	3. <b>CHECK</b> PI-68-340A NORMAL.
<b>CAUTION</b> RCS pressure changes and changes in RCS boron concentration (due to differences between pzs and RCS boron) may cause small change in core reactivity.		
	ATC	4. <b>CHECK</b> PI-68-334 NORMAL.
<b>NOTE:</b> A failure of channel III (P-68-323) will affect the automatic actuation of PCV-68-334, PZR PORV, in the normal pressure control circuit. LTOPS operation of this PORV is unaffected by this failure (except when PORV handswitch is in CLOSE position).		
	ATC	5. <b>CHECK</b> PI-68-323 NORMAL.
<b>NOTE:</b> A failure of channel IV (P-68-322) will affect the automatic actuation of PCV-68-340A, PZR PORV, in the normal pressure control circuit. LTOPS operation of this PORV is unaffected by this failure (except when PORV handswitch is in CLOSE position).		
	ATC	6. <b>CHECK</b> PI-68-322 NORMAL.
	ATC	7. <b>CHECK</b> for PIC-68-340A Pressure Controller malfunction:  a. <b>NOTIFY</b> I&C to determine and correct the cause.  b. <b>NOTIFY</b> Duty Operations Manager of the situation.
<b>CAUTION</b> RCS pressure changes and changes in RCS boron concentration (due to differences between pzs and RCS boron) may cause small change in core reactivity.		

Op Test No.: NRC 2013-301 Scenario # 3 Event # 4 Page 24 of 48  
 Event Description: Pressurizer Master Controller Fails With Maximum Output

Time	Position	Applicant's Actions or Behavior										
	ATC	<p>8. <b>MONITOR</b> reactor power:</p> <p>a. <b>CHECK</b> reactor in Mode 1 or 2.</p> <p>b. <b>MONITOR</b> core thermal power for unexpected changes.</p>										
	SRO	<p>9. <b>EVALUATE</b> the following Tech Specs for applicability:</p> <ul style="list-style-type: none"><li>• 3.2.5 DNB Parameters</li><li>• 3.3.1.1 (3.3.1), Reactor Trip System Instrumentation</li><li>• 3.3.2.1 (3.3.2), ESF Actuation System Instrumentation</li><li>• 3.3.3.5 Remote Shutdown Instrumentation</li></ul>										
	SRO	<p><u>LIMITING CONDITION FOR OPERATION</u></p> <p>3.2.5 The following DNB related parameters shall be maintained within the limits shown on Table 3.2-1:</p> <p>a. Reactor Coolant System (RCS) <math>T_{avg}</math></p> <p>b. Pressurizer Pressure</p> <p>c. RCS Total Flow Rate</p> <p><u>APPLICABILITY:</u> MODE 1</p> <p><u>ACTION:</u></p> <p>With any of the above parameters exceeding its limit, restore the parameter to within its limit within 2 hours or reduce THERMAL POWER to less than 5% of RATED THERMAL POWER within the next 4 hours.</p> <table><thead><tr><th><u>PARAMETER</u></th><th><u>LIMITS</u></th></tr></thead><tbody><tr><td></td><td>4 Loops In Operation</td></tr><tr><td>Reactor Coolant System <math>T_{avg}</math></td><td><math>\leq 583^{\circ}\text{F}</math></td></tr><tr><td>Pressurizer Pressure</td><td><math>\geq 2220 \text{ psia}^*</math></td></tr><tr><td>Reactor Coolant System Total Flow</td><td>Figure 3.2-1</td></tr></tbody></table>	<u>PARAMETER</u>	<u>LIMITS</u>		4 Loops In Operation	Reactor Coolant System $T_{avg}$	$\leq 583^{\circ}\text{F}$	Pressurizer Pressure	$\geq 2220 \text{ psia}^*$	Reactor Coolant System Total Flow	Figure 3.2-1
<u>PARAMETER</u>	<u>LIMITS</u>											
	4 Loops In Operation											
Reactor Coolant System $T_{avg}$	$\leq 583^{\circ}\text{F}$											
Pressurizer Pressure	$\geq 2220 \text{ psia}^*$											
Reactor Coolant System Total Flow	Figure 3.2-1											

Op Test No.: NRC 2013-301 Scenario # 3 Event # 4 Page 25 of 48

Event Description: Pressurizer Master Controller Fails With Maximum Output

Time	Position	Applicant's Actions or Behavior
	SRO	If in MODE 1 enters LCO 3.2.5 Action if Pressurizer Pressure decreases to less than 2220 psia.
	ATC	<p>10. <b>CHECK</b> PZR PRESS and PZR SPRAY controllers in AUTO.</p> <p><b>WHEN</b> malfunction has been identified <b>AND</b> isolated or corrected, <b>THEN</b> <b>PERFORM</b> the following:</p> <p>a. <b>ENSURE</b> Master Pzr Pressure Controller PIC-68-340A Output Percent Meter is less than 40%.</p> <p>b. <b>ENSURE</b> PZR PRESS Controller, PZR SPRAY controller, and PZR HTRS in AUTO.</p>
	ATC	Maintains RCS Pressure control with PIC-68-340 or Pressurizer Spray valves in MANUAL.
Lead Examiner may cue next event when Pressurizer Pressure control is established in MANUAL and Tech Specs are identified.		

