United States Nuclear Regulatory Commission Official Hearing Exhibit
In the Matter of: Charlissa C. Smith (Denial of Senior Reactor Operator License)
ASLBP #: 13-925-01-SP-BD01
Docket #: 05523694
Exhibit #: CCS-048-00-BD01
Admitted: 7/17/2013
Rejected:
Other:
Identified: 7/17/2013
Withdrawn:
Stricken:

[redacted] CCS-048

Appendix D **Scenario Outline** **Form ES-D-1**

Facility: Vogtle Scenario No.: 3 Op-Test No.: 2012-301

Examiners: _____ Operators: _____

Initial Conditions: The plant is at 100% power, MOL, steady state operations.
(Base IC # 14, snapped to IC # 183 for HL17 NRC Exam)

Equipment OOS: Safety Injection Pump "A" is tagged out for motor repair.

Turnover: Maintain 100% power. Containment mini-purge is in service for a Containment entry on the next shift.

Preloaded Malfunctions:

TU10B Main Turbine EHC Pump B Auto Start Failure

Overrides

HS-3009 OPEN (Panel Map B-Left, HS-3009 LP-1 MS SPLY to AFW TD PMP-1 to OPEN)

Event No.	Malf. No.	Event Type*	Event Description
T1	SG02D @ 100%	I-UO I-SS TS-SS	SG # 4 NR LT fails high (LT-554). **LCO 3.3.1 Condition A** **LCO 3.3.1 Condition A, FU 13 Condition E** **LCO 3.3.2 Condition A** **LCO 3.3.2 Condition A, FU 5c Condition I** **LCO 3.3.2 FU 6b Condition D**
T2	CV08 @ 25%	C-OATC C-SS TS-SS	CVCS Letdown Leak ORC (Aux. Building – Isolable).
3	N/ A	N-OATC N-SS	Places Excess Letdown in service.
T4	PR02A @ 100%.	I-OATC I-SS TS-SS	Controlling PRZR Pressure channel PT-455 fails high. **LCO 3.3.1 Condition A, FU 6 Condition E, LCO 3.3.1 FU 8a Condition M, LCO 3.3.1 FU 8b Condition E,** **LCO 3.3.2 Condition A, FU 1d Condition D,** **LCO 3.3.2 FU 8b Condition L (One hour action),** **LCO 3.4.1.a Condition A**
T5	TU11	C-UO C-SS	Main Turbine EHC Pump A trips with failure of standby EHC pump to automatically start.

Event No.	Malf. No.	Event Type*	Event Description
T6	SG01A @3%	R-OATC N-UO R-SS TS-SS	Steam Generator # 1 10 gpm SGTL requiring a rapid down power. **LCO 3.4.13 Condition A**
T7	SG01A @ 45% Ramp 180 seconds	M-ALL	DBA SGTR on SG # 1 (~450 gpm)
8	Preload **Critical**	C-UO C-SS	TDAFW steam supply valve from SG # 1 will not manually close requiring closure of TDAFW Trip and Throttle valve to isolate SG # 1.
T9	PR07 @ 80% **Critical**	C-OATC C-SS	PRZR spray valve loop 4 fails 80% open after maximum rate depressurization of RCS when OATC attempts to shut the valve.
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor			

Event 1:

SG # 4 NR LT controlling channel fails high causing MFRV loop # 4 to throttle closed.

Verifiable Actions:

UO – Performs IOA and takes manual control of SG # 4 FW control valves to restore NR level between 60-70%.

Technical Specifications:

LCO 3.3.1 Reactor Trip System (RTS) Instrumentation Condition A

LCO 3.3.1 Reactor Trip System (RTS) Instrumentation FU 13 Condition E

LCO 3.3.2 Engineered Safety Feature Actuation System (ESFAS) Instrumentation Condition A

LCO 3.3.2 Engineered Safety Feature Actuation System (ESFAS) Instrumentation FU 5c Condition I

LCO 3.3.2 Engineered Safety Feature Actuation System (ESFAS) Instrumentation FU 6b Condition D

Event 2:

CVCS Letdown line breaks in the Auxiliary Building that will be isolated lifting letdown relief to the PRT.

Verifiable Actions:

UO – Manipulates penetration room temperature switches at QPCP to determine a leak exists.

OATC – Closes Letdown Orifices HV-8149A, B, C and Letdown Isolations LV-459 and LV-460 to isolate an RCS leak to the PRT.

OATC – Adjusts HC-182 and FIC-121 to establish 8 to 13 gpm seal injection flow with charging flow approximately 10 gpm greater than total seal injection flow.

Technical Specifications:

LCO 3.4.13 RCS Operational Leakage Condition A (Note: Leakage is isolated after OATC closes the Letdown Orifices and Isolations)

Event 3:

Excess Letdown will be placed in service to the seal return header to control PRZR level.

Verifiable Actions:

OATC – Sets 1HC-123 to closed. (0% demand).

OATC – Opens Excess Letdown Isolation valves 1-HV-8153 / 1-HV-8154.

OATC – Adjusts 1HC-123 to establish maximum allowable Excess Letdown flow (~30 gpm).

OATC – Adjusts 1FIC-121 and 1HC-182 to control charging and seal injection flows.

Event 4:

Controlling PRZR Pressure channel PT-455 fails high resulting in PORV 455A opening and both PRZR sprays fully open, RCS pressure will be lowering rapidly.

Verifiable Actions:

OATC – Perform IOAs of 18001-C by closing PRZR sprays, closing PORV 455A, and operating heaters as necessary to control PRZR pressure.

OATC – Manually closes PORV Block Valve 1HV-8000A to stop LOCA to PRT.

OATC – Controls PRZR heaters and sprays to control PRZR pressure.

OATC – Sets PRZR Master Controller to 25% demand.

OATC – Selects channel 457 / 456 on PRZR Pressure control switch PS-455F.

OATC – Places PRZR heaters and PORV 455A in AUTO and ensures proper operation.

OATC – Places PRZR Pressure Master Controller in AUTO and verifies proper operation.

OATC – Selects channel PT-457 as controlling channel on pressure recorder PS-455G.

Technical Specifications:

LCO 3.3.1 Reactor Trip System (RTS) Instrumentation Condition A

LCO 3.3.1 Reactor Trip System (RTS) Instrumentation FU 6, Condition E

LCO 3.3.1 Reactor Trip System (RTS) Instrumentation FU 8a, Condition M

LCO 3.3.1 Reactor Trip System (RTS) Instrumentation FU 8b, Condition E

LCO 3.3.2 Engineered Safety Features Actuation System (ESFAS) Condition A

LCO 3.3.2 Engineered Safety Features Actuation System (ESFAS) FU 1d, Condition D

LCO 3.3.2 Engineered Safety Features Actuation System (ESFAS) FU 8b Condition L (one hour)

LCO 3.4.1.a RCS Pressure, Temperature, and Flow Departure from Nucleate Boiling (DNB) Limits

Event 5:

Main Turbine EHC Pump A trips with failure of the standby pump to automatically start.

Verifiable Actions:

UO – Starts EHC pump B prior to Main Turbine / Reactor trip on low EHC pressure of 1100 psig. This will prevent an unnecessary Turbine / Reactor trip and transient on the plant.

Technical Specifications:

None

Event 6:

A 10 gpm SGTL will occur on SG # 1 requiring a rapid down power per 18013-C, this is to preclude the tube leak from propagating into a SGTR per the EPRI Guidelines.

Verifiable Actions:

OATC – Borates as necessary for rapid down power to maintain Tavg – Tref matched.

UO – Reduces Turbine load at < 5% per minute to maintain Tavg – Tref matched.

Event 7, 8:

A DBA SGTR will occur on SG # 1 requiring a plant trip and safety injection.

Verifiable Actions:

OATC – Manually trips the reactor using either QMCB hand switch, manually actuates safety injection, and adjusts seal injection to RCPs between 8 to 13 gpm after the SI.

UO – Places SGBD hand switches in hard closed to prevent water hammer to SGBD system.

UO – Throttles AFW flow to maintain SG levels 10 – 65%.The UO may perform an early operator action and isolate AFW flow to SG # 1 once SG # 1 level is > 10% NR with SS permission.

UO – Isolates ruptured SG # 1 by performing the following.

- Adjusts SG # 1 ARV potentiometer set point to 7.73 (to control at 1160 psig).
- Trips the TDAFW pump by closing PV-15129 (Trip and Throttle Valve)
- Closes SG # 1 MSIV and Bypass valves.
- Isolates FW flow to SG # 1 (MFIV, MFRV, BFIV, BFRV, TDAFW, MDAFW valves all shut)

UO – Blocks Low Steam line Pressure SI and SLI when RCS pressure < 2000 psig (P-11) and then places the steam dumps in Steam Pressure Mode and opens the 3 cool down steam dumps for a maximum rate Cooldown.

UO – Closes the steam dumps after selected CETC is reached and controls CETC below this temperature (usually this is 518°F or 506°F depending on ruptured SG pressure).

OATC – Depressurizes RCS with maximum PRZR spray flow to refill the pressurizer.

Event 9:

OATC – Trips RCP # 4 when a PRZR spray valve will not shut, trips RCP # 1 if necessary.

The scenario may be stopped after this point with chief examiner approval.

CRITICAL TASKS:

1) Isolates SG # 1 to limit secondary contamination and potential release environment by performing the following actions no later than the 19030-C procedure steps. These are steps 6 through 11 of 19030-C.

- **Adjusts SG # 1 ARV potentiometer set point to 7.73 (to control at 1160 psig).**
- **Trips the TDAFW pump by closing PV-15129 (Trip and Throttle Valve)**
- **Closes SG # 1 MSIV and Bypass valves.**
- **Isolates FW flow to SG # 1 (MFIV, MFRV, BFIV, BFRV, TDAFW, MDAFW, and SGBD and Sample valves all shut)**

2) Depressurizes PRZR to refill the PRZR with ECCS injection and to limit break flow using normal PRZR spray to meet conditions of step 37 of 19030-C.

3) Stops RCP # 4 when PRZR spray valve will not fully close. (Stops RCP # 1 if necessary) This prevents a loss of RCS pressure control requiring a transition to the SGTR ECA series of EOPs. Also, an uncontrolled backfill of the SG from the secondary side may occur resulting in possible loss of shutdown margin and contaminants being introduced into the primary side. This action is performed per step 38a RNO of 19030-C.

target ZERO Every day, every job, safety.	**NUCLEAR SAFETY FOCUS** **TARGET ZERO**
Protected Train: ☒ Alpha ☐ Bravo	**EOOS:** ☒ Green ☐ Yellow ☐ Orange ☐ Red
Plant Conditions:	100 % power MOL.
Major Activities:	Maintain power operations per UOP 12004-C section 4.3 for power operation.
Active LCOs:	☐ LCO 3.5.2 Condition A is in effect due to SIP A tagged out.
OOS/ Degraded CR Instruments:	☐ None
Narrative Status:	☐ Containment mini-purge is in service for a planned Containment Entry on next shift. ☐ SIP A is tagged out for motor repair, expected return to service time is 24 hours with 48 hours left on a shutdown LCO of 72 hours. ☐ The remnants of Hurricane Maya are passing through, severe weather and thunderstorms will be in the area for the next 8 hours. The Severe Weather Checklist is in effect.

