Appendix D	Scenario Outline	Form ES-D-1

Facility: Vogtle Scenario No.: 1 Op-Test No.: 2012-301

Examiners: Meeks Operators: _____
Bates _____
Capehart _____

Initial Conditions: The plant is at 2 X 10^{-3}% power, EOL, Reactor startup in progress.
(Base IC # 16, snapped to IC # 181 for HL17 NRC Exam)

Equipment OOS: None

Turnover: Raise power to ~ 1 to 3% and continue power ascension. Containment mini-purge is in service for a Containment entry on the next shift.

Preloaded Malfunctions:

ES08 - Train A SI auto actuation failure.

ES16 - Train B SI auto actuation failure.

RH04A - Block Auto Start on RHR Pump A

RH01B - RHR pump B trip (conditional trigger with SI + 60 seconds).

ES25A - Mini-Purge dampers 1HV-2628B fails to automatically close

ES25B - Mini-Purge dampers 1HV-2629B fails to automatically close

CC04E - CCW pump # 5 auto contact failure.

Overrides

HS-40008 SI switch to NORMAL (Panel Map, C Panel, click on HS, override to normal).

Note to Simulator Instructor – Place Containment Mini-Purge in service.

NOTE to Simulator Instructor-After IC reset, cycle N31 and N32 Shutdown monitors from OFF to ON, these are NOT on switch check.

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	R-OATC R-SS N-UO	Raise power from 2 X 10^{-3}% to beyond the POAH per 12003-C. Unblocks SR Channels N31/N32 HFASA circuits, adjusts AFW flows.
T2	RC10C @ 100%	I-OATC I-SS TS-SS	Narrow Range Tcold fails high causing FV-0121 to throttle open. **LCO 3.3.1 FU 6, 7 Condition E and LCO 3.3.2 FU 5b Condition I**
T3	RM13122 @ 100%	I-NA TS-SS	Steam Generator # 3 Main Steam Line Radiation Monitor fails high **LCO 3.3.3 FU 15 Condition F**

Event No.	Malf. No.	Event Type*	Event Description
T4	MS03B @ 100%	C-UO C-SS	Steam Generator ARV Loop # 2 fails open.
T5	CC01A	C-UO C-SS TS-SS	CCW pump # 1 trips, standby pump fails to auto start. **INFO LCO 3.7.7**
T6	RP10A	C-OATC C-SS TS-SS	RCP # 1 High Vibration and manual RCP # 1 trip by operator. **LCO 3.4.4 Condition A**
T7	RC04A 0 to 25% with 60 second ramp	M-ALL	Small Break LOCA requires entry into 18004-C (~75 gpm) **LCO 3.4.13 Condition A** Ramp from 25% to 100% (~300 gpm over 20 seconds) when NRC chief examiner directs.
9	Preloaded	I-OATC I-SS **Critical**	**Auto SI fails to actuate, manual SI action from panel A2 required.**
10	Preloaded	C-OATC C-SS **Critical**	**RHR pump A fails to auto start and can be manually started. RHR pump B will trip shortly after SI actuates.**
11	Preloaded	C-UO C-SS **Critical**	**CNMT Mini-Purge Dampers fail to automatically close (HV-2628B and HV-2629B).**
T8	RC03A	M-ALL	Double-Ended pipe rupture at RCP discharge just after transition to E-1 prior to step 4 for RCP Trip Criteria.

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

Event 1:

Power is at 2 X 10-3% power and critical data has been taken. The crew will raise reactor power from the present level to beyond the POAH and continue power ascension.

Verifiable Actions:

OATC - Withdraw control rods to establish a positive SUR and raise power to between 1 to 3% as read on the Power Range Nuclear Instrumentation, then stabilize reactor power using control rods.

UO – Unblocks SR NIS Hi Flux at Shutdown.

UO – Controls AFW flow as the POAH is reached to control SG levels.

Event 2:

Loop # 3 NR Tcold fails high resulting in PRZR program level failing high. This will result in charging flow controller FV-0121 throttling open to raise PRZR level. There will be a PRZR LO LEVEL DEVIATION (ALB11 D01) annunciator to warn the crew that PRZR program level is failed high. If the crew does not have FIC-0121 in manual, when they defeat loop # 3 NR Tcold PRZR level will be high relative to program level, FIC-0121 will reduce to minimum causing a possible flashing of letdown.

Verifiable Actions:

OATC – Performs IOA of 18001-C section B and verifies rods are in manual.

OATC – Takes manual control of FV-121 and reduces demand to control charging flow.

OATC – Selects affected loop # 3 on both the Tavg and Delta T defeat switches.

OATC – Controls charging flow to restore program PRZR level and returns FV-121 to automatic if desired.

Technical Specifications:

LCO 3.3.1 Reactor Trip Instrumentation, FU 6, Condition E

LCO 3.3.1 Reactor Trip Instrumentation, FU 7, Condition E

LCO 3.3.2, Engineered Safety Features Actuation System (ESFAS), FU 5b, Condition I

Event 3:

Steam Generator # 3 Main Steam Line Radiation Monitor Fails High (1RE-13122)

Verifiable Actions:

None – This malfunction is an extra Technical Specification call for the SS. No board actions required.

Technical Specifications:

LCO 3.3.3 Post Accident Monitoring (PAM) Instrumentation, FU 15 Condition F

Event 4:

Steam Generator # 2 ARV PV-3010 pressure transmitter fails high resulting in PV-3010 opening causing a reactor power excursion and entry in AOP-18008-C, Secondary Steam Leak.

Verifiable Actions:

UO – Manually closes PV-3010 to isolate the secondary coolant steam release, stopping the power excursion.

OATC – Manually inserts/withdraws rods as necessary to match Tavg with Tref.

Technical Specifications:

None

Event 5:

CCW pump # 1 will trip with failure of standby CCW pump # 5 to automatically start.

Verifiable Actions:

UO – Manually starts CCW pump # 5

Technical Specifications:

INFO LCO 3.7.7 Component Cooling Water (CCW) System

Event 6:

RCP # 1 rising vibration with vibration alert alarm and high vibration alarms (Immediate Trip Criteria exceeded)

Verifiable Actions:

OATC – Starts RCP # 1 oil lift pump.

OATC – Trips RCP # 1 by opening the non-1E breaker first.

OATC – Places RCP # 1 spray valve in manual and closes RCP # 1 spray valve to prevent short cycling of the spray lines causing PRZR spray to be ineffective at PRZR control.

Technical Specifications:

LCO 3.4.4 RCS Loops – Modes 1 and 2, Condition A

Event 7, 9, 10, 11:

RCS Small Break LOCA of ~ 75 gpm, LOCA will increase to ~ 300 gpm requiring a Reactor trip and manual Safety Injection. At 300 gpm RCS pressure will slowly lower to ~ 1800 psig with SI injection flow present and PRZR level will be off scale low.

Verifiable Actions:

OATC – Manually Trips Reactor

OATC – Manually actuates SI using the hand switch on QMCB panel A2 (other switch is failed).

OATC – Manually starts RHR pump A during OATC Initial Operator Actions.

UO – Manually closes Containment Mini-Purge Dampers HV-2628B and HV-2629B.

Technical Specifications:

LCO 3.4.13 RCS Operational Leakage, Condition A.

Event 8:

Break turns into large break LOCA after entry into 19010-C and prior to step # 4 for RCP Trip Criteria.

Verifiable Actions:

OATC – Manually trips the RCPs after DBA LOCA in first steps of 19010-C.

NOTE to Examiners:

The natural procedure flow path at this point will progress until step 23 of E-1 to check for transition to 19012-C, ES-1.2 Post LOCA Cooldown and Depressurization which will NOT be met.
The procedure will transition you back to step 17 of 19010-C to wait for Cold Leg Recirculation criteria on RWST Lo-Lo Level to be met.

The scenario may be stopped after this point with chief examiner approval or sooner than the crew returning from step 23 to 17 if desired for time considerations.

CRITICAL TASKS:

1) **Manually actuates Safety Injection from QMCB panel A2 hand switch (the other switch will not function) by no later than step # 4 of 19000-C Immediate Operator Actions to ensure adequate core cooling during LOCA.**

2) **Manually starts RHR pump A no later than completion of the OATC Initial Operator Actions to ensure adequate ECCS injection flow for core cooling and recirculation capability during an ensuing DBA LOCA.**

3) **Manually close at least one CVI damper for Containment Mini-Purge which fail to automatically close ensuring termination of release flow path to the environment from Containment during a LOCA. Action must be performed by completion of Initial Operator Actions of 19000-C.**

Op-Test No.: 2012-301 **Scenario No.:** 1

Event No.: 1

Event Description: The Control Room Crew will perform actions necessary to continue the Reactor startup after criticality is achieved using procedure 12003-C. The OATC will need to withdraw control rods to establish a positive SUR and raise power to the POAH and continue power ascension.

Time	Position	Applicant's Action or Behavior
	SS	**NOTE:** The Tavg/Tref Deviation alarm, ALB12-A05, provides actions to maintain Tavg above 551oF, the minimum temperature for criticality.
	OATC SS	4.2.27 Monitor "Tavg/Tref Deviation" alarm, ALB12-A05, during the remainder of the startup and take corrective action as directed to maintain Tavg at 557°F ±2°F. (TS SR 3.4.2.1)
	UO	4.2.28 Unblock both Source Range channels HFASA circuits per 13501, "Nuclear Instrumentation System". (1) Source Range Channel N31 (2) Source Range Channel N32 13501-1 Nuclear Instrumentation System 4.2.2.2 To unblock the HF@SD Alarm: a. At the N31(N32) SHUTDOWN MONITOR, **reset** the HF@SD as follows: (1) IF source range indication is off scale high, **push** and **release** the TEST Pushbutton. (2) IF source range indication is on scale, **reset** the HF@SD ALARM SETPOINT per Step 4.2.1.1. b. At the N31(N32) Signal Processor Drawer: (1) **Place** the SR HF@SD Switch in NORMAL. (2) **Check** SR HF@SD red lamp not lit. c. At the QMCB, **check** the following annunciators extinguished:

Event No.: 1

Event Description: The Control Room Crew will perform actions necessary to continue the Reactor startup after criticality is achieved using procedure 12003-C. The OATC will need to withdraw control rods to establish a positive SUR and raise power to the POAH and continue power ascension.