Op Test No.: NRC 2013-301 Scenario # 3 Event # 5 Page 26 of 48  
 Event Description: RWST Level Indicator Fails Low

Time	Position	Applicant's Actions or Behavior															
<b>Direct the Simulator Operator to initiate Event 5 RWST level indicator LT-63-53 fails low.</b>																	
<p><b>Alarms</b></p> <ul style="list-style-type: none"> <li>• 6E, E-3 "LS-63-50A RWST LVL LO"</li> <li>• 6E, E4 "LS-63-50B RWST LVL LO-LO"</li> </ul> <p><b>Indications</b></p> <p>1-M-6</p> <ul style="list-style-type: none"> <li>• LI-63-53 indicates 0.</li> </ul>																	
<table border="1"> <thead> <tr> <th>Time</th> <th>Position</th> <th>Applicant's Actions or Behavior</th> </tr> </thead> <tbody> <tr> <td colspan="3"> <div style="text-align: center; border: 1px solid black; padding: 10px; margin: 10px auto; width: 200px;"> <b>LS-63-50A RWST LVL LO</b> </div> <p>[1] IF SIS has occurred with RWST level decreasing to ~ 27%, THEN  <b>PERFORM</b> ES-1.3, <i>Transfer to RHR Containment Sump</i>, as applicable.</p> <p>[2] <b>VERIFY</b> RWST level by observing [1-LI-63-50], [1-LI-63-51], [1-LI-63-52], or [1-LI-63-53].</p> <p>[3] IF unit in refueling operation, THEN  <b>NOTE</b> that this is a normal condition.</p> <p>[4] IF need to increase level in RWST, THEN  <b>GO TO</b> 0-SO-62-7, <i>Boron Concentration Control</i>.</p> <p>[5] IF RWST level instrument (1-L-63-50, 51, 52, or 53) has failed, THEN  <b>GO TO</b> AOP-I.09, RWST Level Instrument Malfunction.</p> <p>[6] <b>EVALUATE</b> Technical Specifications.</p> </td> </tr> <tr> <td colspan="3"> <p><b>Examiner Note:</b> Several steps, notes, and cautions in the Annunciator response procedure do not apply to this failure. Only those that are applicable are listed in this event guide.</p> </td> </tr> <tr> <td></td> <td>ATC</td> <td>Responds to alarm using ARP 1-AR-M6E, E3</td> </tr> <tr> <td></td> <td>SRO</td> <td>Transitions to AOP-I.09 RWST LEVEL INSTRUMENT MALFUNCTION.</td> </tr> </tbody> </table>			Time	Position	Applicant's Actions or Behavior	<div style="text-align: center; border: 1px solid black; padding: 10px; margin: 10px auto; width: 200px;"> <b>LS-63-50A RWST LVL LO</b> </div> <p>[1] IF SIS has occurred with RWST level decreasing to ~ 27%, THEN  <b>PERFORM</b> ES-1.3, <i>Transfer to RHR Containment Sump</i>, as applicable.</p> <p>[2] <b>VERIFY</b> RWST level by observing [1-LI-63-50], [1-LI-63-51], [1-LI-63-52], or [1-LI-63-53].</p> <p>[3] IF unit in refueling operation, THEN  <b>NOTE</b> that this is a normal condition.</p> <p>[4] IF need to increase level in RWST, THEN  <b>GO TO</b> 0-SO-62-7, <i>Boron Concentration Control</i>.</p> <p>[5] IF RWST level instrument (1-L-63-50, 51, 52, or 53) has failed, THEN  <b>GO TO</b> AOP-I.09, RWST Level Instrument Malfunction.</p> <p>[6] <b>EVALUATE</b> Technical Specifications.</p>			<p><b>Examiner Note:</b> Several steps, notes, and cautions in the Annunciator response procedure do not apply to this failure. Only those that are applicable are listed in this event guide.</p>				ATC	Responds to alarm using ARP 1-AR-M6E, E3		SRO	Transitions to AOP-I.09 RWST LEVEL INSTRUMENT MALFUNCTION.
Time	Position	Applicant's Actions or Behavior															
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<p><b>Examiner Note:</b> Several steps, notes, and cautions in the Annunciator response procedure do not apply to this failure. Only those that are applicable are listed in this event guide.</p>																	
	ATC	Responds to alarm using ARP 1-AR-M6E, E3															
	SRO	Transitions to AOP-I.09 RWST LEVEL INSTRUMENT MALFUNCTION.															


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Event Description: RWST Level Indicator Fails Low