Op-Test No.: 2012-301 **Scenario No.:** 3

Event No.: 1

Event Description: SG # 4 controlling level channel LT-554 fails HIGH requiring UO to take manual control of SG # 4 MFRV to control SG levels, selects an unaffected level channel, and returns SG # 4 MFRV to Auto.

Time	Position	Applicant's Action or Behavior
	UO	Diagnose the failure of SG # 4 controlling level channel LT-554. Symptoms / alarms: • ALB13-D06 STM GEN 4 HI / LO LVL DEVIATION • ALB14-D01 STM GEN 4 HI-HI LEVEL ALERT. Indications: • MFRV # 4 throttling shut • Feed flow < steam flow on SG # 4
	SS / UO	**IMMEDIATE OPERATOR ACTIONS** E1. Check Steam and feed flows – MATCHED ON ALL SGS. RNO E1. Take manual control of affected SG feed flow valves to restore NR level between 60% and 70%. [SG 4 MFRV 1-FIC-540 placed in manual and depresses UP arrow to raise FW flow]
	SS	Enters AOP-18001-C, Section E for Failure of SG Level Instrumentation.
	SS / UO	**SUBSEQUENT OPERATOR ACTIONS** E2. Selects unaffected SG level channel for control. (Selects 1LT-549, Ch II on 1LS-549C)
	UO	E3. Return SG feed flow valves control to automatic. [SG # 4 MFRV 1-FIC-540 returned to auto] **Cue to Simbooth:** IF asked, the Shift Manager has given permission to place the MFRV in auto.

Op-Test No.: 2012-301 **Scenario No.:** 3

Event No.: 1

Event Description: SG # 4 controlling level channel LT-554 fails HIGH requiring UO to take manual control of SG # 4 MFRV to control SG levels, selects an unaffected level channel, and returns SG # 4 MFRV to Auto.

<table>
<tr><th>Time</th><th>Position</th><th>Applicant's Action or Behavior</th></tr>
<tr><td></td><td>OATC / UO</td><td>E4. Initiate the Continuous Actions Page.</td></tr>
<tr><td></td><td>UO</td><td>*E5. Check SG level control maintains NR level – AT 65%.</td></tr>
<tr><td></td><td>SS</td><td>E6 Notify I & C to initiate repairs.
Contacts SSS to perform the following:
• Notify I&C to initiate repairs
• Write a Condition Report
• Notify OPS Duty Manager of AOP entry</td></tr>
<tr><td></td><td>SS</td><td>E7. Bypass the affected channel per 13509-C, Bypass Test Instrumentation (BTI) Panel Operation.
NOTE: It is not expected the SS will desire to bypass the channel.</td></tr>
<tr><td></td><td>SS</td><td>E8. Trip affected channel bistable and place associated MASTER TEST switch in TEST position per TABLE E1 within 72 hours. (TS 3.3.1 & 3.3.2)
NOTE: It is not expected the SS will trip bistables at this time.</td></tr>
<tr><td></td><td>SS</td><td>E9. Initiate the applicable actions of:
• TS 3.3.1
• TS 3.3.2
LCO 3.3.1 FU 13 CONDITION E SG LO-LO LEVEL RX TRIP</td></tr>
<tr><td></td><td>SS</td><td>
<table>
<tr><th>CONDITION</th><th>REQUIRED ACTION</th><th>COMPLETION TIME</th></tr>
<tr><td>A. One or more Functions with one or more channels inoperable.</td><td>A.1 Enter the Condition referenced in Table 3.3.1-1 for the channel(s).</td><td>Immediately</td></tr>
</table>
</td></tr>
</table>

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Op-Test No.: 2012-301 **Scenario No.:** 3

Event No.: 1

Event Description: SG # 4 controlling level channel LT-554 fails HIGH requiring UO to take manual control of SG # 4 MFRV to control SG levels, selects an unaffected level channel, and returns SG # 4 MFRV to Auto.

		E. One channel inoperable	E.1 Place channel in trip. OR E.2 Be in MODE 3.	72 hours 78 hours
		E9. cont.		
		LCO 3.3.2 FU 6b CONDITION D SG LO-LO LEVEL AFW ACTUATION		
		CONDITION	REQUIRED ACTION	COMPLETION TIME
		D. One channel inoperable	D.1 Place channel in trip. OR D.2.1 Be in MODE 3 AND D2.2 Be in MODE 4	72 hours 78 hours 84 hours
		LCO 3.3.2 FU 5c CONDITION I P-14, FWI		
		CONDITION	REQUIRED ACTION	COMPLETION TIME
		I. One channel inoperable	I.1 Place channel in trip. OR I.2 Be in MODE 3	72 hours 78 hours
	SS	*E10. Check repairs and surveillances – COMPLETE. RNO *E10 Perform the following: a. WHEN repairs and surveillances are complete THEN perform Step E11. b. Return to procedure and step in effect. **END OF EVENT 1.**		

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Op-Test No.: 2012-301 **Scenario No.:** 3

Event No.: 2

Event Description: CVCS Letdown line break ORC that auto isolates the HELBA valves but requires OATC actions to isolate a Letdown leak to the PRT via relief.

Time	Position	Applicant's Action or Behavior
	OATC UO	Diagnose Letdown line break ORC and CVCS relief lifting to PRT: Symptoms / alarms: ALB63-E01 CVCS PIPE BREAK RM PROT ACTUATION ALB61-C06 LVL A LEAK DETECTED (short time delay) ALB07-C05 LP LTDN HX HI TEMP (short time delay) ALB06-F01 CSFST TROUBLE (short time delay) Indications: • Both temperature indicators for room RA09 reading high. • Letdown flow lowering to 0 in 1LI-132C and 1LI-132A. Enters AOP 18007-C, Section A, TOTAL LOSS OF LETDOWN FLOW.
	OATC	A1. Isolate letdown relief flowpath by performing the following: a. Close letdown orifice isolation valves: • HV-8149A • HV-8149B • HV-8149C b. Close letdown isolation valves: • LV-459 • LV-460

Op-Test No.: 2012-301 **Scenario No.:** 3

Event No.: 2

Event Description: CVCS Letdown line break ORC that auto isolates the HELBA valves but requires OATC actions to isolate a Letdown leak to the PRT via relief.

Time	Position	Applicant's Action or Behavior
	OATC	A2. Adjust HC-182 and FIC-121 as necessary to establish the following: • Seal injection flow to all RCPs – 8 to 13 GPM. -AND- • Charging flow – APPROXMATELY 10 GPM GREATER THAN TOTAL SEAL INJECTION FLOW.
	OATC	A3. Check pipe break protection valves – OPEN. • HV-15214 **(NO)** • HV-8160 **(NO)** RNO
	UO	A3. Perform the following: a. Check affected unit room temperatures. UNIT 1 • R-A07 • R-A08 • R-A09 (high room temperature for both trains) b. IF affected room temperatures are greater than 135°F, THEN investigate reason for high temperature in rooms before opening affected valves and restoring letdown.

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Op-Test No.: 2012-301 **Scenario No.:** 3

Event No.: 2

Event Description: CVCS Letdown line break ORC that auto isolates the HELBA valves but requires OATC actions to isolate a Letdown leak to the PRT via relief.

Time	Position	Applicant's Action or Behavior
	OATC	**NOTE to Simbooth:** IF, personnel dispatched to check out RA09, report back the following: **Room appears to be full of steam and the submarine door at the entrance is very hot to the touch. HP will not allow us to attempt to enter the room.**
	OATC	A4. Check instrument air to containment – ESTABLISHED. **(YES)**
	OATC	A5. Check CVCS letdown to BTRS flowpath. a. Check TV-0381B BTRS Demin Inlet Temperature Control – OPEN. (HS-10351 DILUTE or OFF lights lit.) **(OFF LIT)** b. Check HV-8115 LETDOWN DIVERT TO BTRS – OPEN. **(YES)**
	OATC	A6. Identify and correct cause for loss of letdown. a. Check for letdown path valve failures or mispositions. **(NO)** b. Check instrumentation: • PI-131A • TI-130 c. Check PIC-131. d. Check HV-8152. e. Check for other causes.

Op-Test No.: 2012-301 **Scenario No.:** 3

Event No.: 2

Event Description: CVCS Letdown line break ORC that auto isolates the HELBA valves but requires OATC actions to isolate a Letdown leak to the PRT via relief.

Time	Position	Applicant's Action or Behavior
	OATC	A7. Check normal letdown – AVAILABLE. **(NO)** RNO A7. Perform the following: a. Establish Excess Letdown by initiating 13008, CHEMICAL AND VOLUME CONTROL SYSTEM EXCESS LETDOWN. **Note to examiner:** SS should wait here for Excess Letdown to be placed in service prior to proceeding to step A9. **Note to examiner: Excess Letdown steps are on page # 10.** **GO TO EVENT 3** for placing Excess Letdown in service steps, then return to step A9 once Excess Letdown has been placed in service. b. Go to Step A9.

Op-Test No.: 2012-301 **Scenario No.:** 3

Event No.: 2

Event Description: CVCS Letdown line break ORC that auto isolates the HELBA valves but requires OATC actions to isolate a Letdown leak to the PRT via relief.

Time	Position	Applicant's Action or Behavior
	OATC UO	A9. Initiate the Continuous Actions Page.
	OATC	A10. Verify PRZR level – TRENDING TO PROGRAM. **(YES)** **Note to examiner:** The OATC should be able to turn PRZR level to a down trend with Excess Letdown in service.

Op-Test No.: 2012-301 **Scenario No.:** 3

Event No.: 2

Event Description: CVCS Letdown line break ORC that auto isolates the HELBA valves but requires OATC actions to isolate a Letdown leak to the PRT via relief.

Time	Position	Applicant's Action or Behavior
	SS	A11. Check normal letdown flow – ESTABLISHED. **(NO)** RNO A11. Perform the following: a. WHEN normal letdown capability is restored, THEN restore normal letdown by initiating 13006, CHEMICAL AND VOLUME CONTROL SYSTEM. b. Evaluate the impact of continued power operation with normal letdown out of service. c. WHEN Normal Letdown restored remove Excess Letdown by initiating 13008, CHEMICAL VOLUME CONTROL SYSTEM EXCESS LETDOWN.
	OATC	A12. Return to procedure and step in effect. **END OF EVENT 2, proceed to EVENT 4.**

Op-Test No.: 2012-301 **Scenario No.:** 3

Event No.: 3

Event Description: The OATC places Excess letdown in service per direction of the SS to maintain PRZR level after letdown is isolated to stop the RCS leak. The OATC will use SOP 13008-1, to place excess letdown in service.