Time	Position	Applicant's Action or Behavior
		(1) ALB10-B01 SOURCE RNG HI SHUTDOWN FLUX ALARM BLOCKED (2) ALB10-C01 SOURCE RANGE HI FLUX LEVEL AT SHUTDOWN d. **Verify** 14423-1(14424-1), "N31/N35(N32/N36) Signal Processor Channel Operational Test," has been performed satisfactorily in the last 92 days. e. **Notify** the SS that the HF@SD alarm has been returned to OPERABLE and to exit TS LCO 3.3.8 and TS LCO 3.9.2, IF entered.
	SS	12003-C 4.2.29 IF this Reactor startup was a dilution to criticality for LPPT, perform LPPT-GAE/GBE-01. ***This Step is N/A***
	OATC	4.2.30 Verify Power Range Channels indicating properly on recorder NR-45.
	SS OATC	NOTE A spike in startup rate (SUR) will occur when intermediate range nuclear instruments (N35 and N36) automatically swap from pulse counting to MSV mode at about 3 X 10-2% power (rising).
	SS OATC	**CAUTION** Ensure alternate indications of Reactor power level are observed to back up nuclear instrumentation readings.

Event No.: 1

Event Description: The Control Room Crew will perform actions necessary to continue the Reactor startup after criticality is achieved using procedure 12003-C. The OATC will need to withdraw control rods to establish a positive SUR and raise power to the POAH and continue power ascension.

Time	Position	Applicant's Action or Behavior
	OATC	4.2.31 Raise power to approximately 1% to 3%.
	UO	4.2.32 Verify steam dumps or, if applicable, S/G atmospheric relief valves, maintain Tavg at 557°F ±2°F.
	UO	4.2.33 Continue to power operation per 12004-C,"Power Operation (Mode 1)".
	SS	Transitions to UOP-12004-C 4.1.1 Obtain from the Control Room Mode Change Binder AND the Surveillance Tracking Coordinator all deferred (NOT performed) surveillance tests required for Mode 1 entry. a. Schedule AND perform those applicable test procedures PRIOR to Mode 1 entry. CAUTION: Reactor power shall remain less than 5% as read on highest reading PR NIS or highest reading Loop delta T, until all Mode 1 entry requirements have been met. 4.1.2 Slowly raise Reactor Power to 4%. **END OF EVENT 1.**

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Event No.: 2

Event Description: RCS NR Temperature Instrument TE-431B Fails High (Tcold) on loop # 3. This will require the OATC to perform IOAs by placing rods in MANUAL.

The crew will then enter AOP-18001 section B "Failure of RCS Narrow Range Temperature Instrumentation" to complete the corrective actions for this failure.

Time	Position	Applicant's Action or Behavior
	OATC	Diagnose NR Temperature Instrument Failure: (Loop 3 T_{COLD} TE-431B fails high) Symptoms / alarms: ALB12-A04 RC LOOP TAVG/AUCT TAVG HI-LO DEV ALB12-A05 TAVG TREF DEVIATION ALB12-A06 OVERTEMP ΔT ALERT ALB12-B04 AUCT TAVG HIGH ALB11-D01 PRZR LO LEVEL DEVIATION ALB10-E03 OVERTEMP ΔT ROD BLOCK AND RUNBACK ALERT Indications: • Loop 3 Tavg / Delta T indications deviating from other loops. • 1FIC-0121 Charging Flow Controller raising to maximum demand.
	OATC SS	***18001-C Section B*** **IMMEDIATE OPERATOR ACTION** B1. Place ROD BANK SELECTOR SWITCH in MAN position. Verifies immediate operator action step B1 with OATC.
	SS	Enters AOP 18001-C, Section B. (Crew Update)
	OATC	**Subsequent Actions** B2. Restore TAVG to program band. ***NOTE: The OATC should take manual control of charging per direction of ARP 17011, window D01 for PRZR LO LEVEL DEVIATION to prevent a charging transient after defeating the failed Tavg channel.* 18007-C is included if required.**
	OATC	B3. Select affected loop on TS-412T TAVG DEFEAT SEL ***Defeats 432***

Event No.: 2

Event Description: RCS NR Temperature Instrument TE-431B Fails High (Tcold) on loop # 3. This will require the OATC to perform IOAs by placing rods in MANUAL.

The crew will then enter AOP-18001 section B "Failure of RCS Narrow Range Temperature Instrumentation" to complete the corrective actions for this failure.

Time	Position	Applicant's Action or Behavior
		B4. Select affected loop on TS-411F DELTA T DEFEAT SEL. **Defeats *431***
	OATC	B5. Place ROD BANK SELECTOR SWITCH in AUTO position, if desired. ***NOTE: The OATC will leave rods in MANUAL for the power ascent.***
	SS	B6. Notify I & C to initiate repairs. Calls SS to perform the following: • Notify Operations Duty of AOP entry • Write a Condition Report • Notify Maintenance of the failure
	SS	B7. Bypass the affected instrument channel using 13509-C, BYPASS TEST INSTRUMENTATION (BTI) PANEL OPERATION, if desired. ***NOTE: Expect the SS will NOT bypass the channel.***
	SS	B8. Trip the affected channel bistables and place the associated MASTER TEST switches in TEST position per TABLE B1 within 72 hours. (TS 3.3.1 & 3.3.2) ***NOTE: The SS is expected to leave bistables untripped during the allowed out of service time to facilitate I&C trouble shooting of the failed channel.***

Event No.: 2

Event Description: RCS NR Temperature Instrument TE-431B Fails High (Tcold) on loop # 3. This will require the OATC to perform IOAs by placing rods in MANUAL.

The crew will then enter AOP-18001 section B "Failure of RCS Narrow Range Temperature Instrumentation" to complete the corrective actions for this failure.

<table>
<tr><th>Time</th><th>Position</th><th>Applicant's Action or Behavior</th></tr>
<tr><td></td><td>SS</td><td>B9. Initiate the applicable actions of:
• TS 3.3.1
• TS 3.3.2</td></tr>
<tr><td></td><td rowspan="2">SS</td><td>LCO 3.3.1 Function 6, 7 Condition E OTΔT Trip, OPΔT
<table>
<tr><th>CONDITION</th><th>REQUIRED ACTION</th><th>COMPLETION TIME</th></tr>
<tr><td>E. One channel Inoperable.</td><td>E.1 Place channel in trip.
OR
E.2 Be in MODE 3.</td><td>72 hours

78 hours</td></tr>
</table></td></tr>
<tr><td></td><td>LCO 3.3.2 Function 5b. Condition I FWI
<table>
<tr><th>CONDITION</th><th>REQUIRED ACTION</th><th>COMPLETION TIME</th></tr>
<tr><td>I. One channel Inoperable.</td><td>I.1 Place channel in trip.
OR
I.2 Be in MODE 3.</td><td>72 hours

78 hours</td></tr>
</table></td></tr>
<tr><td></td><td>OATC / UO</td><td>B10. Initiate the Continuous Actions Page.</td></tr>
<tr><td></td><td>SS</td><td>*B11. Check repairs and surveillances – COMPLETE. (NO)
RNO
*B11. Perform the following:
a. WHEN repairs and surveillances are complete, THEN perform Step B12.
b. Return to procedure and step in effect.
END OF EVENT 2.</td></tr>
</table>

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Event No.: 3

Event Description: Main Steam Line Rad Monitor 1RE-13122 Fails High

Time	Position	Applicant's Action or Behavior
	OATC UO SS	Alarms / Indications: • ALB05 B03 INTMD RADIATION ALARM • ALB05 C03 HIGH RADIATION ALARM • Safety Related Display Console (SRDC) 1RE-13122 High & Alert alarms. • IPC 1RE-13122 Step change to High Radiation.
	UO OATC	17005-1 B03 INTMD RADIATION ALARM **PROBABLE CAUSE** An alert condition on one or more of the Radiation Monitor Channels. **AUTOMATIC ACTIONS** NONE **INITITIAL OPERATOR ACTIONS** NONE **SUBSEQUENT OPERATOR ACTIONS** 1. Check the Safety Related Display Console (QRM2), the RMS Communications Console (QRM1) and the Plant Computer to determine the monitor in alarm and Go To 17100-1, "Annunciator Response Procedure For The Process And Effluent Radiation Monitor System (RMS)" or 17102-1, "Annunciataor Response Procedure For The Safety Related Display Control QRM2" as appropriate. 2. IF alarm is for 1-RE-2562A or C, refer to response for High Alarm in 17102-1. 3. Initiate a CR documenting Alarm condition. **COMPENSATORY OPERATOR ACTIONS** Monitor Plant Computer for radiation alarms if annunciators is inoperable or in solid.

Event No.: 3

Event Description: Main Steam Line Rad Monitor 1RE-13122 Fails High

Time	Position	Applicant's Action or Behavior
	OATC UO SS	17005-1 C03 HIGH RADIATION ALARM **PROBABLE CAUSE** A high alarm on one or more of the Radiation Monitor Channels. **AUTOMATIC ACTIONS** NONE **INITIAL OPERATOR ACTIONS** NONE **SUBSEQUENT OPERATOR ACTIONS** 1. Check the Safety Related Display Console (QRM2), the RMS Communications Console (QRM1) and the Plant Computer to determine the monitor in alarm and Go To 17100-1, "Annunciator Response Procedure For The Process And Effluent Radiation Monitor System (RMS)" or 17102-1, "Annunciataor Response Procedure For The Safety Related Display Control QRM2" as appropriate. 2. Initiate a CR documenting Alarm condition. **COMPENSATORY OPERATOR ACTIONS** Monitor Plant Computer for radiation alarms if annunciators is inoperable or in solid.