Time	Position	Applicant's Actions or Behavior																																				
		<div>1. <b>EVALUATE</b> the following Tech Specs for applicability:</div> <div><div>• 3.3.2.1 (3.3.2), Engineered Safety Feature Actuation System Instrumentation</div><div>• 3.3.3.7, Accident Monitoring Instrumentation</div></div>																																				
		<div><div><div>LIMITING CONDITION FOR OPERATION</div><div>3.3.2.1 The Engineered Safety Feature Actuation System (ESFAS) instrumentation channels and interlocks shown in Table 3.3-3 shall be OPERABLE with their trip setpoints set consistent with the values shown in the Nominal Trip Setpoint column of Table 3.3-4.</div><div>APPLICABILITY: As shown in Table 3.3-3.</div><div>ACTION:</div><div><div>a. With an ESFAS instrumentation channel or interlock trip setpoint less conservative than the value shown in the Allowable Values column of Table 3.3-4, declare the channel inoperable and apply the applicable ACTION requirement of Table 3.3-3 until the channel is restored to OPERABLE status with the trip setpoint adjusted consistent with the Nominal Trip Setpoint value.</div><div>b. With an ESFAS instrumentation channel or interlock inoperable, take the ACTION shown in Table 3.3-3.</div></div><div><div>ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION</div><table><thead><tr><th>FUNCTIONAL UNIT</th><th>TOTAL NO. OF CHANNELS</th><th>CHANNELS TO TRIP</th><th>MINIMUM CHANNELS OPERABLE</th><th>APPLICABLE MODES</th><th>ACTION</th></tr></thead><tbody><tr><td colspan="6">9. AUTOMATIC SWITCHOVER TO CONTAINMENT SUMP</td></tr><tr><td>a. RWST Level - Low COINCIDENT WITH Containment Sump Level - High AND Safety Injection</td><td>4</td><td>2</td><td>3</td><td>1, 2, 3, 4</td><td>18</td></tr><tr><td></td><td>4</td><td>2</td><td>3</td><td>1, 2, 3, 4</td><td>18</td></tr><tr><td colspan="6">(See 1 above for Safety Injection Requirements)</td></tr><tr><td colspan="6">ACTION 18 - With the number of OPERABLE Channels one less than the Total Number of Channels, operation may proceed provided the inoperable channel is placed in the bypassed condition within 8 hours and the Minimum Channels OPERABLE requirement is met; one additional channel may be bypassed for up to 4 hours for surveillance testing per Specification 4.3.2.1.1.</td></tr></tbody></table></div></div></div>	FUNCTIONAL UNIT	TOTAL NO. OF CHANNELS	CHANNELS TO TRIP	MINIMUM CHANNELS OPERABLE	APPLICABLE MODES	ACTION	9. AUTOMATIC SWITCHOVER TO CONTAINMENT SUMP						a. RWST Level - Low COINCIDENT WITH Containment Sump Level - High AND Safety Injection	4	2	3	1, 2, 3, 4	18		4	2	3	1, 2, 3, 4	18	(See 1 above for Safety Injection Requirements)						ACTION 18 - With the number of OPERABLE Channels one less than the Total Number of Channels, operation may proceed provided the inoperable channel is placed in the bypassed condition within 8 hours and the Minimum Channels OPERABLE requirement is met; one additional channel may be bypassed for up to 4 hours for surveillance testing per Specification 4.3.2.1.1.					
FUNCTIONAL UNIT	TOTAL NO. OF CHANNELS	CHANNELS TO TRIP	MINIMUM CHANNELS OPERABLE	APPLICABLE MODES	ACTION																																	
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	SRO	Enters LCO 3.3.2.1 Action 18.																																				

Op Test No.: NRC 2013-301 Scenario # 3 Event # 5 Page 28 of 48

Event Description: RWST Level Indicator Fails Low

Time	Position	Applicant's Actions or Behavior															
	SRO	<p>2. <b>NOTIFY</b> MIG to remove failed level instrument from service <b>USING</b> appropriate appendix:</p> <table border="1"><thead><tr><th>INST NUMBER</th><th>PROT CH</th><th>APPENDIX</th></tr></thead><tbody><tr><td>L-63-50 (L-913)</td><td>I</td><td>A</td></tr><tr><td>L-63-51 (L-914)</td><td>II</td><td>B</td></tr><tr><td>L-63-52 (L-915)</td><td>III</td><td>C</td></tr><tr><td>L-63-53 (L-916)</td><td>IV</td><td>D</td></tr></tbody></table>	INST NUMBER	PROT CH	APPENDIX	L-63-50 (L-913)	I	A	L-63-51 (L-914)	II	B	L-63-52 (L-915)	III	C	L-63-53 (L-916)	IV	D
INST NUMBER	PROT CH	APPENDIX															
L-63-50 (L-913)	I	A															
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L-63-52 (L-915)	III	C															
L-63-53 (L-916)	IV	D															
	SRO	<p>3. <b>GO TO</b> appropriate plant procedure.</p> 															
Lead Examiner may cue next event when Tech Specs are identified.																	



Op Test No.: NRC 2013-301 Scenario # 3 Event # 6, 7, 8 Page 29 of 48

Event Description: #4 SG FWLB Inside Cont/Failure of Phase B/EGTS Auto Start Failure

Time	Position	Applicant's Actions or Behavior
<b>Simulator Operator: When directed, initiate Event 6 #4 Steam Generator Feed Line Break Inside Containment.</b>		
<p><b>Indications available:</b></p> <p><b>Annunciators:</b></p> <p><b>1-M-6</b></p> <ul style="list-style-type: none"> <li>• 6B, C-6, "CONTAINMENT HI-HI PRESSURE SPRAY ACTUATION"</li> <li>• 6E, C-6 "ZS-61-186 ICE CONDENSER LOWER INLET DOOR OPEN"</li> </ul> <p><b>Indicators:</b></p> <p><b>1-M-4</b></p> <ul style="list-style-type: none"> <li>• SG-4 FW INLET FLOW increasing</li> <li>• SG-4 NR LEVEL: decreasing level</li> </ul>		
	SRO	Transitions to E-0 and Direct Immediate Operator Actions (IOAs)
<p>Examiner Note: following IOA performance, prior to Steps 1-4 immediate action verification, ATC/BOP surveys MCBs for any expected automatic system response that failed to occur. Upon discovery, they may take manual action(s) to align plant systems as expected for the event in progress. (Ref. EPM-4, Prudent Operator Actions)</p>		
	CREW	Performs the first four steps of E-0 unprompted.
	SRO	Directs performance of E-0
<p><b>NOTE 1</b> Steps 1 through 4 are immediate action steps.</p>		
<p><b>NOTE 2</b> This procedure has a foldout page.</p>		
	ATC	<p>1. <b>VERIFY</b> reactor TRIPPED:</p> <ul style="list-style-type: none"> <li>• Reactor trip breakers OPEN</li> <li>• Reactor trip bypass breakers DISCONNECTED or OPEN</li> <li>• Rod bottom lights LIT</li> <li>• Rod position indicators less than or equal to 12 steps.</li> <li>• Neutron flux DROPPING</li> </ul>