Time	Position	Applicant's Action or Behavior
	OATC	Section 4.1 of 13008-1 is selected.
	OATC	**NOTE:** Independent Verifications performed within Section 4.1 are documented on Checklist 1. 4.1.1 Verify Reactor power is maintained ≤ 3622.6 MWT while Excess Letdown is in service and LEFM is in service. IF LEFM is NOT in service, maintain power ≤ 3562 MWT per guidance of 12004-C.
	OATC	4.1.2 **Verify** that a CVCS Charging Pump is running.
	OATC	4.1.3 **Verify** CLOSED RX HEAD VENT TO EXCESS LETDOWN ISOLATION 1-HV-8098.
	OATC	4.1.4 **Verify** flow controller EXCESS LETDOWN, 1HC-123 is set to closed (0% demand).
	OATC	4.1.5 **Verify** OPEN RCPs Seal Leakoff Isolation valves: • 1-HV-8100 RCPS SEAL LEAKOFF ORC ISOLATION • 1-HV-8112 RCPS SEAL LEAKOFF IRC ISOLATION

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Op-Test No.: 2012-301 **Scenario No.:** 3

Event No.: 3

Event Description: The OATC places Excess letdown in service per direction of the SS to maintain PRZR level after letdown is isolated to stop the RCS leak. The OATC will use SOP 13008-1, to place excess letdown in service.

Time	Position	Applicant's Action or Behavior
	OATC	4.1.6 **Verify** EXCESS LETDOWN TO VCT, 1HS-8143 is in the OPEN VCT position.
	OATC	4.1.7 **Verify** Reactor power is maintained ≤3622.6 MWT while Excess Letdown is in service and LEFM is in service. IF LEFM is NOT in service, **maintain** power ≤3562 MWT per guidance of 12004-C.
	OATC	4.1.8 **Open** EXCESS LETDOWN LINE Isolation Valves: • 1-HV-8153 EXCESS LETDOWN LINE ISO VLV • 1-HV-8154 EXCESS LETDOWN LINE ISO VLV
	OATC	4.1.9 **Record** the following: • Pressure on indicator EXCESS LETDOWN HX OUTLET, 1PI-124. • Temperature on indicator EXCESS LETDOWN HX OUTLET, 1TI-122. **Note to examiner:** ALB63-A06 FILTERS BACKFLUSH PNL ALARM will illuminate shortly after placing Excess Letdown in service.

Op-Test No.: 2012-301 **Scenario No.:** 3

Event No.: 3

Event Description: The OATC places Excess letdown in service per direction of the SS to maintain PRZR level after letdown is isolated to stop the RCS leak. The OATC will use SOP 13008-1, to place excess letdown in service.

Time	Position	Applicant's Action or Behavior
	OATC	4.1.10 WHILE establishing excess letdown, **perform** the following: • **Monitor** pressure rise on pressure indicator EXCESS LETDOWN HX OUTLET, 1PI-124 and **verify** it remains less than 50 pounds above pressure recorded in Step 4.1.8. • **Monitor** temperature rise on temperature indicator EXCESS LETDOWN HX OUTLET, 1TI-122 and **verify** it remains less than 165 degrees.
	OATC	4.1.11 Slowly **adjust** output flow controller EXCESS LETDOWN 1HC-123 to establish maximum allowable flow (estimated to be approximately 30 gpm).
	OATC	4.1.12 **Perform** the following as required to maintain desired pressurizer level: • **Adjust** charging using CHARGING LINE CONTROL, 1FIC-121. • **Adjust** seal injection using SEAL FLOW CONTROL, 1HC-182.

Op-Test No.: 2012-301 **Scenario No.:** 3

Event No.: 3

Event Description: The OATC places Excess letdown in service per direction of the SS to maintain PRZR level after letdown is isolated to stop the RCS leak. The OATC will use SOP 13008-1, to place excess letdown in service.

Time	Position	Applicant's Action or Behavior
	OATC	4.1.13 IF normal letdown is isolated, **align** the outlet of the Seal Water Heat Exchanger to the Volume Control Tank spray nozzle as follows: (IV REQUIRED) (N/A if previously performed) a. **Unlock** and **open** CVCS SEALS SEAL WATER HX OUTLET TO VCT, 1-1208-U6-104. (KEY 1OP2-281) (RA-26) b. **Close** CVCS SEALS SEAL WATER HX OUTLET TO NCP SUCTION, 1-1208-U6-106. (RA-26)
	OATC	4.1.14 IF directed by SS to transfer excess letdown to the RCDT, **perform** the following: a. **Verify** RCDT system is aligned to accept Excess Letdown flow per 13002-1 "Reactor Drain Tank Operation." b. **Place** EXCESS LETDOWN TO VCT, 1HS-8143 to the OPEN RCDT position. c. **Monitor** temperature rise on EXCESS LETDOWN HX OUTLET 1TI-122 and **verify** it remains less than 165 degrees. d. Slowly **raise** output on flow controller EXCESS LETDOWN, 1HC-123 to establish maximum allowable flow. e. swap to RCDT is being performed for Chemistry control or level control Step 4.2.7. f. **Perform** the following as required to maintain desired pressurizer level: • **Adjust** charging using CHARGING LINE CONTROL, 1FIC-121. • **Adjust** seal injection using SEAL FLOW CONTROL, 1HC-182.

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Op-Test No.: 2012-301 **Scenario No.:** 3

Event No.: 3

Event Description: The OATC places Excess letdown in service per direction of the SS to maintain PRZR level after letdown is isolated to stop the RCS leak. The OATC will use SOP 13008-1, to place excess letdown in service.

Time	Position	Applicant's Action or Behavior
	OATC	4.1.15 IF the Seal Water Heat Exchanger Outlet was aligned to the Volume Control Tank, **restore** normal alignment as follows: (IV REQUIRED) a. **Open** CVCS SEALS SEAL WATER HX OUTLET TO NCP SUCTION, 1-1208-U6-106. (RA-26) b. **Close** and **lock** CVCS SEALS SEAL WATER HX OUTLET TO VCT, 1-1208-U6-104 (KEY 1OP2-281). (RA-26) **END OF EVENT 3, Return to EVENT 2 on page # 7, step A9.**

Op-Test No.: 2012-301 **Scenario No.: 3**

Event No.: 4

Event Description: PRZR Pressure channel PT-455 fails high resulting in PRZR PORV 455A and both PRZR Sprays fully opening. The OATC will have to take manual action to prevent a Reactor trip and SI.

Time	Position	Applicant's Action or Behavior
	OATC	Diagnose the high failure of PRZR Pressure channel PT-455. Symptoms / alarms: • ALB11-B03 PRZR HI PRESS • ALB11-C01 PRZR CONTROL HI LEVEL DEV AND HEATERS ON • ALB11-C03 PRZR HI PRESS CHANNEL ALERT • ALB12-D03 PRZR PRESS LO PORV BLOCK • ALB12-E04 PV-0455A OPEN SIGNAL • ALB06-F06 CSFST TROUBLE Indications: • PRZR Pressure channel PT-455 off scale high. • PRZR Pressure channels PT-456, 457, and 458 rapidly lowering. • Both PRZR Sprays full open.
	OATC	**AOP 18001-C, Section C IMMEDIATE ACTIONS** C1. Check RCS pressure - STABLE OR RISING. **(NO)** RNO: C1. Perform the following: • Close spray valves. • Close affected PRZR PORV. • Operate PRZR heaters as necessary.
	SS	Enters AOP 18001-C, Section C and verifies immediate operator actions properly completed.

Op-Test No.: 2012-301 **Scenario No.:** 3

Event No.: 4

Event Description: PRZR Pressure channel PT-455 fails high resulting in PRZR PORV 455A and both PRZR Sprays fully opening. The OATC will have to take manual action to prevent a Reactor trip and SI.

Time	Position	Applicant's Action or Behavior
	OATC	C2. Check controlling channel – OPERATING PROPERLY. **(NO)** RNO: C2. Perform the following: a. Place HS-455A in close. b. Place PRZR spray valve controllers in manual.
	OATC UO	C3. Initiate the Continuous Actions Page.
	OATC	C4. Control PRZR pressure using heaters and sprays – BETWEEN 2220 AND 2250 PSIG.
	OATC	C5. Check PIC-455A Pressurizer Master Pressure Controller – IN AUTO WITH OUTPUT SIGNAL APPROXIMATELY 25%. **(NO)** RNO: C5. Place PIC-455A in manual and adjust controller output to approximately 25%.
	OATC	C6. Check affected channel selected on PS-455F PRZR PRESS CNTL SELECT. **(YES)**

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Op-Test No.: 2012-301 **Scenario No.:** 3

Event No.: 4

Event Description: PRZR Pressure channel PT-455 fails high resulting in PRZR PORV 455A and both PRZR Sprays fully opening. The OATC will have to take manual action to prevent a Reactor trip and SI.

Time	Position	Applicant's Action or Behavior
	OATC	C7. Select unaffected channels on PS-455F: Failed Channel / Select ***P455*** / ***CH457 / 456*** P456 / CH455 / 458 P457 / CH455 / 456 P458 / CH455 / 456
	OATC	C8. Perform the following: a. Check PRZR pressure – STABLE AT APPROXIMATELY 2235 PSIG. b. Place PRZR heaters in AUTO. c. Place PRZR spray valve controllers in AUTO. RNO: a. Adjust PRZR pressure to approximately 2235 psig using PRZR heaters and sprays. **Cue to Simbooth**: IF asked, the Shift Manager has given permission to place the PRZR pressure control system in auto.
	OATC	C9. Place PORVs in AUTO and verify proper operation.
	OATC	C10. Return PRZR pressure Master Controller to AUTO.

Op-Test No.: 2012-301 **Scenario No.: 3**

Event No.: 4

Event Description: PRZR Pressure channel PT-455 fails high resulting in PRZR PORV 455A and both PRZR Sprays fully opening. The OATC will have to take manual action to prevent a Reactor trip and SI.

Time	Position	Applicant's Action or Behavior
	OATC	C11. Select same channel on PS-455G PRZR PRESS REC SEL as selected on PS-455F. ***457***
	OATC	C12. Check P-11 status light on BPLB indicates correctly for plant condition within one hour. ***OFF***
	OATC	C13. Notify I&C to initiate repairs. SS will call typically call the SSS to perform the following: • Notify Operations Duty Manager of the AOP entry • Write a Condition Report • Notify I&C
	OATC	C14. Bypass the affected instrument channel using 13509 C, BYPASS TEST INSTRUMENTATION (BTI) PANEL OPERATION, if desired. **NOTE: SS is NOT expected to bypass failed channel.**

Op-Test No.: 2012-301 **Scenario No.:** 3

Event No.: 4

Event Description: PRZR Pressure channel PT-455 fails high resulting in PRZR PORV 455A and both PRZR Sprays fully opening. The OATC will have to take manual action to prevent a Reactor trip and SI.