Event No.: 3

Event Description: Main Steam Line Rad Monitor 1RE-13122 Fails High

Time	Position	Applicant's Action or Behavior
	OATC UO SS	17102-1 CDCA C2 1-RE-13122 (RED LAMP LIT) (HIGH) NOTE: For other than HIGH conditions see pages 5 and 6. **PROBABLE CAUSE** 1. Steam Generator 3 tube rupture. 2. Equipment malfunction. AUTOMATIC ACTIONS NONE
	OATC UO SS	**INTITIAL OPERATOR ACTIONS** NOTE: Steam Line Radiation Monitor sensitivity is very low and they are not expected to provide indication for tube ruptures less than 1000 gpm with RCS DEQ I-131 concentrations below 1 uCi/gm. 1. Evaluate plant parameters to determine if a Steam Generator tube rupture is indicated. a. VCT makeup frequency and/or charging flow has increased. b. Pressurizer level and/or pressure has decreased. c. Steam Flow/Feed Flow mismatch and SG level response. 2. IF a Steam Generator tube rupture is verified, manually initiate reactor trip and SI and Go To 19000-C.

Event No.: 3

Event Description: Main Steam Line Rad Monitor 1RE-13122 Fails High

Time	Position	Applicant's Action or Behavior
	OATC UO SS	**SUBSEQUENT OPERATOR ACTIONS** 1. IF a Steam Generator tube rupture is NOT identified. a. Obtain detector trend data per 13508-1, "Radiation Monitoring Systems." b. Notify Health Physics of the alarm. c. Request Chemistry to sample and count Steam Generators and Condenser Off-Gas for activity. d. Monitor the channel for further changes. 2. IF sampling and analysis determine that Steam Generator tube leakage exists, Go To 18009-C, "Steam Generator Tube Leakage." 3. IF sampling and analysis determine the channel has malfunctioned. a. Comply with Technical Specification LCO 3.3.3 b. Request Chemistry to deactivate the channel. **COMPENSATORY OPERATOR ACTIONS** NONE
	OATC UO SS	LCO 3.3.3 Post Accident Monitoring (PAM) Instrumentation. FU 15 Steam Line Radiation Monitor. Required Channels – 1/steam line. Condition F – One Steam Line Radiation Monitor channel inoperable. Required Action – Restore the channel to OPERABLE status. Completion Time – 30 days. **END OF EVENT 3.**

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Event No.: 4

Event Description: SG #2 ARV Pressure Transmitter Fails High resulting in a fully opened ARV. The crew will respond by performing the actions of AOP 18008-C, "Secondary Coolant Leakage". The UO will be able to isolate the leak with manual operation of the ARV controller on the main control board.

Time	Position	Applicant's Action or Behavior
	UO	Diagnoses opening of SG ARV Loop 4 by the following indications: • ALB15-F01 MN STM SFTY VLVS LEAKING • ALB61-C01 MN STM SFTY VLVS LEAKING • ALB11-D01 PRZR LO LEVEL DEVIATION • High ARV tailpipe temperature (back panel indication). • SG #2 ARV position indicating lights Red – ON, Green – OFF. • Lowering RCS temperature. • Rising Reactor power. • SG #2 ARV controller indication. (RED UP ARROW LIT)
	SS	Enters AOP 18008-C, "Secondary Coolant Leakage."
	SS UO OATC UO	1. Perform the following as necessary: • Reduce Turbine load if any of the following indications exceed 100% power: __ UQ1118 (GREATER THAN 100% MWT for the applicable unit) __ NI's __ ΔTs • Isolate the leak. ***(UO closes SG ARV)*** • IF leakage is such that significant hazard to personnel or equipment exists OR leakage rate is unstable and is worsening, THEN: 1) Trip the reactor. 2) WHEN reactor trip is verified, THEN close MSIVs and BSIVs. 3) Go to 19000-C, E 0 REACTOR TRIP OR SAFETY INJECTION.
	OATC/UO	2. Initiate the Continuous Actions Page.

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Event No.: 4

Event Description: SG #2 ARV Pressure Transmitter Fails High resulting in a fully opened ARV. The crew will respond by performing the actions of AOP 18008-C, "Secondary Coolant Leakage". The UO will be able to isolate the leak with manual operation of the ARV controller on the main control board.

Time	Position	Applicant's Action or Behavior
	UO	*3. Monitor steam leakage characteristics: • Small in magnitude such that no significant hazard to personnel or equipment exists. **(YES)** • Leakage rate is relatively stable and is not rapidly worsening. **(YES)**
	OATC UO	4. Check the following: a. Tavg – MATCHED WITH TREF. **(YES)** b. PRZR level – IN PROGRAM BAND. **(YES)** c. PRZR pressure – BETWEEN 2220 AND 2250 PSIG. **(YES)** d. SG levels – IN PROGRAM BAND. **(YES)**
	UO	5. Check containment conditions - NORMAL: • Pressure **(YES)** • Temperature **(YES)** • Moisture **(YES)** • Sump level **(YES)**
	UO	6. Close SG blowdown isolation valves if the source of leakage is unknown.
	UO	*7. Check CSTs level – GREATER THAN 80%. **(YES)**
	UO	*8. Monitor hotwell makeup rate – SUFFICIENT TO MAINTAIN LEVEL. **(YES)**
	SS	9. Review applicable Technical Specification requirements. No LCO's.

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Event No.: 4

Event Description: SG #2 ARV Pressure Transmitter Fails High resulting in a fully opened ARV. The crew will respond by performing the actions of AOP 18008-C, "Secondary Coolant Leakage". The UO will be able to isolate the leak with manual operation of the ARV controller on the main control board.

Time	Position	Applicant's Action or Behavior
	SS	10. Perform one of the following: __Continue plant operation. **YES** -OR- __Commence a unit shutdown by initiating 12004 C, POWER OPERATION (MODE 1). **NO** **END OF EVENT 4.**

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Event No.: 5

Event Description: CCW pump # 1 trips with failure of CCW pump # 5 to automatically start.

Time	Position	Applicant's Action or Behavior
	CREW	Diagnoses CCW pump # 1 trip Symptoms / alarms: ALB36 A01 4160V SWGR 1AA02 TROUBLE ALB02 A06 CCW TRAIN A LO HDR PRESS ALB02 B06 CCW TRAIN A LO FLOW ALB02 D06 CCW TRAIN A RHR HX LO FLOW ALB02 E05 CCW TRAIN A RHR PMP SEAL LO FLOW
	SS	Enters AOP 18020-C Loss of Component Cooling Water.
	UO	1. Check CCW pumps in the affected train – TWO RUNNING. **(NO)** 1. RNO – Starts CCW pump # 5 on Train A.
	UO	2. Checks CCW train operation: • Flow – APPROXIMATELY 9000 GPM. (YES) • Pressure – APPROXIMATELY 90 PSIG.
	SS	3. Returns to procedure and step in effect.
	SS	INFO LCO 3.7.7 Component Cooling Water (CCW) System. **END OF EVENT 5.**

Event No.: 6

Event Description: RCP # 1 High Vibration with RCP # 1 manual trip.

Time	Position	Applicant's Action or Behavior
	OATC	Symptoms / Alarms: ALB08 E03 RCP 1 VIBRATION ALERT ALB08 E05 RCP VIBRATION HIGH (1 minute later)
	CREW	17005-1 E03 / E05 1. Dispatch an operator to the Vibration Monitoring Panel 1-1201-P5-VMP to: a. Check both vibration channels and alarm setpoints for shaft and frame of RCP 1 (4 points in all) to verify no obvious vibration monitoring equipment problems exist. b. Notify maintenance to verify alarm condition. c. Log any RCP Vibration LEDs illuminated and any elevated vibration readings in Control Room Electronic Log. **NOTE:** Simbooth Operator will report back the following: • 22 mils shaft and rising • 5.5 mils frame and rising **NOTE:** Simbooth Operator will report back the following for the previous shifts rounds **IF** asked. • 7 mils shaft. • 0.468 mils frame.
	SS	Refers to 13003-1, "Reactor Coolant Pump Operation"

Event No.: 6

Event Description: RCP # 1 High Vibration with RCP # 1 manual trip.

Time	Position	Applicant's Action or Behavior
	OATC	13003-1 PRECAUTION 2.2.10 An RCP shall be stopped if any of the following conditions exist. • RCP shaft vibration of 20 mils or greater. • RCP frame vibration of 5 mils of greater. 4.3.1 RCP Shutdown **CAUTION:** If RCP # 1 or # 4 is to be stopped, the associated Spray Valve is placed in manual and closed to prevent spray short cycling.
	OATC	4.3.1.1 IF RCP # 1 or # 4 is to be stopped, place the associated spray valve in MANUAL and close the valve: • RCP 1: 1-PIC-0455C (OATC will close this valve) • RCP 4: 1-PIC-0455B (OATC will leave this valve alone)
	OATC	4.3.1.2 IF in Modes 1 or 2, perform an RCP shutdown as follows: a. Start the RCP Oil Lift Pump for affected RCP, if available. b. IF Reactor Power is Greater than 15% Rated Thermal Power: **(It is NOT, this step is N/A)** **c.** IF Reactor Power is less than 15% Rated Thermal Power **(IT IS)** (1) Stop the RCP by placing its Non-1E Control Switch in STOP and then placing its 1E Control Switch in STOP: RCP Non-1E Control Switch 1E Control Switch Loop 1 1-HS-0495B 1-HS-0495A (2) Initiate 18005-C, "Partial Loss of Flow."

Event No.: 6

Event Description: RCP # 1 High Vibration with RCP # 1 manual trip.

Time	Position	Applicant's Action or Behavior
	OATC	**NOTE:** When stopping the last RCP, its Oil Lift Pump needs to run for at least 10 minutes after stopping the RCP. 4.3.1.4 WHEN the RCP has coasted to a stop (as indicated by reverse flow), stop the RCP Oil Lift Pump.
	SS	18005-C 1. Check Reactor power – LESS THAN OR EQUAL TO 15%. **(YES)**
	SS	2. Stop any power changes in progress. 3. Initiate the Continuous Actions Page.
	UO	4. Check affected loop SG NR Level – TRENDING TO 65%. **(NO)** RNO – Control feed flow to maintain affected loop SG NR level between 60% and 70%.
	OATC	5. Check Tavg – TRENDING TO PROGRAM. **(YES)** 6. Verify PRZR level – TRENDING TO PROGRAM. **(YES)** 7. Verify PRZR pressure – TRENDING TO 2235 PSIG. **(YES)** 8. Check RCP 1 and RCP 4 – RUNNING. **(NO)** RNO – Close the affected loop spray valve: • Loop 1: PIC-0455C
	SS	9. Initiate shutdown to Mode 3 by initiating 12004-C, POWER OPERATION (MODE 1). (TS 3.4.4)
	SS	10. Determine and correct the cause of the pump trip.