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Event Description: #4 SG FWLB Inside Cont/Failure of Phase B/EGTS Auto Start Failure

Time	Position	Applicant's Actions or Behavior
	BOP	2. <b>VERIFY</b> turbine TRIPPED: <ul style="list-style-type: none"> <li>Turbine stop valves CLOSED.</li> </ul>
	BOP	3. <b>VERIFY</b> at least one 6.9KV shutdown board ENERGIZED on this unit.
	ATC	4. <b>DETERMINE</b> if SI actuated: <ul style="list-style-type: none"> <li>ECCS pumps RUNNING.</li> <li>Any SI alarm LIT [M-4D].</li> </ul>
<b>CRITICAL TASK</b>	BOP	Places HS-30-64A and 64B Phase B and CNTMT Vent Isol to ACTUATE
	BOP	5. <b>PERFORM</b> ES-0.5, Equipment Verifications WHILE continuing in this procedure.
	SRO/ATC	Continue with the performance of E-0 REACTOR TRIP OR SAFETY INJECTION
	BOP	Performs ES-0.5, Equipment Verifications go to page 41 for details
	SRO	Addresses foldout page, see next page for details.
	ATC	Places HS 68-8A, 31A, 50A, and 73A RCP's to STOP based on FOP criteria.

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Event Description: #4 SG FWLB Inside Cont/Failure of Phase B/EGTS Auto Start Failure

### FOLDOUT PAGE

#### RCP TRIP CRITERIA

**IF** any of the following conditions occurs:

- RCS pressure less than 1250 psig **AND** at least one CCP or SI pump running  
**OR**

- Phase B isolation,

**THEN**

**STOP** all RCPs.

#### EVENT DIAGNOSTICS

- **IF** any S/G pressure is dropping uncontrolled, **THEN**  
**PERFORM** the following:
  - a. **CLOSE** MSIVs and MSIV bypass valves.
  - b. **IF** any S/G pressure continues to drop uncontrolled, **THEN**  
**PERFORM** the following:
    - 1) **ENSURE** SI actuated.
    - 2) **IF** at least one S/G is intact (S/G pressure controlled or rising),  
**THEN**  
**ISOLATE** AFW to faulted S/G(s):
      - **CLOSE** AFW level control valves for faulted S/G(s)
      - **IF** any AFW valve for faulted S/G CANNOT be CLOSED, **THEN**  
**PERFORM** Appendix E, Isolating AFW to Faulted S/G.
    - 3) **ENSURE** at least one of the following conditions met:
      - total AFW flow greater than 440 gpm  
**OR**
      - Narrow Range level greater than 10% [25% ADV] in at least one intact S/G.
- **IF** both trains of shutdown boards de-energized, **THEN**  
**GO TO** ECA-0.0, Loss of All AC Power.

#### TANK SWITCHOVER SETPOINTS

- **IF** CST level less than 5%, **THEN**  
**ALIGN** AFW suction to ERCW.
- **IF** RWST level less than 27%, **THEN**  
**GO TO** ES-1.3, Transfer to RHR Containment Sump.

Op Test No.: NRC 2013-301 Scenario # 3 Event # 6, 7, 8 Page 32 of 48

Event Description: #4 SG FWLB Inside Cont/Failure of Phase B/EGTS Auto Start Failure

Time	Position	Applicant's Actions or Behavior
<b>CRITICAL TASK</b>	ATC/BOP	Places HS-3-161A, AFP 1B-B LCV to SG-4 to ACC RESET then CLOSE Places HS-3-175A, SG-4 Turbine AFP LCV to CLOSE and PTL.
	ATC	<p>6. <b>DETERMINE</b> if secondary heat sink available:</p> <p>a. <b>CHECK</b> total AFW flow greater than 440 gpm.</p> <p>a. <b>IF</b> S/G narrow range level is less than 10% [25% ADV] in all S/Gs, <b>THEN START</b> AFW pumps and <b>ALIGN</b> valves as necessary to raise AFW flow greater than 440 gpm.</p> <p>b. <b>CHECK</b> narrow range level greater than 10% [25% ADV] in at least one S/G.</p> <p>b. <b>MAINTAIN</b> total feed flow greater than 440 gpm UNTIL narrow range level greater than 10% [25% ADV] in at least one S/G.</p> <p>c. <b>CONTROL</b> feed flow to maintain narrow range level between 10% [25% ADV] and 50% in intact or ruptured S/Gs.</p>
	ATC/BOP	Manually controls AFW flow to maintain total AFW flow greater than 440 gpm until S/G are greater than 10% NR in at least 1 S/G. (25% ADV) NR.
	ATC	<p>7. <b>CHECK</b> if main steam lines should be isolated:</p> <p>a. <b>CHECK</b> if any of the following conditions have occurred:</p> <ul style="list-style-type: none"> <li>Any S/G pressure less than 600 psig</li> </ul> <p><b>OR</b></p> <ul style="list-style-type: none"> <li>Any S/G pressure dropping UNCONTROLLED</li> </ul> <p><b>OR</b></p> <ul style="list-style-type: none"> <li>Phase B actuation.</li> </ul> <p>b. <b>ENSURE</b> MSIVs and MSIV bypass valves CLOSED.</p> <p>c. <b>ENSURE</b> applicable Foldout Page actions COMPLETED.</p>