Time	Position	Applicant's Action or Behavior
	SS	C15. Trip the affected channel bistables and place the associated MASTER TEST switches in TEST position per TABLE C1 within 72 hours. (TS 3.3.1 & 3.3.2) **NOTE: SS expected to leave bistables untripped during allowed out of service time to facilitate troubleshooting by I&C.**
	SS	C16. Initiate the applicable actions of: • TS 3.3.1 Reactor Trip Function — Condition LCO 3.3.1 — A 6 OTΔT — E 8a Low PRZR pressure — M 8b High PRZR pressure — E • TS 3.3.2 ESFAS Function — Condition LCO 3.3.2 — A 1d SI low PRZR pressure — D 8b P-11 Interlock — **L (one hour action)** • TS 3.4.1.a DNB RCS pressure < 2199 psig B (Momentary)

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Op-Test No.: 2012-301 **Scenario No.:** 3

Event No.: 4

Event Description: PRZR Pressure channel PT-455 fails high resulting in PRZR PORV 455A and both PRZR Sprays fully opening. The OATC will have to take manual action to prevent a Reactor trip and SI.

Time	Position	Applicant's Action or Behavior
	SS	C17. Check repairs and surveillances - COMPLETE. RNO: C17. Perform the following: a. WHEN repairs and surveillances are complete, THEN perform step C18. b. Return to procedure and step in effect. **END OF EVENT 4, proceed to EVENT 5.**

Op-Test No.: 2012-301 **Scenario No.: 3**

Event No.: 5

Event Description: Main Turbine EHC pump 1 trips and the standby pump fails to automatically start on low pressure. The UO will refer to ARP-17033-1 for corrective actions. The standby pump will be manually started to prevent a turbine trip on low EHC pressure.

Time	Position	Applicant's Action or Behavior
	UO	Diagnoses trip of EHC pump: Alarms: ALB33-B07 480V SWGR 1NB02 TROUBLE ALB20-D05 HYD FLUID LO PRESS (after several minutes) Indications: EHC pump 1 (HS-6539): Red – OFF Amber – ON Green – ON EHC pressure (PI-6338) <1600 psig and lowering. EHC Pump 1 amps (II-40073) drop to 0 amps.
	UO	Refers to ARP 17033-1 for Window B07. (480V SWGR 1NB02 TROUBLE)

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Op-Test No.: 2012-301 **Scenario No.:** 3

Event No.: 5

Event Description: Main Turbine EHC pump 1 trips and the standby pump fails to automatically start on low pressure. The UO will refer to ARP-17033-1 for corrective actions. The standby pump will be manually started to prevent a turbine trip on low EHC pressure.

Time	Position	Applicant's Action or Behavior
	UO	**ARP 17033-1 WINDOW B07** **1.0 PROBABLE CAUSE** 1. One of the breakers on Switchgear 1NB02 tripped due to a fault. 2. Bus ground fault. 3. Potential transformer/fuse failure. 4. Loss of bus voltage from Switchgear 1NA04. 5. Transformer 1NB02X winding high temperature. 6. Loss of 125V DC control power from Panel 1ND21. 7. Loss of power to transformer temperature monitor. **2.0 AUTOMATIC ACTIONS** NONE

Op-Test No.: 2012-301 **Scenario No.:** 3

Event No.: 5

Event Description: Main Turbine EHC pump 1 trips and the standby pump fails to automatically start on low pressure. The UO will refer to ARP-17033-1 for corrective actions. The standby pump will be manually started to prevent a turbine trip on low EHC pressure.

Time	Position	Applicant's Action or Behavior
	UO	**NOTE:** Loss of 125V DC control power results in loss of breaker remote/local remote operating capabilities and associated control circuit trip features. **3.0 INITIAL OPERATOR ACTIONS** NONE **4.0 SUBSEQUENT OPERATOR ACTIONS** 1. Check for associated alarms and indications. 2. Dispatch an operator to Switchgear 1NB02 to check for: a. Ground fault indications. b. Other abnormal conditions. 3. IF alarm is due to a breaker tripping on fault or undervoltage: a. Determine affected loads. b. Start redundant loads, if applicable. 4. IF alarm is due to a loss of 125V DC control power, dispatch an operator to the switchgear to manually operate breakers, under the direction of the Control Room. 5. IF a bus ground fault is indicated, selectively shift to redundant loads and de-energize components to locate the ground.

Op-Test No.: 2012-301 **Scenario No.: 3**

Event No.: 5

Event Description: Main Turbine EHC pump 1 trips and the standby pump fails to automatically start on low pressure. The UO will refer to ARP-17033-1 for corrective actions. The standby pump will be manually started to prevent a turbine trip on low EHC pressure.

Time	Position	Applicant's Action or Behavior
	UO	4.0 **SUBSEQUENT OPERATOR ACTIONS (continued)** 6. Initiate maintenance as required to correct cause of the alarm. 5.0 **COMPENSATORY OPERATOR ACTIONS** 1. Initiate maintenance to correct problem (i.e., restore alarm). 2. IF after three days the alarm has NOT been restored, initiate a Temporary Modification per 00307-C, "Temporary Modifications" to clear the bad input(s). Record this action required on Figure 5 of 10018-C, "Annunciator Control."

Op-Test No.: 2012-301 **Scenario No.: 3**

Event No.: 5

Event Description: Main Turbine EHC pump 1 trips and the standby pump fails to automatically start on low pressure. The UO will refer to ARP-17033-1 for corrective actions. The standby pump will be manually started to prevent a turbine trip on low EHC pressure.

Time	Position	Applicant's Action or Behavior
	UO	**ARP 17020-1 WINDOW D05** 1.0 **PROBABLE CAUSE** 1. Failure of Electrohydraulic Control (EHC) Fluid Pumps. 2. Clogged strainers and filters in pump suction or discharge. 3. EHC Fluid System leak. 2.0 **AUTOMATIC ACTIONS** 1. If pressure drops below 1400 psig, the standby EHC Fluid Pump will start. 2. If pressure continues to drop to 1100 psig, the Turbine will trip. 3.0 **INITIAL OPERATOR ACTIONS** 1. IF a reactor trip occurs, Go To 19000 C, "E 0 Reactor Trip Or Safety Injection." 2. Verify standby EHC Fluid Pump is on, if needed. 4.0 **SUBSEQUENT OPERATOR ACTIONS** CAUTION EHC fluid is a fire resistant fluid that may be harmful to personnel. Observe proper safety precautions when in contact with this fluid. 1. Dispatch an operator to the Hydraulic Power Unit to check for system leaks or pump failure. 2. IF equipment failure is indicated, initiate maintenance as required.

Op-Test No.: 2012-301 **Scenario No.:** 3

Event No.: 5

Event Description: Main Turbine EHC pump 1 trips and the standby pump fails to automatically start on low pressure. The UO will refer to ARP-17033-1 for corrective actions. The standby pump will be manually started to prevent a turbine trip on low EHC pressure.

Time	Position	Applicant's Action or Behavior
	UO	**NOTE:** Student notices green and amber lights for EHC pump 1 and then starts EHC pump 2 with SS permission. **NOTE:** After starting EHC pump 2 EHC pressure returns to 1600 psig.
	UO SS	Will call SSS to: • Write condition report • Notify Maintenance
		END OF EVENT 5, proceed to EVENT 6.

Op-Test No.: 2012-301 **Scenario No.:** 3

Event No.: 6

Event Description: SG 1 develops a 15 GPM tube leak requiring entry into AOP 18009-C. With SGTL > 5 gpm a rapid shutdown using AOP 18013-C is required. This event will be used for the required reactivity manipulation.

Time	Position	Applicant's Action or Behavior
	CREW	Diagnose SG Tube Leakage: ALARMS: ALB05-B03 INTMD RADIATION ALARM ALB05-C03 HIGH RADIATION RE-0724 – Primary to secondary leakage monitor (IPC) RE-0810 – SJAE low range monitor (IPC) RE-12839C – SJAE monitor (IPC) INDICATIONS: Charging flow increases if in auto. (expect manual control) PRZR level slowly lowers.
	SS	Enters AOP 18009-C, Steam Generator Tube Leak and directs actions of OATC / UO listed in the following steps. (Crew Update)
	OATC / UO	1. Initiate continuous actions page.
	OATC	2. Maintains PRZR level by: a. Adjusting charging flow. b. Check PRZR level stable or rising. RNOb.1) Isolating letdown (only necessary if at 120 GPM. letdown) RNOb.2) Start additional charging pump. (will not be necessary) RNOb.3) IF PRZR level can NOT be maintained greater than 9%, THEN perform the following: a. Trip the Reactor. b. WHEN Reactor trip verified, THEN actuate SI. c. Go to 19000 C, E 0 REACTOR TRIP OR SAFETY INJECTION.

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Op-Test No.: 2012-301 **Scenario No.:** 3

Event No.: 6

Event Description: SG 1 develops a 15 GPM tube leak requiring entry into AOP 18009-C. With SGTL > 5 gpm a rapid shutdown using AOP 18013-C is required. This event will be used for the required reactivity manipulation.

<table>
<tr><th>Time</th><th>Position</th><th>Applicant's Action or Behavior</th></tr>
<tr><td></td><td>SS

UO</td><td>3. Try to identify affected SG:

a. Direct Chemistry attempt to identify the leaking SG by initiating 31120-C.

b. Check SG level indications stable or rising with relatively lower feed flow rate. (will not be able to see this)</td></tr>
<tr><td></td><td>OATC</td><td>4. Verifies VCT level maintained with automatic makeup control</td></tr>
<tr><td></td><td>OATC / SS</td><td>5. Check leak rate < 5 GPM as determined by CVCS flow balance. [charging – (letdown + seal leak off)]

(Leak rate will be ~15 GPM)

RNO a. Initiate 18013-C, Rapid Power Reduction.

RNO b. Be in mode 3 within 1 hour.

RNO c. Go to step 11.</td></tr>
<tr><td></td><td>SS</td><td>Initiates a unit shutdown per AOP-18013-C, Rapid Down Power.
<table>
<tr><th>Entry</th><th>Condition</th><th>Target</th><th>Approx. Time @ 3-5%/min</th></tr>
<tr><td>17015-D05
17015-E01</td><td>MFPT High Vibrations</td><td><70% RTP</td><td>5-8 minutes</td></tr>
<tr><td>17019-B04
18025-C</td><td>Condenser Low Vacuum
or Circ Water Pump Trip
or Loss of Utility Water</td><td>Vacuum >22.42" Hg and STABLE or RISING</td><td></td></tr>
<tr><td>18009-C</td><td>SG Tube Leak (≥75 gpd with an ROC ≥30 gpd/hr)</td><td><50% RTP within 1 hour</td><td>10-17 minutes</td></tr>
<tr><td>18009-C</td><td>SG Tube Leak (≥5 gpm)</td><td>20% RTP within 1 hour & trip reactor</td><td>16-27 minutes</td></tr>
<tr><td>18039-C</td><td>Confirmed Loose Part</td><td>20% RTP quickly</td><td>16-27 minutes</td></tr>
<tr><td></td><td>SS determination based on plant conditions</td><td>As determined by the SS</td><td></td></tr>
</table></td></tr>
</table>

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Op-Test No.: 2012-301 **Scenario No.:** 3

Event No.: 6

Event Description: SG 1 develops a 15 GPM tube leak requiring entry into AOP 18009-C. With SGTL > 5 gpm a rapid shutdown using AOP 18013-C is required. This event will be used for the required reactivity manipulation.