Event No.: 6

Event Description: RCP # 1 High Vibration with RCP # 1 manual trip.

Time	Position	Applicant's Action or Behavior
	SS	11. Check shutdown to Mode 3 – COMPLETE. RNO – Return to step 9.
		END OF EVENT 6.

Op-Test No.: 2012-301 **Scenario No.:** 1

Event No.: 7

Event Description: RCS leakage will develop that is within the capacity of the normal charging flow path to maintain PRZR level and pressure. The crew will be required to enter AOP-18004 for RCS Leakage. The crew will determine an approximate leak rate of 75 gpm, then the leak will increase requiring a reactor trip with manual action by the OATC to actuate SI (auto SI fails). The OATC will also be required to manually start RHR pump A which will not auto start. The UO will be required to close HV-2628B and HV-2629B on CNMT Mini-Purge which will not auto close.

Time	Position	Applicant's Action or Behavior
	TEAM	Diagnoses an RCS leak has developed: Symptoms / alarms: • INTERMEDIATE AND HIGH RADIATION ALARMS Indications: • RE-2562 showing alarm condition on SRDC. • Charging – letdown flow mismatch. • PRZR level lowering.
	SS / TEAM	Enters AOP-18004-C section A for RCS Leakage (MODE 1, 2, AND 3 WITH RCS PRESSURE > 1000 PSIG) Step A1 – SS checks crew in proper section (section A). Step A2 - SS directs initiation of Continuous Actions page.
	OATC	Step A3 – Maintains PRZR level. Step A3a – adjusts charging flow to maintain PRZR level. Step A3b – Checks PRZR level stable or rising. **(NO)**

Event No.: 7

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Time	Position	Applicant's Action or Behavior
	OATC	RNO Step A3b b. Perform the following: 1) Isolate letdown by closing: a. Letdown Orifice Valves. b. Letdown Isolation Valves. c. Excess Letdown Valves. 2) Start an additional Charging Pump as necessary. 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.
	OATC	Step # A4 - Maintains VCT level using AUTO or MANUAL makeup.
	SS	Step # A5 – Notifies SM to implement EPIPs per NMP-EP-110.
	OATC	Step # A6 – Checks PRZR PORVs closed. Step # A7 – Checks PRZR Safety valves closed.
	SS / UO	Step # A8 – Stops any load changes in progress.

Event No.: 7

Event Description: RCS leakage will develop that is within the capacity of the normal charging flow path to maintain PRZR level and pressure. The crew will be required to enter AOP-18004 for RCS Leakage. The crew will determine an approximate leak rate of 75 gpm, then the leak will increase requiring a reactor trip with manual action by the OATC to actuate SI (auto SI fails). The OATC will also be required to manually start RHR pump A which will not auto start. The UO will be required to close HV-2628B and HV-2629B on CNMT Mini-Purge which will not auto close.

Time	Position	Applicant's Action or Behavior
	OATC	Step # A9 – Checks PRZR pressure trending to program.
	OATC	Step # A10 – Monitors CTMT pressure < 3.8 psig and stable.
	OATC	Step # A11 – Initiates an RCS leak rate in accordance with 14905. **NOTE:** The OATC should be able to determine by a rough leak balance that leak rate is approximately 75 gpm.
	SS	LCO 3.4.13 RCS Operational LEAKAGE. a. No pressure boundary LEAKAGE; b. 1 gpm unidentified LEAKAGE; c. 10 gpm identified LEAKAGE; d. 150 gallons per day primary to secondary LEAKAGE through any one steam generator (SG). Condition A – RCS operational LEAKAGE not within limits for reasons other than pressure boundary LEAKAGE or primary to secondary LEAKAGE. Required Action – Reduce LEAKAGE to within limits. Completion Time – 4 hours.
	Simbooth Operator	Increase leak severity to force a reactor trip and manual safety injection, due to lowering PRZR level and pressure when NRC examiner requests. May be earlier than step A11 for time considerations if NRC desires.

Event No.: 7

Event Description: RCS leakage will develop that is within the capacity of the normal charging flow path to maintain PRZR level and pressure. The crew will be required to enter AOP-18004 for RCS Leakage. The crew will determine an approximate leak rate of 75 gpm, then the leak will increase requiring a reactor trip with manual action by the OATC to actuate SI (auto SI fails). The OATC will also be required to manually start RHR pump A which will not auto start. The UO will be required to close HV-2628B and HV-2629B on CNMT Mini-Purge which will not auto close.

Time	Position	Applicant's Action or Behavior
	OATC	18004-C RNO Step A3b. (continuous action) b. Perform the following: 4) Start an additional Charging Pump as necessary. 5) IF PRZR level can NOT be maintained greater than 9%, THEN perform the following: a. Trip the Reactor.
	Critical	**NOTE: SI auto actuation will NOT occur, OATC must actuate.** **b. WHEN Reactor trip verified, THEN actuate SI.** c. Go to 19000-C, E-0 REACTOR TRIP OR SAFETY INJECTION.
	CREW SS	Performs Immediate Operator Actions per 19000-C, E-0 Reactor Trip or Safety Injection. 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

Event No.: 7

Event Description: RCS leakage will develop that is within the capacity of the normal charging flow path to maintain PRZR level and pressure. The crew will be required to enter AOP-18004 for RCS Leakage. The crew will determine an approximate leak rate of 75 gpm, then the leak will increase requiring a reactor trip with manual action by the OATC to actuate SI (auto SI fails). The OATC will also be required to manually start RHR pump A which will not auto start. The UO will be required to close HV-2628B and HV-2629B on CNMT Mini-Purge which will not auto close.

Time	Position	Applicant's Action or Behavior
	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 SS	4. Check if SI is actuated. **(YES)** • Any SI annunciators – LIT • SI ACTUATED BPLP window – LIT Go to Step 6
	SS CREW	6. Initiate the Foldout Page.
	SS OATC UO	7. Perform the following: • OATC Initial Actions Page. • UO Initial Actions Page. **NOTE: SS initiates step 8 after OATC/UO Initial Actions completed.**

Event No.: 7

Event Description: RCS leakage will develop that is within the capacity of the normal charging flow path to maintain PRZR level and pressure. The crew will be required to enter AOP-18004 for RCS Leakage. The crew will determine an approximate leak rate of 75 gpm, then the leak will increase requiring a reactor trip with manual action by the OATC to actuate SI (auto SI fails). The OATC will also be required to manually start RHR pump A which will not auto start. The UO will be required to close HV-2628B and HV-2629B on CNMT Mini-Purge which will not auto close.

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 **Critical**	3. Check ECCS Pumps and NCP status: a. CCPs RUNNING. (YES) b. SI Pumps – RUNNING. (YES) **NOTE: RHR pump B is tripped, RHR pump A failed to auto start.** c. **RHR Pumps – RUNNING. (NO)** **RNO** **c. Start pumps.** d. NCP – TRIPPED. **(YES)**
	OATC	4. Verify CCW Pumps – ONLY TWO RUNNING EACH TRAIN. **(YES)**

Event No.: 7

Event Description: RCS leakage will develop that is within the capacity of the normal charging flow path to maintain PRZR level and pressure. The crew will be required to enter AOP-18004 for RCS Leakage. The crew will determine an approximate leak rate of 75 gpm, then the leak will increase requiring a reactor trip with manual action by the OATC to actuate SI (auto SI fails). The OATC will also be required to manually start RHR pump A which will not auto start. The UO will be required to close HV-2628B and HV-2629B on CNMT Mini-Purge which will not auto close.

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 EACH TRAIN. b. NSCW TOWER RTN HDR BYPASS BASIN hand switches – IN AUTO: • HS-1668A • HS-1669A
	OATC	6. Verify Containment Cooling Units: **(YES)** a. ALL RUNNING IN LOW SPEED. • MLB indication b. NSCW Cooler isolation valves – OPEN. • MLB indication
	OATC **Critical**	**NOTE: HV-2628B and HV-2629B will NOT automatically close.** 7. Check Containment Ventilation Isolation. a. Dampers and Valves – CLOSED. • CVI MLB indication **(NOT ALL)** **RNO** **a. Perform the following** **1) Close Dampers and Valves.** 2) Start Piping Pen Units.

Event No.: 7

Event Description: RCS leakage will develop that is within the capacity of the normal charging flow path to maintain PRZR level and pressure. The crew will be required to enter AOP-18004 for RCS Leakage. The crew will determine an approximate leak rate of 75 gpm, then the leak will increase requiring a reactor trip with manual action by the OATC to actuate SI (auto SI fails). The OATC will also be required to manually start RHR pump A which will not auto start. The UO will be required to close HV-2628B and HV-2629B on CNMT Mini-Purge which will not auto close.

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.**

Event No.: 7

Event Description: RCS leakage will develop that is within the capacity of the normal charging flow path to maintain PRZR level and pressure. The crew will be required to enter AOP-18004 for RCS Leakage. The crew will determine an approximate leak rate of 75 gpm, then the leak will increase requiring a reactor trip with manual action by the OATC to actuate SI (auto SI fails). The OATC will also be required to manually start RHR pump A which will not auto start. The UO will be required to close HV-2628B and HV-2629B on CNMT Mini-Purge which will not auto close.

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.

Event No.: 7

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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)**
	UO **Critical**	9. Check Main Generator Output Breakers – OPEN. **(YES)** **NOTE TO EXAMINER:** The UO will be asked by the OATC / SS to close CVI dampers HV-2628B and HV-2629B that do NOT automatically close on the CVI signal. These dampers need to be closed by the end of the Operator Initial Actions (OATC or UO) prior to returning to step 8 of 19000-C main procedure body.

Event No.: 7

Event Description: RCS leakage will develop that is within the capacity of the normal charging flow path to maintain PRZR level and pressure. The crew will be required to enter AOP-18004 for RCS Leakage. The crew will determine an approximate leak rate of 75 gpm, then the leak will increase requiring a reactor trip with manual action by the OATC to actuate SI (auto SI fails). The OATC will also be required to manually start RHR pump A which will not auto start. The UO will be required to close HV-2628B and HV-2629B on CNMT Mini-Purge which will not auto close.