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Event Description: #4 SG FWLB Inside Cont/Failure of Phase B/EGTS Auto Start Failure

Time	Position	Applicant's Actions or Behavior
	ATC	<p>8. <b>CHECK</b> RCP trip criteria:</p> <p>a. <b>CHECK</b> the following:</p> <ul style="list-style-type: none"> <li>RCS pressure less than 1250 psig</li> </ul> <p><b>AND</b></p> <ul style="list-style-type: none"> <li>At least one CCP <b>OR</b> SI pump <b>RUNNING</b>.</li> </ul> <p>b. <b>STOP</b> RCPs.</p>
	ATC	Places HS 68-8A, 31A, 50A, and 73A RCP's to STOP (If not already performed.).
	ATC/BOP	<p>9. <b>MONITOR</b> RCS temperatures:</p> <ul style="list-style-type: none"> <li><b>IF</b> any RCP running, <b>THEN</b> <b>CHECK</b> T-avg stable at or trending to between 547°F and 552°F.</li> </ul> <p><b>OR</b></p> <ul style="list-style-type: none"> <li><b>IF</b> RCPs stopped, <b>THEN</b> <b>CHECK</b> T-cold stable at or trending to between 547°F and 552°F.</li> </ul> <p><b>IF</b> temperature less than 547°F and dropping, <b>THEN</b> <b>PERFORM</b> the following:</p> <p>a. <b>ENSURE</b> steam dumps and atmospheric reliefs <b>CLOSED</b>.</p> <p>b. <b>IF</b> cooldown continues, <b>THEN</b> <b>CONTROL</b> total feed flow:</p> <ol style="list-style-type: none"> <li><b>ENSURE</b> total AFW flow less than or equal to 600 gpm.</li> <li><b>MAINTAIN</b> total AFW flow greater than 440 gpm UNTIL narrow range level is greater than 10% [25% ADV] in at least one S/G.</li> </ol> <p>c. <b>IF</b> cooldown continues after AFW flow is controlled, <b>THEN</b> <b>CLOSE</b> MSIVs and MSIV bypass valves.</p>

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Event Description: #4 SG FWLB Inside Cont/Failure of Phase B/EGTS Auto Start Failure

Time	Position	Applicant's Actions or Behavior
	ATC/BOP	Manually controls AFW flow to maintain total AFW flow greater than 440 gpm and less than 600 gpm until at least one S/G level is greater than 10% NR.
	ATC	<p>10. <b>CHECK</b> pressurizer PORVs, safeties, and spray valves:</p> <p>a. Pressurizer PORVs CLOSED.</p> <p>b. Pressurizer safety valves CLOSED.</p> <p>10. c. Normal spray valves CLOSED.</p> <p>d. Power to at least one block valve AVAILABLE.</p> <p>e. At least one block valve OPEN.</p>
	ATC	<p>11. <b>DETERMINE</b> if S/G secondary pressure boundaries are INTACT:</p> <ul style="list-style-type: none"> <li>• <b>CHECK</b> all S/G pressures CONTROLLED or RISING.</li> <li>• <b>CHECK</b> all S/G pressures greater than 140 psig.</li> </ul> <p><b>PERFORM</b> the following:</p> <p>a. <b>MONITOR</b> status trees.</p> <p>b. <b>GO TO</b> E-2, Faulted Steam Generator Isolation.</p> 
<p><b>Examiner Note:</b> <b>MONITOR</b> status trees, the crew will implement status tree monitoring via ICS. When a RED or ORANGE path status tree is observed, the SRO will designate one of the Board operators (typically the BOP) to verify status tree conditions using <b>1-FR-0, UNIT 1 STATUS TREES</b>. Once verified, the SRO should direct the crew to transition to the appropriate RED and/or ORANGE path procedure(s).</p> <p>When a RED Path for Containment is evident on ICS, the SRO will transition to FR-Z.1, go to page 41 for details.</p>		
	SRO	Transitions to E-2, Faulted Steam Generator Isolation.
<p><b>CAUTION</b> Unisolating a faulted S/G or secondary break should NOT be considered UNLESS needed for RCS cooldown.</p>		
	ATC	<p>1. <b>CHECK</b> MSIVs and MSIV bypass valves CLOSED.</p>

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Event Description: #4 SG FWLB Inside Cont/Failure of Phase B/EGTS Auto Start Failure

Time	Position	Applicant's Actions or Behavior
	BOP	<p>2. <b>CHECK ANY S/G secondary pressure boundary INTACT:</b></p> <ul style="list-style-type: none"> <li>Any S/G pressure CONTROLLED or RISING.</li> </ul>
	SRO	<p>3. <b>IDENTIFY Faulted S/G(s):</b></p> <p>a. <b>CHECK S/G pressures:</b></p> <ul style="list-style-type: none"> <li>Any S/G pressure DROPPING in an uncontrolled manner.</li> </ul> <p><b>OR</b></p> <ul style="list-style-type: none"> <li>Any S/G pressure less than 140 psig.</li> </ul>
	SRO	Identifies #4 S/G as faulted.
<p><b>CAUTIONS</b></p> <ul style="list-style-type: none"> <li>Secondary heat sink requires at least one S/G available.</li> <li>If the TD AFW pump is the only source of feed flow, isolating both steam supplies will result in loss of secondary heat sink.</li> </ul>		
	BOP	<p>4. <b>ISOLATE Faulted S/G(s):</b></p> <p>a. <b>ENSURE MFW isolated to faulted S/G(s) by any of the following:</b></p> <ul style="list-style-type: none"> <li>feedwater isolation valve CLOSED [M-4]</li> </ul> <p><b>OR</b></p> <ul style="list-style-type: none"> <li>feedwater regulating valve and bypass valve CLOSED [M-3].</li> </ul>