Time	Position	Applicant's Action or Behavior
	SS	1. Performs SHUTDOWN BRIEFING **METHOD** • Auto rod control should be used. • Reduce Turbine Load at approximately **3%** RTP per minute (approx 36 MWe) up to **5%** RTP (approx 60 MWe). • Borate considering the calculations from the reactivity briefing sheet and BEACON. • Maintain AFD within the doghouse. • SS (or SRO designee) - Maintain supervisory oversight. • All rod withdrawals will be approved by the SS. • Approval for each reactivity manipulation is not necessary as long as manipulations are made within the boundaries established in this briefing (i.e. turbine load adjustment up to 60 MWe, etc.). • A crew update should be performed at approximately every 100 MWe power change. • If manpower is available, peer checks should be used for all reactivity changes. **OPERATIONAL LIMITS** • Maintain TAVG within ±6°F of TREF. **If TAVG/TREF mismatch >6°F and *not* trending toward a matched condition or if TAVG ≤ 551°F, then trip the reactor.** • *If load reduction due to a loss of vacuum,* every effort should be made to maintain the steam dumps closed. (Permissive C-9 ≥ 24.92" Hg). **INDUSTRY OE** • Shift supervision must maintain **effective oversight** and exercise **conservative decision making.** • Correction of significant RCS TAVG deviations should only be via secondary plant control manipulations and not primary plant control manipulations. (i.e., do not withdraw control rods or dilute).

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Op-Test No.: 2012-301 **Scenario No.:** 3

Event No.: 6

Event Description: SG 1 develops a 15 GPM tube leak requiring entry into AOP 18009-C. With SGTL > 5 gpm a rapid shutdown using AOP 18013-C is required. This event will be used for the required reactivity manipulation.

Time	Position	Applicant's Action or Behavior
	OATC	2. Verify rods in AUTO.
	UO	3. Reduce Turbine Load at the desired rate up to 5%/min (60 MWE/min).
	OATC	4. Borate as necessary by initiating 13009, CVCS REACTOR MAKEUP CONTROL SYSTEM. **Note to examiner:** Boration steps from 13009 start on page # 32. IF, crew Emergency Borates, steps from 13009 start on page # 38.
	OATC / UO	5. Initiate the Continuous Actions Page.
	OATC / UO	6. Check desired ramp rate - LESS THAN OR EQUAL TO 5%/MIN.
	OATC	7. Maintain Tavg within 6°F of Tref: a. Monitor Tavg/Tref deviation (UT-0495). b. Verify rods inserting as required. c. Energize Pressurizer back-up heaters as necessary.
	OATC / UO	8. Maintain reactor power and turbine power – MATCHED. a. Balance reactor power with secondary power reduction using boration and control rods. b. Check rate of reactor power reduction ADEQUATE FOR PLANT CONDITIONS. c. Check RCS Tavg GREATER THAN 551°F (TS 3.4.2). d. Check RCS Tavg - WITHIN 6°F OF TREF.

Op-Test No.: 2012-301 **Scenario No.:** 3

Event No.: 6

Event Description: SG 1 develops a 15 GPM tube leak requiring entry into AOP 18009-C. With SGTL > 5 gpm a rapid shutdown using AOP 18013-C is required. This event will be used for the required reactivity manipulation.

Time	Position	Applicant's Action or Behavior
	OATC	9. Maintain PRZR Pressure AT 2235 PSIG.
	OATC	10. Maintain PRZR Level AT PROGRAM.
	UO	11. Maintain SG Level – BETWEEN 60% AND 70%.
	SS	12. Notify the System Operator that a load reduction is in progress.
	SS	13. Notify SM to make the following notifications as appropriate: Plant Management Notifications using 10000-C, CONDUCT OF OPERATIONS. 91001-C, EMERGENCY CLASSIFICATION AND IMPLEMENTING INSTRUCTIONS. 00152, FEDERAL AND STATE REPORTING REQUIREMENTS. Chemistry Technical Specification sampling for load reductions greater than 15% using 35110 C, CHEMISTRY CONTROL OF THE REACTOR COOLANT SYSTEM. QC to perform a NOPT inspection using 84008, RPV ALLOY 600 MATERIAL INSPECTIONS AND REPORTS for reactor shutdowns.
	NOTE	**Event will continue until adequate power maneuver completed as determined by the NRC Chief Examiner, at that point, the SGTR will occur and the crew will trip the plant IAW 18009-C, step 3.b RNO.** **END OF EVENT 6, proceed to EVENT 7.**

Op-Test No.: 2012-301 **Scenario No.:** 3

Event No.: 6 Rapid Power Reduction boration steps

Event Description: Rapid Power Reduction boration steps from 13009.

Time	Position	Applicant's Action or Behavior
	OATC	4.2 BORATION 4.2.1 Determine the existing RCS boron concentration from Boron Meter 1-AI-40134 OR by sample analysis. 4.2.2 To determine the number of gallons of boric acid required to borate the RCS, perform the following. IF borating to required boron for a xenon free cool down, obtain the maximum boron concentration for the cool down range from the PTDB Tab 1.3.4-T1 and T2. OR IF borating to a desired boron concentration, determine the desired change in boron concentration by subtracting the existing concentration from the desired concentration. THEN Determine the amount of boric acid necessary to accomplish the desired change in boron concentration using PTDB Tab 2.3 and correct the obtained value using PTDB Tab 2.1. **Note to examiner:** The OATC may also use a Beacon Book calculation to obtain a boron addition target for the Rapid Power Reduction. For a power reduction to 70%, this will be a boron addition of 230 gallons at 30 gpm.
	OATC	4.2.3 Place VCT MAKEUP CONTROL 1-HS-40001B in STOP.
	OATC	4.2.4 Place VCT MAKEUP MODE SELECT 1-HS-40001A in BOR.

Op-Test No.: 2012-301 **Scenario No.:** 3

Event No.: 6 Rapid Power Reduction boration steps

Event Description: Rapid Power Reduction boration steps from 13009.

Time	Position	Applicant's Action or Behavior
		NOTE If necessary, boric acid flow may be adjusted using 1-FIC-0110 with SS concurrence. Changes to pot setting should be logged in the Control Room Log and restored at completion of activity.
	OATC	4.2.5 Adjust potentiometer on Boric Acid Blender Flow Controller 1-FIC-0110 as desired and verify in AUTO.
		CAUTION Digital counter setting on BORIC ACID TO BLENDER integrator 1-FQI-0110 reads in tenth-gallon increments.
	OATC	4.2.6 Set BORIC ACID TO BLENDER integrator 1-FQI-0110 to the desired amount of Boric Acid.

Op-Test No.: 2012-301 **Scenario No.:** 3

Event No.: 6 Rapid Power Reduction boration steps

Event Description: Rapid Power Reduction boration steps from 13009.

Time	Position	Applicant's Action or Behavior
	OATC	4.2.7 Verify the following: • BA TO BLENDER 1-HS-0110A is in AUTO. • BLENDER OUTLET TO CHARGING PUMPS SUCT 1-HS-0110B is in AUTO. • One Boric Acid Transfer Pump in AUTO or START. • RX MU WTR TO BA BLENDER 1-FV-0111A is closed with 1HS-0111A in AUTO. • BLENDER OUTLET TO VCT 1-FV-0111B is closed with 1HS-0111B in AUTO. NOTES • Boration can be manually stopped at any time by placing 1-HS-40001B in STOP. • VCT pressure, 1-PI-115 should be maintained between 20 and 45 psig.
	OATC	4.2.8 Place VCT MAKEUP CONTROL 1-HS-40001B in START and perform the following: • Verify Boric Acid Transfer Pump is running. • Verify 1-FV-0110B is open. • Verify 1-FV—0110A throttles open to provide desired flow on 1-FI-0110A. • Monitor BORIC ACID TO BLENDER integrator 1-FQI-0110.

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Op-Test No.: 2012-301 **Scenario No.:** 3

Event No.: 6 Rapid Power Reduction boration steps

Event Description: Rapid Power Reduction boration steps from 13009.

Time	Position	Applicant's Action or Behavior
	OATC	4.2.9 WHEN 1-FQI-0110 BORIC ACID TO BLENDER integrator reaches its setpoint, verify boration stops and the following valves close. • 1-FV-0110A, BA TO BLENDER • 1-FV-0110B, BLENDER OUTLET TO CHARGING PUMPS SUCT
	OATC	4.2.10 Flush approximately 15 gallons of Reactor Makeup Water through 1-FV-0110B by performing the flowing: a. Place VCT MAKEUP MODE SELECT 1-HS-40001A to ALT DIL. b. Set TOTAL MAKEUP integrator 1-FQI-0111 for 13 to 15 gallons. c. Place BLENDER OUTLET TO VCT 1-HS-0111B in CLOSE. d. Place VCT MAKEUP CONTROL 1-HS-40001B in START. e. Verify flow is indicated on 1-FI-0110B. f. WHEN TOTAL MAKEUP integrator 1-FQI reaches the desired setpoint, verify the following valves close: • 1-FV-0111A, RX MU WTR TO BA BLENDER • 1-FV-0110B, BLENDER OUTLET TO CHARGING PUMPS SUCT

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Op-Test No.: 2012-301 **Scenario No.:** 3

Event No.: 6 Rapid Power Reduction boration steps

Event Description: Rapid Power Reduction boration steps from 13009.

<table>
<tr><th>Time</th><th>Position</th><th>Applicant's Action or Behavior</th></tr>
<tr><td></td><td>OATC</td><td>4.2.11 Verify 1-FIC-0110 potentiometer is set to setting recorded prior to boration (or as directed by SS).</td></tr>
<tr><td></td><td>OATC</td><td>4.2.12 Align Reactor Makeup Control system for automatic operation as follows:
<table>
<tr><th></th><th>COMPONENT</th><th>NAME</th><th>POSITION</th></tr>
<tr><td>a.</td><td>1-HS-110B</td><td>BLENDER OUTLET TO VCT</td><td>AUTO</td></tr>
<tr><td>b.</td><td>1HS-40001A</td><td>VCT MAKEUP MODE SELECT</td><td>AUTO</td></tr>
<tr><td>c.</td><td>1-HS-40001B</td><td>VCT MAKEUP CONTROL</td><td>START</td></tr>
</table></td></tr>
<tr><td></td><td>OATC</td><td>4.2.13 IF BA TRANSFER PUMP was placed in START at Step 4.2.7, return to AUTO or as directed by SS.</td></tr>
<tr><td></td><td>OATC</td><td>4.2.14 Monitor RCS Tavg, source range count rate, and Reactor Power as applicable.</td></tr>
<tr><td></td><td>OATC</td><td>4.2.15 Operate the Pressurizer Back-up Heaters as necessary to equalize boron concentration between the RCS and the Pressurizer.</td></tr>
</table>

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Op-Test No.: 2012-301 **Scenario No.:** 3

Event No.: 6 Rapid Power Reduction boration steps

Event Description: Rapid Power Reduction boration steps from 13009.

Time	Position	Applicant's Action or Behavior
	OATC	4.2.16 Verify desired boration through sample analysis or from Boron Concentration Meter 1-1208-T6-006. (1-AI-40134)
		Return to EVENT 6, Rapid Power Reduction, page # 30, step 4.