Time	Position	Applicant's Action or Behavior
	OATC UO	**BACK TO 19000-C PROCEDURE MAIN BODY** 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.

Event No.: 7

Event Description: RCS leakage will develop that is within the capacity of the normal charging flow path to maintain PRZR level and pressure. The crew will be required to enter AOP-18004 for RCS Leakage. The crew will determine an approximate leak rate of 75 gpm, then the leak will increase requiring a reactor trip with manual action by the OATC to actuate SI (auto SI fails). The OATC will also be required to manually start RHR pump A which will not auto start. The UO will be required to close HV-2628B and HV-2629B on CNMT Mini-Purge which will not auto close.

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 OPE.N **(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.

Event No.: 7

Event Description: RCS leakage will develop that is within the capacity of the normal charging flow path to maintain PRZR level and pressure. The crew will be required to enter AOP-18004 for RCS Leakage. The crew will determine an approximate leak rate of 75 gpm, then the leak will increase requiring a reactor trip with manual action by the OATC to actuate SI (auto SI fails). The OATC will also be required to manually start RHR pump A which will not auto start. The UO will be required to close HV-2628B and HV-2629B on CNMT Mini-Purge which will not auto close.

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.

Event No.: 7

Event Description: RCS leakage will develop that is within the capacity of the normal charging flow path to maintain PRZR level and pressure. The crew will be required to enter AOP-18004 for RCS Leakage. The crew will determine an approximate leak rate of 75 gpm, then the leak will increase requiring a reactor trip with manual action by the OATC to actuate SI (auto SI fails). The OATC will also be required to manually start RHR pump A which will not auto start. The UO will be required to close HV-2628B and HV-2629B on CNMT Mini-Purge which will not auto close.

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. **(YES)** • MAIN STEM 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: **c.** Check SG levels – ANY RISING IN AN UNCONTROLLED MANNER. **(NO)** RNO c. Go to Step 14.

Event No.: 7

Event Description: RCS leakage will develop that is within the capacity of the normal charging flow path to maintain PRZR level and pressure. The crew will be required to enter AOP-18004 for RCS Leakage. The crew will determine an approximate leak rate of 75 gpm, then the leak will increase requiring a reactor trip with manual action by the OATC to actuate SI (auto SI fails). The OATC will also be required to manually start RHR pump A which will not auto start. The UO will be required to close HV-2628B and HV-2629B on CNMT Mini-Purge which will not auto close.

Time	Position	Applicant's Action or Behavior
	CREW	14. Check if RCS is intact inside Containment. **(NO)** • Containment radiation – NORMAL **(NO)** • Containment pressure – NORMAL **(NO)** • Containment Emergency Recirculation Sump levels – NORMAL **(NO)** RNO 14. Go to 19010-C, E-1 LOSS OF REACTOR OR SECONDARY COOLANT.
	SS	Transitions to 19010-C, E-1 Loss of Reactor or Secondary Coolant. **THIS IS THE END OF EVENT 7.** **EVENT 8 and steps for 19010-C are on the following pages.** **NOTE: This will be a plausible alternate ending if the NRC Chief Examiner wishes to end the scenario at this point for time considerations as all Critical steps will have been performed at this time.**

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Event No.: 8

Event Description: Large break LOCA will occur just after transition to 19010-C, E-1 Loss of Reactor or Secondary Coolant. This will require the OATC to trip the RCPs due to RCS pressure will drop to CNMT pressure.

Time	Position	Applicant's Action or Behavior
	OATC UO	1. Initiate the following: • Continuous Actions and Foldout Page. • Critical Safety Function Status Trees per 19200-C, F-O CRITICAL SAFETY FUNCTION 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 SI Pump b. RCS pressure – LESS THAN 1375 PSIG. **(YES)** c. Stop all RCPs.
	OATC	5. Check ACCW Pumps – AT LEAST ONE RUNNING. **(YES)**
	UO	6. Place Containment Hydrogen Monitors in service by initiating 13130, POST-ACCIDENT HYDROGEN CONTROL. **NOTE to examiners: Crew may call C & T to perform this.**

Op-Test No.: 2012-301 **Scenario No.:** 1

Event No.: 8

Event Description: Large break LOCA will occur just after transition to 19010-C, E-1 Loss of Reactor or Secondary Coolant. This will require the OATC to trip the RCPs due to RCS pressure will drop to CNMT pressure.

Time	Position	Applicant's Action or Behavior
	UO	7. Check SGs secondary pressure boundaries: a. Identify faulted SG(s): __ ANY SG PRESSURE LOWERING IN AN UNCONTROLLED MANNER. **(NO)** -OR- __ ANY SG COMPLETELY DEPRESSURIZED. **(NO)** RNO a. Go to Step 8.
	UO	8. Check intact SG levels: a. NR level – AT LEAST ONE GREATER THAN 10% (32% ADVERSE. 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 9.

Event No.: 8

Event Description: Large break LOCA will occur just after transition to 19010-C, E-1 Loss of Reactor or Secondary Coolant. This will require the OATC to trip the RCPs due to RCS pressure will drop to CNMT pressure.

Time	Position	Applicant's Action or Behavior
	UO	9. Check SG Tubes intact: a. Direct Chemistry to take periodic activity samples of all SGs one at a time. b. Secondary radiation – NORMAL. **(YES)** • MAIN STM LINE MONITORS • RE-13120 (SG 1) • RE-13121 (SG 2) • RE-13122 (SG 3) • RE-13119 (SG 4) • CNDSR AIR EJCTR/STM RAD MONITORS • RE-12839C • RE-12839D (if on scale) • RE-12839E (if on scale) • STM GEN LIQ PROCESS RAD: • RE-0019 (Sample) • RE-0021 (Blowdown) • SG sample radiation. c. Check SG levels – ANY RISING IN AN UNCONTROLLED MANNER. **(NO)** RNO c. Go to Step 10.

Event No.: 8

Event Description: Large break LOCA will occur just after transition to 19010-C, E-1 Loss of Reactor or Secondary Coolant. This will require the OATC to trip the RCPs due to RCS pressure will drop to CNMT pressure.

Time	Position	Applicant's Action or Behavior
	OATC	10. 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 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. d. Any RCS WR CL temperature – LESS THAN 220°F. **(YES)** e. Arm COPS.
	CREW	11. Check if ECCS flow should be reduced: **a.** RCS Subcooling – GREATER THAN 24°F (38°F ADVERSE). **(NO)** RNO a. Go to Step 12

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Event No.: 8

Event Description: Large break LOCA will occur just after transition to 19010-C, E-1 Loss of Reactor or Secondary Coolant. This will require the OATC to trip the RCPs due to RCS pressure will drop to CNMT pressure.

Time	Position	Applicant's Action or Behavior
	OATC	12. Check if Containment Spray should be stopped: a. CS Pumps – RUNNING. **(YES)** b. Containment pressure – LESS THAN 15 PSIG. **(NO)** RNO b. WHEN Containment pressure is less than 15 psig, THEN go to step 12.c. Go to Step 13.
	CREW	**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)

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Event No.: 8

Event Description: Large break LOCA will occur just after transition to 19010-C, E-1 Loss of Reactor or Secondary Coolant. This will require the OATC to trip the RCPs due to RCS pressure will drop to CNMT pressure.

Time	Position	Applicant's Action or Behavior
	OATC	13. Check if RHR Pumps should be stopped: a. RHR Pumps – ANY RUNNING WITH SUCTION ALIGNED TO RWST. (YES) b. RCS pressure: 1) Greater than 300 psig. **(NO)** RNO 1) Go to Step 16.

Event No.: 8

Event Description: Large break LOCA will occur just after transition to 19010-C, E-1 Loss of Reactor or Secondary Coolant. This will require the OATC to trip the RCPs due to RCS pressure will drop to CNMT pressure.

<table>
<tr><th>Time</th><th>Position</th><th>Applicant's Action or Behavior</th></tr>
<tr><td></td><td>UO</td><td>
16. Check if DGs should be stopped:

a. AC Emergency Busses – ENERGIZED BY OFFSITE POWER. (YES)

b. Reset SI, if necessary. (YES, reset SI at this time)

c. Stop any unloaded DG and place in standby by initiating 13145, DIESEL GENERATORS.

d. Check Stub Busses – ENERGIZED. (NO)

• NB01
• NB10

RNO

d. Energize Stub Busses by performing the following as necessary:

<table>
<tr><th>NB01</th><th>NB10</th></tr>
<tr><td>1) Open breaker NB01-01</td><td>1) Open breaker NB10-01</td></tr>
<tr><td>2) Close breaker AA02-22</td><td>2) Close breaker BA03-18</td></tr>
<tr><td>3) Close breaker NB01-01</td><td>3) Close breaker NB10-01</td></tr>
</table>

Note to Simbooth: The crews will request to send the OSA operator to shutdown the DG per 13145-1. Report back that C & T will dispatch an operator to shutdown the DGs.
</td></tr>
</table>

Event No.: 8

Event Description: Large break LOCA will occur just after transition to 19010-C, E-1 Loss of Reactor or Secondary Coolant. This will require the OATC to trip the RCPs due to RCS pressure will drop to CNMT pressure.

Time	Position	Applicant's Action or Behavior
	OATC	17. Check Cold Leg recirculation capability: a. Power available to: Train A components: • HV-8811A – CNMT SUMP TO RHR PMP-A SUCTION **(YES)** • RHR Pump A - OPERABLE **(YES)** • HV-8809A – RHR PMP-A TO COLD LEG 1 & 2 ISO VLV **(YES)** • RHR Heat Exchanger A – OPERABLE **(YES)** **NOTE to examiners: Train B is NOT available due to RHR pump B is tripped.** -OR- Train B components: • HV-8811B – CNMT SUMP TO RHR PMP-B SUCTION **(YES)** • RHR Pump B - OPERABLE **(NO)** • HV-8809B – RHR PMP-B TO COLD LEG 3 & 4 ISO VLV **(YES)** • RHR Heat Exchanger B – OPERABLE **(YES)**

Op-Test No.: 2012-301 **Scenario No.:** 1 **Page 9 of 12**

Event No.: 8

Event Description: Large break LOCA will occur just after transition to 19010-C, E-1 Loss of Reactor or Secondary Coolant. This will require the OATC to trip the RCPs due to RCS pressure will drop to CNMT pressure.