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Event Description: #4 SG FWLB Inside Cont/Failure of Phase B/EGTS Auto Start Failure

Time	Position	Applicant's Actions or Behavior
	BOP	<p>b. <b>ENSURE</b> AFW isolated to faulted S/G(s):</p> <ul style="list-style-type: none"> <li>• <b>CLOSE</b> MD AFW LCV</li> <li>• <b>CLOSE</b> TD AFW LCV and <b>PLACE</b> in PULL TO LOCK.</li> </ul>
<b>CRITICAL TASK</b>	ATC/BOP	<p>Places HS-3-161A, AFP 1B-B LCV to SG-4 to ACC RESET then CLOSE</p> <p>Places HS-3-175A, SG-4 Turbine AFP LCV to CLOSE and PTL.</p> <p>If not already performed.</p>
	BOP	<p>c. <b>CHECK</b> S/G #1 or #4 faulted.</p> <p>d. <b>CLOSE</b> TD AFW pump steam supply from faulted S/G FCV-1-15 (S/G #1) or FCV-1-16 (S/G #4).</p>
	BOP	<p>4. e. <b>VERIFY</b> S/G blowdown valves CLOSED.</p> <p>f. <b>VERIFY</b> atmospheric relief CLOSED.</p>
		<p>5. <b>CHECK</b> CST level greater than 5%.</p>




Op Test No.: NRC 2013-301 Scenario # 3 Event # 6, 7, 8 Page 37 of 48Event Description: #4 SG FWLB Inside Cont/Failure of Phase B/EGTS Auto Start Failure

Time	Position	Applicant's Actions or Behavior
	BOP	<p>6. <b>VERIFY</b> secondary radiation NORMAL:</p> <p>a. <b>CHECK</b> secondary radiation NORMAL <b>USING</b> Appendix A, Secondary Rad Monitors. (App. A also contained in ES-0.5)</p> <p>b. <b>NOTIFY</b> Chem Lab to take S/G activity samples.</p> <p>c. <b>WHEN</b> Chem Lab is ready to sample S/Gs, <b>THEN</b> <b>PERFORM</b> the following:</p> <p>1) <b>ENSURE</b> FCV-15-43 Blowdown Flow Control valve CLOSED.</p> <p>2) <b>ENSURE</b> Phase A signal RESET.</p> <p>3) <b>OPEN</b> blowdown isolation valves.</p> <p>d. <b>NOTIFY</b> RADCON to survey main steam lines and S/G blowdown.</p> <p>e. <b>WHEN</b> S/G samples completed, <b>THEN</b> <b>CLOSE</b> blowdown isolation valves.</p>

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Event Description: #4 SG FWLB Inside Cont/Failure of Phase B/EGTS Auto Start Failure

Time	Position	Applicant's Actions or Behavior
	ATC	<p>7. <b>CHECK</b> SI termination criteria:</p> <p>a. RCS subcooling based on core exit T/Cs greater than 40°F.</p> <p>b. Secondary heat sink:</p> <ul style="list-style-type: none"> <li>Narrow range level in at least one Intact S/G greater than 10% [25% ADV]</li> </ul> <p><b>OR</b></p> <ul style="list-style-type: none"> <li>Total feed flow to Intact S/Gs greater than 440 gpm.</li> </ul> <p>c. RCS pressure stable or rising.</p> <p>d. Pressurizer level greater than 10% [20% ADV].</p> <p>e. <b>GO TO</b> ES-1.1, SI Termination.</p> 
	SRO	Transitions to ES-1.1, SI TERMINATION.


**Scenario may be terminated when the SRO transitions to ES-1.1 or earlier, at discretion of Lead Examiner.**

Op Test No.: NRC 2013-301 Scenario # 3 Event # 5, 6, 7 Page 39 of 48Event Description: #4 Steam Generator FWLB IS Cont/Failure of Phase B/Failure of EGTS Auto Start.

Time	Position	Applicant's Actions or Behavior
<b>FR-Z.1 Actions</b>		
<b>NOTE</b> If this procedure has been entered for an orange path and performance of ECA-1.1 (Loss of RHR Sump Recirculation) is required, FR-Z.1 may be performed concurrently with ECA-1.1.		
	ATC/BOP	1. <b>MONITOR</b> RWST level greater than 27%.
	ATC/BOP	2. <b>VERIFY</b> Phase B valves CLOSED: <ul style="list-style-type: none"><li>• Panel 6K PHASE B GREEN</li><li>• Panel 6L PHASE B GREEN.</li></ul>
	ATC/BOP	3. <b>ENSURE</b> RCPs STOPPED.

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Event Description: #4 Steam Generator FWLB IS Cont/Failure of Phase B/Failure of EGTS Auto Start.