Op-Test No.: 2012-301 **Scenario No.: 3** **Page 38 of 3**

Event No.: 6, Steps for Emergency Boration if crew opts to perform.

Event Description: Rapid Power Reduction Emergency Boration steps.

Time	Position	Applicant's Action or Behavior
		NOTE: Table 1 provides a convenient tool for checking Emergency Boration flow path alternatives.
	OATC	4.9.1 Emergency Boration Through 1-HV-8104
	OATC	4.9.1.1 Start one (1) Boric Acid Transfer Pump.
	OATC	4.9.1.2 Verify a Charging Pump is running.
	OATC	4.9.1.3 Open EMERGENCY BORATE valve 1-HV-8104.
		NOTE: The following step assumes that with 12 gpm of seal return, 30 gpm will be supplied to the RCS.
	OATC	4.9.1.4 Place 1-FIC-0121 in MANUAL.
	OATC	4.9.1.5 Adjust 1-FIC-0121 to maintain flow greater than 42 gpm.
		NOTES: • IPC computer point for Boric Acid flow Rate is FO183 (GPM). • Computer point for Boric Acid Totalized Flow is UF0183 (Gallons)
	OATC	4.9.1.6 Verify Emergency Boration flow 1-FI-0183 greater than 30 gpm.

Event No.: 6, Steps for Emergency Boration if crew opts to perform.

Event Description: Rapid Power Reduction Emergency Boration steps.

Time	Position	Applicant's Action or Behavior
	OATC	4.9.1.7 If flow is less than 30 gpm, start the second Boric Acid Transfer Pump.
	OATC	4.9.1.8 Operate the Pressurizer Backup Heaters as necessary to equalize boron concentration between the RCS and the Pressurizer.
	OATC	4.9.1.9 Check plant conditions are consistent with the boration of the RCS: RCS Tavg may be dropping. NIS may be dropping.
	OATC	4.9.1.10 Determine the amount of boric acid required to allow termination of Emergency Boration.
		NOTE: Monitor Boric Acid Flow Rate computer point F0183. After flow has started the totalized flow should be reset by selecting "Reset Boric Acid Flow Totalizer" from the IPC System Menu.
	OATC	4.9.1.11 When the determined amount of boric acid has been added to the RCS, close 1-HV-8104.
	OATC	4.9.1.12 Return the Boric Acid Transfer Pumps to the desired system configuration.
	OATC	4.9.1.13 Restore 1-FIC-0121 to the AUTO position.

Op-Test No.: 2012-301 **Scenario No.: 3** **Page 40 of 3**

Event No.: 6, Steps for Emergency Boration if crew opts to perform.

Event Description: Rapid Power Reduction Emergency Boration steps.

Time	Position	Applicant's Action or Behavior
	OATC	4.9.1.14 Direct Chemistry to sample and report the RCS boron concentration, or monitor the Boron Meter 1-AI-40134 if available. **Return to EVENT 6, Rapid Power Reduction, page # 30, step 4.**

Op-Test No.: 2012-301 **Scenario No.: 3**

Event No.: 7

Event Description: A DBA SGTR will occur on SG # 1 with complications. The TDAFW steam supply from SG # 1 will not close requiring the crew to trip the TDAFW pump using the Trip and Throttle Valve. In addition, after depressurizing the RCS with PRZR spray to refill the PRZR and lower break flow, a PRZR spray will not close requiring the crew to stop RCP # 4.

Time	Position	Applicant's Action or Behavior
	CREW	Performs Immediate Operator Actions per 19000-C, E-0 Reactor Trip or Safety Injection.
	SS	Makes a page announcement of Reactor Trip.
	OATC	1. Check Reactor Trip: **(YES)** • Rod Bottom Lights – LIT • Reactor Trip and Bypass Breakers – OPEN • Neutron Flux – LOWERING
	UO	2. Check Turbine Trip: **(YES)** • All Turbine Stop Valves – CLOSED
	UO	3. Check Power to AC Emergency Buses. **(YES)** a. AC Emergency Busses – AT LEAST ONE ENERGIZED. • 4160 AC 1E Busses b. AC Emergency Busses – ALL ENERGIZED. • 4160V AC 1E Busses • 480V AC 1E Busses
	OATC	4. Check if SI is actuated. **(YES)** • Any SI annunciators – LIT • SI ACTUATED BPLP window – LIT
	SS	Go to Step 6.

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Op-Test No.: 2012-301 **Scenario No.: 3**

Event No.: 7

Event Description: A DBA SGTR will occur on SG # 1 with complications. The TDAFW steam supply from SG # 1 will not close requiring the crew to trip the TDAFW pump using the Trip and Throttle Valve. In addition, after depressurizing the RCS with PRZR spray to refill the PRZR and lower break flow, a PRZR spray will not close requiring the crew to stop RCP # 4.

Time	Position	Applicant's Action or Behavior
	SS CREW	6. Initiate the Foldout Page.
	SS OATC UO	7. Perform the following: • OATC Initial Actions Page (**Note to examiner**, start page 43) • UO Initial Actions Page (**Note to examiner**, start page 46) **NOTE: SS initiates step 8 after OATC/UO Initial Actions completed.**

Op-Test No.: 2012-301 **Scenario No.: 3**

Event No.: 7

Event Description: A DBA SGTR will occur on SG # 1 with complications. The TDAFW steam supply from SG # 1 will not close requiring the crew to trip the TDAFW pump using the Trip and Throttle Valve. In addition, after depressurizing the RCS with PRZR spray to refill the PRZR and lower break flow, a PRZR spray will not close requiring the crew to stop RCP # 4.

Time	Position	Applicant's Action or Behavior
	OATC	**PERFORMS OATC INITIAL ACTIONS** 1. Check both trains of ECCS equipment – ALIGNING FOR INJECTION PHASE: **(YES)** • MLB indication
	OATC	2. Check Containment Isolation Phase A – ACTUATED. **(YES)** • CIA MLB indication
	OATC	3. Check ECCS Pumps and NCP status: a. CCPs RUNNING. **(YES)** b. SI Pumps – RUNNING. **(YES)** c. RHR pumps – RUNNING. **(YES)** d. NCP – TRIPPED. **(YES)**
	OATC	4. Verify CCW Pumps – ONLY TWO RUNNING TRAIN B. **(YES)**

Op-Test No.: 2012-301 **Scenario No.: 3**

Event No.: 7

Event Description: A DBA SGTR will occur on SG # 1 with complications. The TDAFW steam supply from SG # 1 will not close requiring the crew to trip the TDAFW pump using the Trip and Throttle Valve. In addition, after depressurizing the RCS with PRZR spray to refill the PRZR and lower break flow, a PRZR spray will not close requiring the crew to stop RCP # 4.

Time	Position	Applicant's Action or Behavior
	OATC	**PERFORMS OATC INITIAL ACTIONS** 5. Verify proper NSCW system operation: **(YES)** a. NSCW Pumps – ONLY TWO RUNNING PER TRAIN. b. NSCW TOWER RTN HDR BYPASS BASIN hand switches – IN AUTO: • HS-1669A • HS-1668A
	OATC	6. Verify Containment Cooling Units: **(YES)** a. ALL RUNNING IN LOW SPEED. **(YES)** • MLB indication b. NSCW Cooler isolation valves – OPEN. **(YES)** • MLB indication
	OATC	7. Check Containment Ventilation Isolation. a. Dampers and Valves – CLOSED. **(YES)**

Op-Test No.: 2012-301 **Scenario No.: 3**

Event No.: 7

Event Description: A DBA SGTR will occur on SG # 1 with complications. The TDAFW steam supply from SG # 1 will not close requiring the crew to trip the TDAFW pump using the Trip and Throttle Valve. In addition, after depressurizing the RCS with PRZR spray to refill the PRZR and lower break flow, a PRZR spray will not close requiring the crew to stop RCP # 4.

Time	Position	Applicant's Action or Behavior
	OATC	**PERFORMS OATC INITIAL ACTIONS** 8. Check Containment pressure – REMAINED LESS THAN 21 PSIG. **(YES)**
	OATC	9. Check ECCS flows: a. BIT flow **(YES)** b. RCS pressure – LESS THAN 1625 PSIG. **(YES)** c. SI Pump flow. (YES) d. RCS pressure – LESS THAN 300 PSIG. **(NO)** RNO d. Go to Step 10.
	OATC	10. Check ECCS Valve alignment – PROPER INJECTION LINEUP INDICATED ON MLBs. **(YES)**
	OATC	11. Check ACCW pumps – AT LEAST ONE RUNNING. **(YES)**
	OATC	12. Adjust Seal Injection flow to all RCPs – 8 to 13 GPM.
	OATC	13. Dispatch Operator to ensure one train of SPENT FUEL POOL COOLING in service per 13719, SPENT FUEL POOL COOLING AND PURIFICATION SYSTEM. **END OF OATC INITIAL ACTIONS – RETURNS TO MAIN BODY OF 19000-C CONTINUING AT STEP 8, page # 49.**

Op-Test No.: 2012-301 **Scenario No.: 3**

Event No.: 7

Event Description: A DBA SGTR will occur on SG # 1 with complications. The TDAFW steam supply from SG # 1 will not close requiring the crew to trip the TDAFW pump using the Trip and Throttle Valve. In addition, after depressurizing the RCS with PRZR spray to refill the PRZR and lower break flow, a PRZR spray will not close requiring the crew to stop RCP # 4.

Time	Position	Applicant's Action or Behavior
	UO	**PERFORMS UO INITIAL ACTIONS** 1. Check AFW Pumps – RUNNING. **(YES)** • MDAFW Pumps • TDAFW Pump, if required.
	UO	2. Check NR level in at least one SG – GREATER THAN 10%. (32% ADVERSE). **(YES)**
	UO	3. Check if main steamlines should be isolated: **(NO)** a. Check for one of more of the following conditions: __ Any steamline pressure LESS THAN OR EQUAL TO 585 PSIG. __ Containment pressure – GREATER THAN 14.5 PSIG. __ Low Steam Pressure SI/SLI – BLOCKED AND High Steam Pressure Rate – ON TWO OR MORE CHANNELS OF ANY STEAMLINE. RNO a. Go to Step 4.

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Op-Test No.: 2012-301 **Scenario No.: 3**

Event No.: 7

Event Description: A DBA SGTR will occur on SG # 1 with complications. The TDAFW steam supply from SG # 1 will not close requiring the crew to trip the TDAFW pump using the Trip and Throttle Valve. In addition, after depressurizing the RCS with PRZR spray to refill the PRZR and lower break flow, a PRZR spray will not close requiring the crew to stop RCP # 4.