Time	Position	Applicant's Action or Behavior
	UO	18. Check Auxiliary Building leak detection systems: a. PLANT VENT Radiation Monitors – NORMAL: **(YES)** • RE-12442A EFFL PART • RE-12442B EFFL IODINE • RE-12442C EFFL RAD • RE-12444C RADIOGAS RAD b. Auxiliary Building break detection system on QPCP – ALL LEAK DETECTION STATUS LIGHTS NOT LIT. **(YES)**
	CREW	19. Direct Chemistry to obtain samples: • For boron, pH, and radioactivity: • RCS • Both Containment Emergency Sumps (if cold leg recirculation has been established.) • For radioactivity, hydrogen and oxygen concentrations. • Containment atmosphere

Event No.: 8

Event Description: Large break LOCA will occur just after transition to 19010-C, E-1 Loss of Reactor or Secondary Coolant. This will require the OATC to trip the RCPs due to RCS pressure will drop to CNMT pressure.

Time	Position	Applicant's Action or Behavior
	CREW	20. Evaluate plant equipment. a. Secure unnecessary plant equipment. b. Within 8 hours of SI actuation, isolate NSCW Corrosion Monitor Racks: • Close 1202-U4-179 • Close 1202-U4-180 (located in NSCTs on NSCW return header) c. Repair or make available inoperable equipment which may be required. d. Consult TSC for additional equipment to be started or actions to be taken to assist in recovery including. • H2 Monitors • CRDM Fans • Within 5 days, initiate Containment inspection/cleanup if Containment Spray actuated and was terminated prior to recirculation.

Event No.: 8

Event Description: Large break LOCA will occur just after transition to 19010-C, E-1 Loss of Reactor or Secondary Coolant. This will require the OATC to trip the RCPs due to RCS pressure will drop to CNMT pressure.

Time	Position	Applicant's Action or Behavior
	CREW	21. **In the event of a Design Basis Accident, the following apply concerning conservation of Ultimate Heat Sink inventory:** • IF a DBA LOCA coincident with a LOSP has occurred, THEN secure one train of NSCW within 24 hours of the initiating event per 13150, NUCLEAR SERVICE COOLING WATER SYSTEM. • IF a DBA LOCA without an LOSP has occurred and normal NSCW makeup is lost, THEN secure one train of NSCW within 24 hours of the loss of makeup capability per 13150, NUCLEAR SERVICE COOLING WATER SYSTEM. • Initiate periodic monitoring of NSCW Basin level to ensure adequate inventory is maintained for continued operation of NSCW Basin makeup. • Consult TSC as necessary for alternate sources of NSCW Basin makeup.

Op-Test No.: 2012-301 **Scenario No.:** 1 **Page 12 of 12**

Event No.: 8

Event Description: Large break LOCA will occur just after transition to 19010-C, E-1 Loss of Reactor or Secondary Coolant. This will require the OATC to trip the RCPs due to RCS pressure will drop to CNMT pressure.

Time	Position	Applicant's Action or Behavior
	SS	22. Check is RCS cooldown and depressurization is required: a. RCS pressure – GREATER THAN 300 PSIG. **(NO)** RNO a. IF RHR Pump flow is greater than 500 gpm, THEN go to step 23.
	SS	23. Check if transfer to Cold Leg recirculation is required: a. RWST level – LESS THAN 29%. (NO) RNO a. Return to Step 17.
	THE END	**THIS IS THE END OF EVENT 8.** **AND** **THE END OF THE SCENARIO. (unless stopped earlier by NRC)**

target ZERO Every day, every job, safety.	**NUCLEAR SAFETY FOCUS** **TARGET ZERO**
Protected Train: ☒ Alpha ☐ Bravo	**EOOS:** ☒ Green ☐ Yellow ☐ Orange ☐ Red
Plant Conditions:	2 x 10^{-3} % power EOL, critical data has been taken. 12003-C Step 4.2.27 is current step in progress.
Major Activities:	Raise power to the POAH, continue power ascent per UOP 12004-C.
Active LCOs:	☐ No LCOs are in effect at this time.
OOS/ Degraded CR Instruments:	☐ None
Narrative Status:	☐ Containment mini-purge is in service for a planned Containment Entry on next shift. ☐ 13501-1, "NIS", Step 4.2.2.2d "N31/N35 (N32/N36) "Signal Processor Operational Test" has been performed SAT per 14423-1(14424-1). ☐ 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. ☐ All Mode 1 entry requirements are met.

SIMULATOR REACTIVITY BRIEFING SHEET

Shift: **Day** Date: **Today** Burnup: **20,000** MWD/MTU Core Life: **EOL**

MINIMUM SHIFT REACTIVITY INFORMATION TO BE BRIEFED

Power: **0** Rod Motion: **Rods in manual.**

Current Temperature Control Strategy: **Dilution**

Currently Making Up: **50** gallons every **as needed**

The desired Tavg operating band is 557.0 ± 0.05°F

CVCS makeup boric acid flow per 100 gallon makeup (FI-110A): **9.6** gallons/100
CVCS makeup pot setting (FIC-110): **2.40**

BTRS Strategy: **None**
AFD Strategy: **Maintain on target ± 1 AFD units**

Reactivity System Components Degraded/OOS:

None

Activities Expected That May Affect Core Reactivity (Reactivity Focus Items):

Reactor startup in progress, manual rod withdrawal.

CURRENT CORE REACTIVIITY PARAMETERS

Boron worth: **9.2** pcm/ppm PCM per 1% power change: **23.3** pcm/%

Current MTC values HFP: **-30.2** pcm/°F HZP: **-12.7** pcm/°F

Current BAST C_b: **7,000** ppm Current RCS C_b: **672** ppm

Boration required per	degree °F:	**32**	gallons
	1% power change:	**25**	gallons
	10% power change:	**247**	gallons
	30% power change:	**741**	gallons
Dilution required per	degree °F:	**302**	gallons
	1% power change:	**233**	gallons

Boration required for stuck rods (154 ppm/rod): **3,061** gallons for 2 stuck rods
4,650 gallons for 3 stuck rods

**If more than 3 rods are stuck, begin emergency boration and calculate gallons for actual number of stuck rods.*

Human Performance Tools

Peer Check	Three-Way Communication	Self-Verification (STAR)
Pre-Job Briefing	Phonetic Alphabet	Timeout
Procedure Use (placekeeping)	One Minute Matters (situational awareness)	

Valid for Cycle 17, PTDB Tab 1.0 revision 28.0 and Tab 16.0 revision 18.0

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

Facility: Vogtle Scenario No.: 2 Op-Test No.: 2012-301

Examiners: Meeks Operators: _____
Bates _____
Capehart _____

Initial Conditions: The plant is at 100% power, MOL, steady state operations.
(Base IC # 14, snapped to IC # 182 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:

GE12A - PCB 161710 Auto Trip Failure

GE12B - PCB 161810 Auto Trip Failure

SI06B – Block Auto Start on SI Pump B

Overrides

1HV-8801A BIT Discharge Valve – SHUT

1HV-8801B BIT Discharge Valve – SHUT

NOTE to Simbooth: Place Containment Mini-Purge in service.

Event No.	Malf. No.	Event Type*	Event Description
T1	TU19A @ 0%	I-OATC I-SS TS-SS	Main Turbine Impulse Pressure Transmitter – PT505 fails low. **LCO 3.3.1 FU 16b, 16f Condition S (1 hour Tech Spec actions)**
T2	RD13D	R-OATC N-UO R-SS TS-SS	Dropped Rod K-14 in Control Bank B, reduces power to < 75 in 1 hour. **LCO 3.1.4 Condition B**
T3	FW02C @ 0%	C-UO C-SS	Controlling SG # 3 feed flow channel (FI-530A) fails low.
T4	NS02B NS04C	C-UO C-SS TS-SS	NSCW pump # 3 locked rotor, NSCW pump # 5 shaft shears on start. **LCO 3.7.8 Condition A, LCO 3.8.1 Condition B**
T5	CV07	C-OATC C-SS TS-SS	Normal Charging Pump (NCP) trips. **LCO TR 13.1.5 Condition A, LCO TR 13.1.3 Condition A**

6	N/A	N-OATC N-SS	Places CVCS Charging and Letdown in service.
T7	RC16 @ 0.6%	M-ALL	RCS Head LOCA (Small Break LOCA just large enough to reach RCP Trip Criteria over time).
		OATC UO **Critical**	Trips RCPs with RCS pressure < 1375 psig and ECCS flow present.
8	Preloaded	C-OATC C-SS **Critical**	SIP B auto start failure requiring manual start.
9	Preloaded	I-UO I-SS **Critical**	Main Generator Output Breakers fail to automatically trip open.
Event No.	Malf. No.	Event Type*	Event Description
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor			

Event 1:

Main Turbine Impulse Pressure PT-505 fails low (Tref) resulting in inward rod motion.

Verifiable Actions:

OATC – Performs IOA of 18001-C, section H and places control rods in manual to stop uncontrolled inward rod motion.

OATC – Restores Tavg to program band to maintain Tavg and Tref matched.

UO – Verifies PIC-507 Steam Dump Control Pot at 7.28 (1092 psig) and in AUTO, then place Steam Dumps in the Steam Pressure Mode.

Technical Specifications:

LCO 3.3.1 LCO 3.3.1 Reactor Trip System (RTS) Instrumentation FU 16b, 16f Condition S. (1 hour Tech Spec actions)

Event 2:

Rod K-14 drops requiring 1 hour power reduction to < 75% RTP per Tech Specs.

Verifiable Actions:

OATC – Controls power distribution and RCS temperature using control rods and boron.

UO – Lower turbine load to match Tave and Tref.

Technical Specifications:

LCO 3.1.4 Rod Group Alignment Limits, Condition B

Event 3:

Steam Generator # 3 controlling feed flow channel fails low resulting in MFRV # 3 opening causing SG # 3 level to rise.

Verifiable Actions:

UO – Performs IOA of 18001-C and to manually control of MFP(s) speed and affected feed flow valves to control SG levels between 60 – 70% NR.