Time	Position	Applicant's Actions or Behavior
	ATC/BOP	<p>4. <b>DETERMINE</b> if this procedure should be exited:</p> <p>a. <b>CHECK</b> for faulted S/G:</p> <ul style="list-style-type: none"> <li>Any S/G pressure <b>DROPPING</b> in an uncontrolled manner</li> </ul> <p><b>OR</b></p> <ul style="list-style-type: none"> <li>Any S/G pressure less than 140 psig.</li> </ul> <p>b. <b>CHECK</b> containment pressure less than 12 psig.</p> <p>c. <b>CHECK</b> at least one containment spray pump <b>RUNNING</b> and delivering flow.</p> <p>d. <b>CHECK</b> at least one containment air return fan <b>RUNNING</b>.</p> <p>e. <b>RETURN</b> to procedure and step in effect.</p> 
	SRO	Transitions to E-2 (go to page 34).

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Event Description: Equipment Verifications

Time	Position	Applicant's Actions or Behavior
<b>ES-0.5 Actions</b>		
	BOP	1. <b>VERIFY</b> D/Gs RUNNING.
	BOP	2. <b>VERIFY</b> D/G ERCW supply valves OPEN.
	BOP	3. <b>VERIFY</b> at least four ERCW pumps RUNNING.
	BOP	4. <b>VERIFY</b> CCS pumps RUNNING: <ul style="list-style-type: none"> <li>• Pump 1A-A (2A-A)</li> <li>• Pump 1B-B (2B-B)</li> <li>• Pump C-S.</li> </ul>
	BOP	5. <b>VERIFY</b> EGTS fans RUNNING.
	BOP	Places 0-HS-65-23A EGTS Fan A and 0-HS-65-42A EGTS Fan B to START
	BOP	6. <b>VERIFY</b> generator breakers OPEN.
	BOP	7. <b>NOTIFY</b> at least two AUOs to report to MCR to be available for local actions.
	BOP	8. <b>VERIFY</b> AFW pumps RUNNING: <ul style="list-style-type: none"> <li>a. MD AFW pumps</li> <li>b. TD AFW pump.</li> </ul>
<b>NOTE</b> AFW level control valves should NOT be repositioned if manual action has been taken to control S/G levels, to establish flow due to failure, or to isolate a faulted S/G.		


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Event Description: Equipment Verifications

Time	Position	Applicant's Actions or Behavior
	BOP	<p>9. <b>CHECK</b> AFW valve alignment:</p> <p>a. <b>VERIFY</b> MD AFW LCVs in AUTO.</p> <p>b. <b>VERIFY</b> TD AFW LCVs OPEN.</p> <p>c. <b>VERIFY</b> MD AFW pump recirculation valves FCV-3-400 and FCV-3-401 CLOSED.</p>
	BOP	<p>10. <b>VERIFY</b> MFW Isolation:</p> <p>a. <b>CHECK</b> MFW pumps TRIPPED.</p> <p>b. <b>ENSURE</b> the following:</p> <ul style="list-style-type: none"> <li>• MFW regulating valves CLOSED</li> <li>• MFW regulating bypass valve controllers in MANUAL with output ZERO</li> <li>• MFW isolation valves CLOSED.</li> </ul>
	BOP	<p>11. <b>MONITOR</b> ECCS operation:</p> <p>a. <b>VERIFY</b> ECCS pumps RUNNING:</p> <ul style="list-style-type: none"> <li>• CCPs</li> <li>• RHR pumps</li> <li>• SI pumps</li> </ul> <p>b. <b>VERIFY</b> CCP flow through CCPIT.</p> <p>c. <b>CHECK</b> RCS pressure less than 1500 psig.</p>

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Event Description: Equipment Verifications

Time	Position	Applicant's Actions or Behavior
		<p>d. <b>VERIFY</b> SI pump flow.</p> <p>e. <b>CHECK</b> RCS pressure less than 300 psig.</p> <p>e. <b>GO TO</b> Step 12.</p>  <p>f. <b>VERIFY</b> RHR pump flow.</p>
	BOP	<p>12. <b>VERIFY</b> ESF systems <b>ALIGNED</b>:</p> <p>a. Phase A <b>ACTUATED</b>:</p> <ul style="list-style-type: none"> <li>• PHASE A TRAIN A alarm LIT [M-6C, B5].</li> <li>• PHASE A TRAIN B alarm LIT [M-6C, B6].</li> </ul> <p>b. Cntmt Vent Isolation <b>ACTUATED</b>:</p> <ul style="list-style-type: none"> <li>• CNTMT VENT ISOLATION TRAIN A alarm LIT [M-6C, C5].</li> <li>• CNTMT VENT ISOLATION TRAIN B alarm LIT [M-6C, C6].</li> </ul> <p>c. Status monitor panels:</p> <ul style="list-style-type: none"> <li>• 6C DARK</li> <li>• 6D DARK</li> <li>• 6E LIT OUTSIDE outlined area</li> <li>• 6H DARK</li> <li>• 6J LIT.</li> </ul> <p>d. Train A status panel 6K:</p> <ul style="list-style-type: none"> <li>• CNTMT VENT GREEN</li> <li>• PHASE A GREEN</li> </ul> <p>e. Train B status panel 6L:</p> <ul style="list-style-type: none"> <li>• CNTMT VENT GREEN</li> <li>• PHASE A GREEN</li> </ul>

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Event Description: Equipment Verifications