Time	Position	Applicant's Action or Behavior
	UO	**PERFORMS UO INITIAL ACTIONS** 4. Verify FW Isolation Valves closed: **(YES)** • MFIVs • BFIVs • MFRVs • BFRVs
	UO	5. Verify SG Blowdown isolated: **(YES)** • Place SG Blowdown Isolation Valve handswitches HS-7603A, B, C, and D in the CLOSE position. • SG Sample Isolation Valves – CLOSED.
	UO	6. Verify Diesel Generators – RUNNING. **(YES)**
	UO	7. Throttle total AFW flow as necessary to maintain SG NR levels between 10% (32% ADVERSE) and 65%.
	UO	8. Verify both MFPs – TRIPPED. **(YES)**

Op-Test No.: 2012-301 **Scenario No.: 3**

Event No.: 7

Event Description: A DBA SGTR will occur on SG # 1 with complications. The TDAFW steam supply from SG # 1 will not close requiring the crew to trip the TDAFW pump using the Trip and Throttle Valve. In addition, after depressurizing the RCS with PRZR spray to refill the PRZR and lower break flow, a PRZR spray will not close requiring the crew to stop RCP # 4.

Time	Position	Applicant's Action or Behavior
	UO	9. Check Main Generator Output Breakers – OPEN. **(YES)**
	OATC UO	**BACK TO 19000-C PROCEDURE MAIN BODY, page # 49.**

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Op-Test No.: 2012-301 **Scenario No.: 3**

Event No.: 7

Event Description: A DBA SGTR will occur on SG # 1 with complications. The TDAFW steam supply from SG # 1 will not close requiring the crew to trip the TDAFW pump using the Trip and Throttle Valve. In addition, after depressurizing the RCS with PRZR spray to refill the PRZR and lower break flow, a PRZR spray will not close requiring the crew to stop RCP # 4.

Time	Position	Applicant's Action or Behavior
	CREW	8. Initiate the Continuous Actions Page.
	OATC	9. Check RCS temperature stable at or trending to 557°F. -OR- Without RCP(s) running – RCS WR COLD LEG TEMPERATURES. RNO (IF needed) 9. IF temperature is less than 557°F and lowering, THEN perform the following as necessary: a. Stop dumping steam. b. Perform the following as appropriate: __ IF at least one SG NR level greater than 10% (32% ADVERSE), THEN lower total feed flow. -OR- __ IF all SG NR levels less than 10% (32% ADVERSE), THEN lower total feed flow to NOT less than 570 gpm. c. If cooldown continues, THEN close MSIVs and BSIVs. d. If temperature greater than 557°F and rising, THEN dump steam.

Op-Test No.: 2012-301 **Scenario No.:** 3

Event No.: 7

Event Description: A DBA SGTR will occur on SG # 1 with complications. The TDAFW steam supply from SG # 1 will not close requiring the crew to trip the TDAFW pump using the Trip and Throttle Valve. In addition, after depressurizing the RCS with PRZR spray to refill the PRZR and lower break flow, a PRZR spray will not close requiring the crew to stop RCP # 4.

Time	Position	Applicant's Action or Behavior
	OATC	**CAUTION:** A PRZR PORV Block Valve which was closed to isolate an excessively leaking or open PRZR PORV should not be opened unless used to prevent challenging the PRZR Safeties. 10. Check PRZR PORVs, Block Valves, and Spray Valves: a. PRZR PORVs – CLOSED AND IN AUTO. **(YES)** b. Normal PRZR Spray Valves – CLOSED. **(YES)** c. Power to at least one Block Valve – AVAILABLE. **(YES)** d. PRZR PORV Block Valves – AT LEAST ONE OPEN. **(NO)** RNO d. Verify open at least one PRZR PORV Block Valve when PRZR pressure is greater than 2185 psig.
	OATC	11. Check if RCPs should be stopped: a. ECCS Pumps – AT LEAST ONE RUNNING: **(YES)** • CCP or SI Pump b. RCS pressure – LESS THAN 1375 PSIG. **(NO)** RNO b. Go to Step 12. **Note to examiner:** It is expected RCP pressure will be above 1375 psig at this time.

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Op-Test No.: 2012-301 **Scenario No.: 3**

Event No.: 7

Event Description: A DBA SGTR will occur on SG # 1 with complications. The TDAFW steam supply from SG # 1 will not close requiring the crew to trip the TDAFW pump using the Trip and Throttle Valve. In addition, after depressurizing the RCS with PRZR spray to refill the PRZR and lower break flow, a PRZR spray will not close requiring the crew to stop RCP # 4.

Time	Position	Applicant's Action or Behavior
	UO	12. Check SGs secondary pressure boundaries: a. SG Pressures: __ Any lowering in an uncontrolled manner. **(NO)** -OR- __ Any completely depressurized. **(NO)** RNO a. Go to Step 13.

Op-Test No.: 2012-301 **Scenario No.: 3**

Event No.: 7

Event Description: A DBA SGTR will occur on SG # 1 with complications. The TDAFW steam supply from SG # 1 will not close requiring the crew to trip the TDAFW pump using the Trip and Throttle Valve. In addition, after depressurizing the RCS with PRZR spray to refill the PRZR and lower break flow, a PRZR spray will not close requiring the crew to stop RCP # 4.

Time	Position	Applicant's Action or Behavior
	UO	13. Check SG Tubes intact: a. Direct Chemistry to take periodic activity samples of all SGs one at a time. b. Secondary Radiation – NORMAL. **(NO)** • MAIN STEAM LINE MONITORS • RE-13120 (SG1) • RE-13121 (SG2) • RE-13122 (SG3) • RE-13119 (SG4) • CNDSR AIR EJCTR/STM RAD MONITORS: • RE-12839 • RE-12839D (if on scale) • RE-12839E (if on scale) • STM GEN LIQ PROCESS RAD: • RE-0019 (Sample) • RE-0021 (Blowdown) • SG sample radiation: RNO b. Go to 19030-C, E-3 STEAM GENERATOR TUBE RUPTURE. **Note to examiner:** 19030-C, E-3 SGTR actions are on following attachment.

Op-Test No.: 2012-301 **Scenario No.:** 3

Event No.: 7

Event Description: DBA SGTR actions from 19030-C, E-3 STEAM GENERATOR TUBE RUPTURE

Time	Position	Applicant's Action or Behavior
	CREW	1. Initiate the following: • Continuous Actions and Foldout Page. • Critical Safety Function Status Trees per 19200-C, F-O CRITICAL SAFETY FUNCITON STATUS TREE.
	SS	2. Initiate NMP-EP-110, EMERGENCY CLASSIFICATION DETERMINATION AND INITIAL ACTION.
	OATC	3. Maintain Seal Injection flow to all RCPs – 8 to 13 GPM.
	OATC	4. Check if RCPs should be stopped: a. ECCS Pumps – AT LEAST ONE RUNNING: **(YES)** __ CCP or Sip Pump b. RCS pressure – LESS THAN 1375 PSIG. **(NO)** RNO b. IF RCS pressure lowers to less than 1375 psig prior to initiation of RCS cooldown in Step 17. THEN stop all RCPs and return to Step in effect. Go to Step 5.

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Op-Test No.: 2012-301 **Scenario No.:** 3

Event No.: 7

Event Description: **DBA SGTR actions from 19030-C, E-3 STEAM GENERATOR TUBE RUPTURE**

Time	Position	Applicant's Action or Behavior
	UO	5. Identify ruptured SG(s) by any of the following conditions. **Unexpected rise in any SG NR level.** High radiation from any SG sample. High radiation from any SG steamline. High radiation from any SG blowdown line. **Note to examiner:** SG # 1 level will be rising with AFW flow throttled. However, this is a hard call for the candidate until the TDAFW steam supply is isolated in later steps since steam is being supplied to the TDAFW pump causing the level rise to NOT be as pronounced.
		CAUTION: At least one SG should be maintained available for RCS cooldown.
	UO *Critical*	6. Isolate ruptured SG(s): **a. Adjust ruptured SG ARV(s) controller setpoint to 1160 psig (pot setting 7.73)** b. Check ruptured SG ARV(s) – CLOSED. __ **PV-3000 (SG 1)** __ PV-3010 (SG 2) __ PV-3020 (SG 3) __ PV-3030 (SG 4)

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Op-Test No.: 2012-301 **Scenario No.:** 3

Event No.: 7

Event Description: DBA SGTR actions from 19030-C, E-3 STEAM GENERATOR TUBE RUPTURE

Time	Position	Applicant's Action or Behavior
		CAUTION: If TDAFW Pump is the only available AFW pump, maintain at least one steam supply OPEN.
	UO	7. Close affected TDAFW Pump Steam supply valve(s): HV-3009 (SG 1) LP-1 MS SPLY TO AUX FW TD PMP-1. HV-3019 (SG 2) LP-2 MS SPLY TO AUX FW TD PMP-1. **Note to examiner:** HV-3009 will **NOT** close. RNO
	Critical	**7. IF at least one MDAFW Pump running, THEN trip the TDAFW Pump by closing PV-15129 using HS-15111.**
	UO **Critical**	**8. Verify SG Blowdown Isolation Valves – CLOSED WITH HANDSWITCHES IN CLOSE POSTION.** **Note to examiner: HV-7603A.**
	OATC **Critical**	**9. Isolate flow from the ruptured SG(s) by closing its Main Steamline isolation and Bypass Valves.** **Note to examiner: HV-3006A / B, HV-13006A / B.**

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Op-Test No.: 2012-301 **Scenario No.:** 3

Event No.: 7

Event Description: DBA SGTR actions from 19030-C, E-3 STEAM GENERATOR TUBE RUPTURE

Time	Position	Applicant's Action or Behavior
		CAUTIONS: • This procedure should be performed in a timely manner to assure that break flow in the ruptured SG(s) is terminated before water enters the SGs main steam piping. • Any ruptured SG that is also faulted, should remain isolated during subsequent recovery actions unless needed for RCS cooldown or SG activity sample.
	UO *Critical*	10. Check ruptured SG(s) level: a. SG NR level – GREATER THAN 10% (32% ADVERSE). **(YES)** b. Step feed flow to ruptured SG(s). **Close the TDAFW and MDAFW valves to SG # 1.** **(Note to examiner: 1HS-5122A and 1HS-5139A)**
	UO	11. Check ruptured SG(s) pressure – GREATER THAN 290 PSIG. **(YES)**
		NOTE: When the low steamline pressure SI/SLI is blocked, main steamline isolation will occur is the high steam pressure rate setpoint is exceeded.

Op-Test No.: 2012-301 **Scenario No.:** 3

Event No.: 7

Event Description: DBA SGTR actions from 19030-C, E-3 STEAM GENERATOR TUBE RUPTURE

Time	Position	Applicant's Action or Behavior
		12. Check if low steamline pressure SI/SLI should be blocked:
	UO	a. Steam dumps – AVAILABLE. **(YES)**
	OATC	b. PRZR pressure – LESS THAN 2000 PSIG. **(YES)**
	UO	c. High steam pressure rate alarms – CLEAR. **(YES)**
	UO	d. Block low steam line pressure SI/SLI using the following: • HS-40068 • HS-40069
	UO	13. Align steam Dumps for RCS cooldown:
		a. IF Steam Dumps are in T AVG mode, **(YES)** THEN
	UO	1) Match demand on SG Header Pressure Controller PIC-507 and SD demand meter UI-500.
	UO	2) Transfer Steam Dumps to STM PRESS mode using HS-500C.
		b. RCS temperature – GREATER THAN 550°F.
	UO	c. As RCS cooldown is initiated, hold HS-0500A and HS-0500B in the BYPASS INTERLOCK position until RCS temperature is less than 550°F.
	UO	14. Raise intact SG levels prior to maximum rate cooldown.