UO – Selects an unaffected steam flow control channel on FS-530C selector switch.

UO – Returns MFP(s) speed and SG control valves to automatic.

Technical Specifications:

None

Event 4:

NSCW pump # 3 trips and NSCW pump # 5 shears shaft on start.

Verifiable Actions:

UO – Places all Train A NSCW pumps in PTL.

UO – Depresses both Emergency Stop push buttons for DG1A.

UO / OATC – Places various components in PTL on affected NSCW train.

Technical Specifications:

LCO 3.7.8 Nuclear Service Cooling Water (NSCW), Condition A

LCO 3.8.1 AC Sources – Operating, Condition B

Event 5:

The Normal Charging Pump will trip.

Verifiable Actions:

OATC – Manually closes the Letdown Orifices and the Letdown Isolation valves to stop flashing in the Letdown system.

OATC / UO – Trends the RCP operating parameters on the IPC computer.

Technical Specifications:

LCO TR 13.1.5 – Charging Pumps – Operating

LCO TR 13.1.3 – Boration Flow Paths - Operating

Event 6:

CVCS Charging and Letdown will be returned to service. (**NOTE:** The Chief Examiner may decide to go to the next event after a charging pump is started and prior to placing Letdown in service.

Verifiable Actions:

OATC – Adjusts HC-182 Seal Flow Controller to maximum seal flow and adjusts Charging Flow Controller FC-121 to minimum.

OATC – Starts a charging pump. (CCP)

OATC - Adjusts HC-182 to obtain 8 -13 gpm seal injection and adjusts Charging Flow Controller FC-121 to obtain desired charging flow.

NOTE: The next malfunction may be entered at this point with NRC Chief Examiner discretion.

OATC – Places Letdown Pressure Controller PIC-131 to 50 – 75% demand.

OATC – Places Letdown Temperature Controller TIC-130 in manual and adjusts to the recorded control room rounds position.

OATC – Opens letdown isolations and letdown orifices.

OATC – Adjusts PIC-131 and places in AUTO and places TIC-130 in AUTO.

OATC – Adjusts FIC-121, HC-182 to maintain PRZR level and seal injection.

Technical Specifications:

None

Event 7, 8, 9:

RCS small break vessel head LOCA resulting in RCS pressure < RCP Trip Criteria over time.

Verifiable Actions:

OATC – Manually starts SIP B which fails to start on SI with the other SIP not available.

UO – Manually opens Main Generator Output Breaker.

OATC / UO – Manually trips the Reactor Coolant Pumps per RCP Trip Criteria.

Technical Specifications:

Not applicable.

The scenario may be stopped after the Reactor Coolant Pumps are tripped per the RCP Trip Criteria of 19000-C or 19010-C at Chief NRC Examiner discretion.

CRITICAL TASKS:

1) Manually starts SIP B to ensure adequate ECCS injection flow for core heat removal during small break LOCA. This will be performed no later than step 3b of the OATC Initial Operator Actions of 19000-C that checks for ECCS Pumps and NCP status.

2) Manually trip the Reactor Coolant Pumps per the RCP Trip Criteria on the Foldout Page of 19000-C. This will be performed no later than step # 11 of 19000-C, if RCP trip criteria are met prior to reaching this step. If trip criteria are reached after this step, this will be performed per Foldout Page of 19000-C or step # 4 of 19010-C, whichever comes first. This will reduce inventory loss out the break during a classic small break LOCA event and will reduce peak clad temperatures than if the pumps were to trip later during the accident.

3) Manually open the Main Generator output breakers to prevent motoring and significant damage to a valuable plant component. This was discussed with the operations department representative and he agreed it can be a critical step as far as the plant is concerned. This is pending concurrence with the NRC Chief Examiner. This is to replace the critical step for opening BIT Discharge Valves which failed to auto open with the BIT Discharge Valves will NOT open under any circumstances at the NRC Chiefs request. IF, the NRC Chief does not agree, this will be deleted as a critical step and there will be the minimum of 2 critical steps for this scenario.

Op-Test No.: 2012-301 **Scenario No.:** 2

Event No.: 1

Event Description: **PT505 Fails Low – resulting in inward rod motion.**

Time	Position	Applicant's Action or Behavior
	OATC UO	Diagnose Turbine Impulse Pressure PT505 failed low: Symptoms / alarms: ALB12-A05 TAVG TREF DEVIATION ALB05-E04 AMSAC TROUBLE Indications: • Control rods rapidly inserting in automatic.
	SS	Enters AOP 18001-C, Section H, FAILURE OF TURBINE IMPULSE PRESSURE INSTRUMENTATION.
	OATC	IMMEDIATE OPERATOR ACTIONS H1. Check – NO ROD MOTION **(NO)** RNO H1. Place ROD BANK SELECTOR SWITCH in MAN position.
	OATC	H2. Restore TAVG to program band. **(NOTE: Withdraws rods)**
	UO	H3. Perform the following: a. Verify PIC-507 STEAM DUMP CONTROL set at 1092 psig. (approximately 7.28) b. Verify PIC-507 in AUTO. c. Place HS-500C STEAM DUMP CONTROL MODE SELECT in STEAM PRESS.

Op-Test No.: 2012-301 **Scenario No.:** 2

Event No.: 1

Event Description: PT505 Fails Low – resulting in inward rod motion.

<table>
<tr><th>Time</th><th>Position</th><th>Applicant's Action or Behavior</th></tr>
<tr><td></td><td>OATC</td><td>H4. Check P-7 and P-13 status lights indicate correctly for plant conditions within one hour. (TS 3.3.1)</td></tr>
<tr><td></td><td>SS</td><td>H5. Initiate the applicable actions of Technical Specification 3.3.1.
<table>
<tr><th>FUNCTION</th><th>APPLICABLE MODES</th><th>REQUIRED CHANNELS</th><th>CONDITIONS</th></tr>
<tr><td colspan="4">16 Reactor Trip System Interlocks</td></tr>
<tr><td>b. Low Power Reactor Trips Block, P-7</td><td>1</td><td>1 per train</td><td>S</td></tr>
<tr><td>f. Turbine Impulse Pressure, P-13</td><td>1,2</td><td>2</td><td>S</td></tr>
</table>
<table>
<tr><th>CONDITION</th><th>REQUIRED ACTION</th><th>COMPLETION TIME</th></tr>
<tr><td>S. One or more channels inoperable.</td><td>S.1 Verify interlock in required state for existing unit conditions.
OR
S.2 Be in MODE 2</td><td>1 hour

7 hours</td></tr>
</table></td></tr>
<tr><td></td><td>SS</td><td>H6. Notify I & C to initiate repairs.</td></tr>
<tr><td></td><td>OATC
UO</td><td>H7. Initiate the Continuous Actions Page.</td></tr>
</table>

Op-Test No.: 2012-301 **Scenario No.: 2** **Page 3 of 3**

Event No.: 1

Event Description: PT505 Fails Low – resulting in inward rod motion.

Time	Position	Applicant's Action or Behavior
	SS	H8. Check repairs and surveillances – COMPLETE. RNO H8. Perform the following: a. WHEN repairs and surveillances are complete, THEN perform Step H9. b. Return to procedure and step in effect. **END OF EVENT 1, PROCEED TO EVENT 2.**

Op-Test No.: 2012-301 **Scenario No.: 2** **Page 1 of 8**

Event No.: 2

Event Description: Control Rod K-14 will drop requiring an entry into the Rod Control System Malfunction AOP for a dropped rod. The AOP will require a power descent to < 75% in 1 hour.

Time	Position	Applicant's Action or Behavior
	OATC	Diagnose control rod K-14 has dropped: Symptoms / alarms: ALB10-C02 POWER RANGE CHANNEL DEVIATION ALB10-D06 ROD DEV ALB10-E05 ROD AT BOTTOM ALB10-E06 RADIAL TILT (short delay) ALB11-D02 PRZR CONTROL LO PRESS AND HEATERS ON (the annunciator above will briefly illuminate and then extinguish) ALB12-A03 RC LOOP TAVG/AUCT TAVG HI-LO DEV ALB12-A04 TAVG/TREF DEVIATION ALB10-D02 PWR RANGE UP DET HI FLX DEV (delayed 5 min) ALB10-E02 PWR RANGE LWR DET HI FLX DEV (delayed 5 min) Indications: • Rod bottom LED on digital rod position indication for rod K-14. • Tavg dropping. • PRZR pressure drops and then rises back toward program. • NI-44 lowers to ~ 82% power.
	UO	A1. Stop any turbine loading changes.
	OATC	A2. Check the following: a. DRPI – AVAILABLE. b. Only one Rod dropped by observing DRPI.

Event No.: 2

Event Description: Control Rod K-14 will drop requiring an entry into the Rod Control System Malfunction AOP for a dropped rod. The AOP will require a power descent to < 75% in 1 hour.

Time	Position	Applicant's Action or Behavior
	SS	A3. Initiate TS 3.1.4.

LCO 3.1.4 All shutdown and control rods shall be OPERABLE, with all individual rod positions within 12 steps of their group step counter demand position.

Applicability: MODES 1 and 2.

ACTIONS:

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. One rod not within alignment limits.	B1.1. Verify SDM is ≥ the limit specified in the COLR.	1 hour
	OR	
	B.1.2 Initiate boration to restore SDM to within limit.	1 hour
	AND	
	B.2 Reduce THERMAL POWER to ≤ 75% RTP.	2 hours
	AND	
	B.3 Verify SDM is ≥ the limit specified in the COLR.	Once per 12 hours
	AND	
	B.4 Perform SR 3.2.1.1	72 hours
	AND	
	B.5 Perform SR 3.2.2.1	72 hours
	AND	
	B.6 Reevaluate safety analysis and confirm results remain valid for duration of operation under these conditions.	5 days

Op-Test No.: 2012-301 **Scenario No.:** 2 **Page 3 of 8**

Event No.: 2

Event Description: Control Rod K-14 will drop requiring an entry into the Rod Control System Malfunction AOP for a dropped rod. The AOP will require a power descent to < 75% in 1 hour.