Time	Position	Applicant's Actions or Behavior
	BOP	<p>13. <b>MONITOR</b> for containment spray and Phase B actuation:</p> <p>a. <b>CHECK</b> for any of the following:</p> <ul style="list-style-type: none"> <li>Phase B ACTUATED</li> </ul> <p><b>OR</b></p> <ul style="list-style-type: none"> <li>Containment pressure greater than 2.8 psig.</li> </ul> <p>b. <b>VERIFY</b> containment spray INITIATED:</p> <ol style="list-style-type: none"> <li>Containment spray pumps RUNNING.</li> <li>Containment spray header isolation valves FCV-72-39 and FCV-72-2 OPEN.</li> <li>Containment spray recirculation valves to RWST FCV-72-34 and FCV-72-13 CLOSED.</li> <li>Containment spray header flow greater than 4750 gpm per train.</li> <li>Panel 6E LIT.</li> </ol>
		<p>c. <b>VERIFY</b> Phase B ACTUATED:</p> <ul style="list-style-type: none"> <li>PHASE B TRAIN A alarm LIT [M-6C, A5].</li> <li>PHASE B TRAIN B alarm LIT [M-6C, A6].</li> </ul> <p>d. <b>ENSURE</b> RCPs STOPPED.</p> <p>e. <b>VERIFY</b> Phase B valves CLOSED:</p> <ul style="list-style-type: none"> <li>Panel 6K PHASE B GREEN.</li> <li>Panel 6L PHASE B GREEN.</li> </ul> <p>f. <b>WHEN</b> 10 minutes have elapsed, <b>THEN</b> <b>ENSURE</b> containment air return fans RUNNING.</p>



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Event Description: Equipment Verifications

Time	Position	Applicant's Actions or Behavior
<b>CRITICAL TASK</b>	BOP	Places HS-30-64A and 64B Phase B and CNTMT Vent Isol to ACTUATE
<b>NOTE</b> The continuous action in Step 14 remains applicable if containment pressure rises above 1.5 psig after ES-0.5 is completed.		
	BOP	14. <b>MONITOR</b> if containment vacuum relief isolation valves should be closed: <ul style="list-style-type: none"> <li>a. <b>CHECK</b> containment pressure greater than 1.5 psig.</li> <li>b. <b>CHECK</b> cntmnt vacuum relief isolation valves CLOSED: [Pnl 6K MANUAL]               <ul style="list-style-type: none"> <li>• FCV-30-46</li> <li>• FCV-30-47</li> <li>• FCV-30-48.</li> </ul> </li> </ul>
	BOP	15. <b>CHECK</b> secondary and containment rad monitors <b>USING</b> the following: <ul style="list-style-type: none"> <li>• Appendix A, Secondary Rad Monitors</li> <li>• Appendix B, Containment Rad Monitors.</li> </ul>

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Event Description: Equipment Verifications

Time	Position	Applicant's Actions or Behavior
		<p style="text-align: center;"><b>APPENDIX A</b></p> <p style="text-align: center;"><b>SECONDARY RAD MONITORS</b></p> <ol style="list-style-type: none"> <li><b>IF</b> SI occurred on <u>Unit 1</u>, <b>THEN</b> <b>CHECK</b> following rad monitors including available trends prior to isolation: <ul style="list-style-type: none"> <li>Condenser exhaust recorder 1-RR-90-119</li> <li>S/G blowdown recorder 1-RR-90-120</li> <li>Unit 1 Main steam line rad monitors [1-M-30]</li> <li>Post-Accident rad recorder 1-RR-90-268B points 3 (blue), 4 (violet), 5 (black), and 6 (turquoise). [1-M-31 (back of 1-M-30)]</li> </ul> </li> <li><b>NOTIFY</b> Unit Supervisor whether secondary radiation is NORMAL or HIGH.</li> </ol>
	BOP	<p style="text-align: center;"><b>APPENDIX B</b></p> <p style="text-align: center;"><b>CONTAINMENT RAD MONITORS</b></p> <ol style="list-style-type: none"> <li><b>IF</b> SI occurred on <u>Unit 1</u>, <b>THEN</b> <b>CHECK</b> following rad monitors: <ul style="list-style-type: none"> <li>Upper containment post-accident rad monitors 1-RM-90-271A and 1-RM-90-272A NORMAL [1-M-30]</li> <li>Lower containment post-accident rad monitors 1-RM-90-273A and 1-RM-90-274A NORMAL [1-M-30]</li> <li>Containment rad recorders 1-RR-90-112 and 1-RR-90-106 NORMAL [0-M-12] (prior to isolation).</li> </ul> </li> <li><b>NOTIFY</b> Unit Supervisor whether secondary radiation is NORMAL or HIGH.</li> </ol>

Op Test No.: NRC 2013-301 Scenario # 3 Event # ES-0.5 Page 47 of 48Event Description: Equipment Verifications

Time	Position	Applicant's Actions or Behavior
	BOP	16. <b>WHEN</b> directed by E-0, <b>THEN</b> <b>PERFORM</b> Appendix D, Hydrogen Mitigation Actions.
	BOP	17. <b>CHECK</b> pocket sump pumps STOPPED: [M-15, upper left corner] <ul style="list-style-type: none"><li>• HS-77-410, Rx Bldg Aux Floor and Equipment Drain Sump pump A</li><li>• HS-77-411, Rx Bldg Aux Floor and Equipment Drain Sump pump B.</li></ul>
	BOP	18. <b>DISPATCH</b> personnel to perform EA-0-1, Equipment Checks Following ESF Actuation.
	BOP	19. <b>ENSURE</b> plant announcement has been made regarding Reactor Trip and SI.
	BOP	20. <b>PERFORM</b> Appendix E, Spent Fuel Cooling Actions, as time permits.

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Event Description: Critical Task

Critical Tasks:	Critical Task Statement
1.	Manually initiate a Phase B isolation prior to completing ES-0.5 step 13.
2.	Isolate AFW Flow to #4 Steam Generator Prior to completing E-2 step 4.