Op-Test No.: 2012-301 **Scenario No.:** 3

Event No.: 7

Event Description: DBA SGTR actions from 19030-C, E-3 STEAM GENERATOR TUBE RUPTURE

Time	Position	Applicant's Action or Behavior
	OATC	15. Check at least one RCP – RUNNING. **(YES)**
	SS	16. Determine required core exit temperature for cooldown.

Lowest Ruptured SG Pressure (psig)	Core Exit Temperature (°F)
1200 and greater	530
1100 to 1199	518
1000 to 1099	506
900 to 999	493
800 to 899	479
700 to 799	463
600 to 699	445
500 to 599	424
400 to 499	399
300 to 399	366
290 to 299	350

Note to examiner: Expect to pick either 518 or 506.

Op-Test No.: 2012-301 **Scenario No.:** 3

Event No.: 7

Event Description: DBA SGTR actions from 19030-C, E-3 STEAM GENERATOR TUBE RUPTURE

Time	Position	Applicant's Action or Behavior
	UO	17. Initiate RCS cooldown: a. Dump steam to Condenser from intact SG(s) at maximum rate using Steam Dumps by slowly raising demand on PIC-507.
	OATC	18. Check if RCS cooldown should be stopped: a. Core Exit TCs – LESS THAN REQUIRED TEMPERATURE. **(NOT AT THIS TIME)** RNO a. WHEN core exits are less than required, THEN perform steps 18.b and 18.c. **Note to examiner:** This will take several minutes to reach CET target temperate of either 518 or 506.
	UO	b. Stop RCS cooldown. c. Maintain Core Exit TCs – LESS THAN REQUIRED TEMPERATURE. **Note to examiner:** The UO will use steam dumps to maintain.

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Op-Test No.: 2012-301 **Scenario No.:** 3

Event No.: 7

Event Description: **DBA SGTR actions from 19030-C, E-3 STEAM GENERATOR TUBE RUPTURE**

Time	Position	Applicant's Action or Behavior
	UO	19. Check intact SG levels: a. NR level – AT LEAST ONE GREATER THAN 10%. (32% ADVERSE) **(YES)** b. Maintain NR levels between 10% (32% ADVERSE) and 65%. c. NR level – ANY RISING IN AN UNCONTROLLED MANNER. **(NO)** RNO c. Go to Step 20.
	OATC	20. Check PRZR PORVs and Block Valves: a. Power to PRZR PORV Block Valves – AVAILABLE. **(YES)** b. PRZR PORVs – CLOSED. **(YES)** c. PRZR PORV Block Valves – AT LEAST ONE OPEN. **(NO)** RNO c. IF Block Valve NOT closed to isolate an excessively leaking or open PRZR PORV, AND WHEN PRZR pressure is greater than 2185 psig, THEN verify open at least one PRZR PORV Block Valve.

Op-Test No.: 2012-301 **Scenario No.:** 3

Event No.: 7

Event Description: DBA SGTR actions from 19030-C, E-3 STEAM GENERATOR TUBE RUPTURE

Time	Position	Applicant's Action or Behavior
		CAUTIONS: If offsite power is lost after SI reset, action is required to restart the following ESF equipment if plant conditions require their operation. • RHR Pumps • SI Pumps • Post-LOCA Cavity Purge Units • Containment Coolers in low speed (Started in high speed on a UV signal) • ESF Chilled Water Pumps (If CRI is reset)
	OATC	21. Reset SI.
		CAUTION: Repositioning Phase A Isolation Valves may cause radiation problems throughout the plant.
	OATC	22. Reset Containment Isolation Phase A.

Op-Test No.: 2012-301 **Scenario No.:** 3

Event No.: 7

Event Description: DBA SGTR actions from 19030-C, E-3 STEAM GENERATOR TUBE RUPTURE

Time	Position	Applicant's Action or Behavior
	UO	23. Establish Instrument Air to Containment. a. Instrument Air pressure – GREATER THAN 100 PSIG. **(YES)** b. Open INSTR AIR CNMT ISO VLV HV-9378. **(YES)** c. Verify PRZR Spray Valves operating as required. **(YES)**
	OATC	24. Check if RHR Pumps should be stopped: a. RHR Pumps – ANY RUNNING WITH SUCTION ALIGNED TO RWST. **(YES)** b. RCS pressure – GREATER THAN 300 PSIG. **(YES)** c. Stop RHR Pumps.
	OATC	25. IF RCS pressure lowers in an uncontrolled manner to less than 300 psig. THEN restart RHR Pumps.

Op-Test No.: 2012-301 **Scenario No.:** 3

Event No.: 7

Event Description: DBA SGTR actions from 19030-C, E-3 STEAM GENERATOR TUBE RUPTURE

Time	Position	Applicant's Action or Behavior
	OATC	26. Check if RCS cooldown should be stopped. a. Core Exit TCs – LESS THAN REQUIRED TEMPERATURE. **(YES, depending on how fast crew is, if NO, the crew will wait until < 518 or 506 and stop the cooldown per the RNO of this step)** b. Stop RCS cooldown. c. Maintain Core Exit TCs – LESS THAN REQUIRED TEMPERATURE.
		CAUTION: Ruptured SG pressure and RCS subcooling should begin to rise as RCS pressure recovers after the cooldown is stopped.
	UO	27. Check ruptured SG(s) pressure – STABLE OR RISING. **(YES)**
	OATC	28. Check RCS Subcooling – GREATER THAN 44°F. (58°F ADVERSE) **(YES)**
	OATC	29. Check all of the following: RCS pressure – GREATER THAN RUPTURED SG(s) PRESSURE. **(YES)** PRZR level – LESS THAN 75% (52% ADVERSE). **(YES)** 30. Check Normal PRZR Spray – AVAILABLE. **(YES)**

Op-Test No.: 2012-301 **Scenario No.:** 3

Event No.: 7

Event Description: **DBA SGTR actions from 19030-C, E-3 STEAM GENERATOR TUBE RUPTURE**

Time	Position	Applicant's Action or Behavior
	OATC ***Critical***	31. Depressurize RCS using Normal PRZR Spray to refill PRZR. a. **Spray PRZR with maximum available spray.** **Note to examiner:** OATC must fully open BOTH spray valves to satisfy the critical step. b. Normal PRZR Spray – EFFECTIVE AT REDUCING RCS PRESSURE. **(YES)** c. Go to Step 37.
	OATC **Critical** **Critical** **Critical**	37. Check if ANY of the following conditions are satisfied. **BOTH** of the following: **1) RCS pressure – LESS THAN RUPTURED SG(s) PRESSURE.** **2) PRZR level – GREATER THAN 9%. (37% ADVERSE)** -OR- RCS Subcooling – LESS THAN 24oF (38°F ADVERSE) -OR- **PRZR level – GREATER THAN 75% (52% ADVERSE)** **Note to examiner:** Due to the nature of a DBA SGTR at Vogtle, it will be very close on whether it is BOTH RCP pressure & PRZR level as highlighted above OR PRZR level > 75% only. The OATC will close the spray valves based on the 1st parameter obtained.

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Op-Test No.: 2012-301 **Scenario No.:** 3

Event No.: 7

Event Description: DBA SGTR actions from 19030-C, E-3 STEAM GENERATOR TUBE RUPTURE

Time	Position	Applicant's Action or Behavior
	OATC	38. Terminate RCS depressurization: a. Verify Normal PRZR Spray valve(s) – CLOSED. **(NO)** RNO ***Critical*** **a. IF a Normal Spray valve can NOT be closed, THEN stop RCP 4.** **IF PRZR pressure continues lowering uncontrollably, THEN stop RCP 1.** **Note to examiner:** It is expected that RCS pressure will be rising after stopping RCP # 4. If NOT, then stopping RCP # 1 will also be a critical step. b. Verify PRZR PORV(s) CLOSED. **(YES)** c. Block COPS. d. Check Auxiliary Spray – IN SERVICE **(NO)** RNO d. Go to step 39.
	OATC	39. Check RCS pressure – RISING. **(YES)**
		CAUTION ECCS FLOW SHOULD BE TERMINATED when termination criteria are satisfied to prevent overfilling of the ruptured SGs.

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Op-Test No.: 2012-301 **Scenario No.:** 3

Event No.: 7

Event Description: DBA SGTR actions from 19030-C, E-3 STEAM GENERATOR TUBE RUPTURE

Time	Position	Applicant's Action or Behavior
	OATC	40. Check if ECCS flow should be terminated. a. RCS Subcooling – GREATER THAN 24°F (38°F ADVERSE) **(YES)** b. Secondary Heat Sink: UO Total feed flow to SGs – GREATER THAN 570 GPM AVAILABLE **(YES)** -OR- NR level in at least one intact SG – GREATER THAN 10% (32% ADVERSE) **(YES)** OATC c. RCS pressure – STABLE OR RISING. **(YES)** d. PRZR level – GREATER THAN 9% (37% ADVERSE) **(YES).**
	OATC	41. Stop ECCS Pumps and place in standby. • SI Pumps • All but one CCP
	OATC	42. Establish charging flow: a. Check Instrument Air – AVAILABLE. b. Open CCP normal miniflow isolation valves. • HV-8111A – CCP-A MINIFLOW • HV-8111B – CCP-B MINIFLOW • HV-8110 – CCP A & B COMMON MINIFLOW

Op-Test No.: 2012-301 **Scenario No.:** 3

Event No.: 7

Event Description: DBA SGTR actions from 19030-C, E-3 STEAM GENERATOR TUBE RUPTURE

Time	Position	Applicant's Action or Behavior
	OATC	42. continued c. Close CCP alternate miniflow valves: • HV-8508A – CCP-A RV TO RWST ISOLATION • HV-8508B – CCP-B RV TO RWST ISOLATION d. Verify white Pressure Control Mode light – NOT LIT: • HV-8508A – CCP-A RV TO RWST ISOLATION • HV-8508B – CCP-B RC TO RWST ISOLATION e. Close BIT DISCH ISOLATION VALVES: • HV-8801A • HV-8801B f. Set SEAL FLOW CONTROL HC-182 to maximum seal flow (HC-0182 closed). g. Open CHARGING TO RCS ISOLATION valves: • HV-8105 • HV-8106
	OATC	43. Control charging flow to maintain PRZR level and Seal injection flow to all RCPs – 8 to 13 GPM.

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Op-Test No.: 2012-301 **Scenario No.:** 3

Event No.: 7

Event Description: DBA SGTR actions from 19030-C, E-3 STEAM GENERATOR TUBE RUPTURE

Time	Position	Applicant's Action or Behavior
	OATC	44. Check ECCS flow not required: a. RCS Subcooling – GREATER THAN 24°F (38°F ADVERSE) **(YES)** b. PRZR level – GREATER THAN 9% (37% ADVERSE) **(YES)**
		END OF EVENT 7, END OF SCENARIO # 3.