Time	Position	Applicant's Action or Behavior
		NOTE: Power reduction as soon as practical after the rod drop occurs minimizes local fuel power distribution variances and the chances of fuel damage. Although TS 3.1.4 requires power be reduced to less than 75% within 2 hours, a target of achieving reactor power level less than 75% in one hour meets the "as soon as practical" objective.
	CREW	A4. Reduce Thermal Power to less than 75% within 1 hour from time of Rod drop. **Note to examiner:** The crew may use the guidance in this procedure to lower power to < 75% OR may use UOP-12004-C, POWER OPERATION (MODE 1) or 18013-C, "Rapid Power Reduction". The steps for Rapid Power Reduction are at the end of this event.
	SS	A5. Fuel preconditioned power level greater than or equal to 90% per Reactor Engineering. **Note to examiner:** The simbooth will inform the SS power level is > or = 90% preconditioned fuel per Reactor Engineering when the SS calls for this information.
	OATC UO	A6. Initiate the Continuous Actions Page.

Op-Test No.: 2012-301 **Scenario No.:** 2 **Page 4 of 8**

Event No.: 2

Event Description: Control Rod K-14 will drop requiring an entry into the Rod Control System Malfunction AOP for a dropped rod. The AOP will require a power descent to < 75% in 1 hour.

Time	Position	Applicant's Action or Behavior
	OATC UO	A7. Maintain Tavg at program by performing the following as appropriate: • Adjust turbine load (UO) • Dilute or borate (OATC) • Use manual Rod control (OATC)
	OATC	A8. Maintain power distribution when greater than or equal to 50%. a. AFD – WITHIN PLUS OR MINUS 5% OF TARGET. **(NO)** (**Note:** Target is ~ -1.8 and average is +3.6 = 5.4%) RNO a. Reduce power until one of the following are met: __ AFD within plus or minus 5% of target. -OR- __ Reactor power less than 50%. b. QPTR – LESS THAN OR EQUAL TO 1.02. **(NO)** (**Note:** 1.07 on top, 1.08 on bottom per note below) RNO b. Initiate TS. 3.2.4. **Note to examiner** - The crew may call for C & T to dispatch personnel to perform OSP-14915-1 Special Condition Surveillance Log Data Sheet 7 to perform a QPTR for the dropped rod. After a time delay, Inform the SS of the QPTR reading (to be determined).

Op-Test No.: 2012-301 **Scenario No.: 2** **Page 5 of 8**

Event No.: 2

Event Description: Control Rod K-14 will drop requiring an entry into the Rod Control System Malfunction AOP for a dropped rod. The AOP will require a power descent to < 75% in 1 hour.

Time	Position	Applicant's Action or Behavior
	SS	A9. Initiate action to determine cause and repair Rod Control malfunction.
	SS	A10. Record the following in the Unit Control Log: • Time of Rod drop. • Dropped Rod number. • Initial power level. • Affected group step counter position.
		NOTE: The time allowed for reactor shutdown in step A11 may be extended past 96 hours by Reactor Engineering.
	CREW	A11. Commence a Unit shutdown per 12004-C, POWER OPERATION (MODE 1) to be in Mode 3 within the next 96 hours or as specified by Reactor Engineering. **Note to examiner: Rapid Power Reduction steps follow.**

Op-Test No.: 2012-301 **Scenario No.: 2** **Page 6 of 8**

Event No.: 2

Event Description: Control Rod K-14 will drop requiring an entry into the Rod Control System Malfunction AOP for a dropped rod. The AOP will require a power descent to < 75% in 1 hour.

Time	Position	Applicant's Action or Behavior
	SS	1. Perform SHUTDOWN BRIEFING.
		SHUTDOWN BRIEFING **METHOD** • Auto rod control should be used. • Reduce Turbine Load at approximately **3%** RTP per minute. (approx 36 MW_e) up to **5%** RTP (approx 60 MW_e). • 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 MW_e, etc.). • A crew update should be performed at approximately every 100 MW_e power change. • If manpower is available, peer checks should be used for all reactivity changes.

Op-Test No.: 2012-301 **Scenario No.: 2** **Page 7 of 8**

Event No.: 2

Event Description: Control Rod K-14 will drop requiring an entry into the Rod Control System Malfunction AOP for a dropped rod. The AOP will require a power descent to < 75% in 1 hour.

Time	Position	Applicant's Action or Behavior
		OPERATIONAL LIMITS • Maintain T_{AVG} within ±6°F of T_{REF}. **If T_{AVG}/T_{REF} mismatch >6°F and *not* trending toward a matched condition or if T_{AVG} ≤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 T_{AVG} deviations should only be via secondary plant control manipulations and not primary plant control manipulations. (i.e., do not withdraw control rods or dilute).
	SS	2. Verify rods in AUTO. **Note to examiner:** Due to Tref failure earlier in scenario, the rods will continuously insert at full speed if placed in automatic. There is no RNO for step # 2 so the SS will have to make the call to place the rods in manual for the down power if using 18013-C.

Op-Test No.: 2012-301 **Scenario No.: 2** **Page 8 of 8**

Event No.: 2

Event Description: Control Rod K-14 will drop requiring an entry into the Rod Control System Malfunction AOP for a dropped rod. The AOP will require a power descent to < 75% in 1 hour.

Time	Position	Applicant's Action or Behavior
	SS	3. Reduce Turbine Load at the desired rate up to 5% min (60 MWE/min).
	SS	4. Borate as necessary by initiating 13009, CVCS REACTOR MAKEUP CONTROL SYSTEM. **Note to examiner:** Boration steps from 13009 at end of this event.
	OATC UO	5. Initiate the Continuous Actions Page.
	SS	6. Check desired ramp rate – LESS THAN OR EQUAL TO 5% MIN.
	SS	7. Maintain Tavg within 6°F of Tref. a. Monitor Tavg/Tref deviation. (UT-0495) b. Verify rods inserting as required. RNO b. Manual rod control should be used with insertions of up to 5 steps at a time. Note to examiner: This may be the RNO the crew uses to justify placing rods in manual. c. Energize Pressurizer back-up heaters as necessary. **END OF EVENT 2, MOVE TO EVENT 3.**

Op-Test No.: 2012-301 **Scenario No.:** 2

Event No.: 2 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.:** 2 **Page 2 of 6**

Event No.: 2 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.: 2** **Page 3 of 6**

Event No.: 2 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.

Op-Test No.: 2012-301 **Scenario No.: 2** **Page 4 of 6**

Event No.: 2 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

Op-Test No.: 2012-301 **Scenario No.: 2** **Page 5 of 6**

Event No.: 2 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>

Op-Test No.: 2012-301 **Scenario No.:** 2 **Page 6 of 6**

Event No.: 2 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 2, Rapid Power Reduction.

Op-Test No.: 2012-301 **Scenario No.:** 2

Event No.: 3

Event Description: SG # 3 Feed Flow 1FI-530A fails low.

Time	Position	Applicant's Action or Behavior
	UO	Diagnoses failure of SG # 3 controlling feed flow instrument: Symptoms / alarms / indications: • ALB13-C01 STM GEN 3 FLOW MISMATCH • Any unexplained steam / feed flow mismatch indication
	UO	Performs IMMEDIATE OPERATOR ACTIONS of AOP-18001 Section G for Failure of Controlling Feed Flow Channel. G1. Checks steam and feed flows – MATCHED ON ALL SGS. RNO G1. Take manual control of the following as necessary to restore NR level between 60% and 70%: • Affected SG feed flow valves (SG 3 MFRV 1FV-0530) • MFP(s) speed (Master Speed Controller SIC-509A)
	SS	Verifies immediate operator actions performed with UO. Enters AOP 18001-C, Section G.
	UO	SUBSEQUENT OPERATOR ACTIONS 18001-C Section G. G2. Select an unaffected control channel. ***NOTE: Selects Channel F531 on 1FS-530C Select Switch.***

Op-Test No.: 2012-301 **Scenario No.:** 2 **Page 2 of 3**

Event No.: 3

Event Description: SG # 3 Feed Flow 1FI-530A fails low.

Time	Position	Applicant's Action or Behavior
	UO	G3. Return MFP(s) speed controls to AUTO. ***NOTE: Returns Master Speed Controller SIC-509A to AUTO.***
	UO	G4. Return SG feed flow valve to AUTO. (Loop 4) ***NOTE: Returns SG3 MFRV 1FV-530 to AUTO.***
	UO	G5. Initiate the Continuous Actions Page.
	UO	G6. Check SG level control maintains NR level – AT 65%. RNO G6. Take manual control of the following as necessary to maintain NR level between 60% and 70%. • Affected SG feed flow valves. • MFP(s) speed.
	SS	G7. Notifies I & C to initiate repairs: Calls SS C & T to perform the following: • Notify Operations Duty of AOP entry. • Write a Condition Report. • Notify Maintenance of the failure.

Op-Test No.: 2012-301 **Scenario No.: 2**

Event No.: 3

Event Description: SG # 3 Feed Flow 1FI-530A fails low.

Time	Position	Applicant's Action or Behavior
	SS	G8. Check repairs and surveillances – COMPLETE. **(NO)** RNO G8. Perform the following: a. WHEN repairs and surveillances are complete, THEN perform Step G9. b. Return to procedure and step in effect. ***NOTE: Repairs are not expected to be completed.*** **END OF EVENT 3.**

Op-Test No.: 2012-301 **Scenario No.: 2** **Page 1 of 8**

Event No.: 4

Event Description: NSCW pump # 3 trips (locked rotor) with NSCW pump # 5 shaft shear on auto start. The crew will have to shutdown NSCW Train A and take actions of AOP-18021-C, Loss of Nuclear Service Cooling Water System.

Time	Position	Applicant's Action or Behavior
	OATC	Diagnose trip of running NSCW pump # 3 on Train A and determine that NSCW pump # 5 is not performing as expected: Symptoms / alarms: ALB36-A01 4160V SWGR 1AA02 TROUBLE ALB02-B01 NSCW TRAIN A LO HDR PRESS ALB02-C03 NSCW TRAIN A DG CLR LO FLOW ALB02-C04 NSCW Train A RHR PMP & MTR CLR LO FLOW ALB02-D02 NSCW TRAIN A CNMT CLR 1 & 2 LO FLOW ALB02-E02 NSCW TRAIN A CNMT CLR 5 & 6 LO FLOW ALB02-F02 NSCW TRAN A RX CVTY CLG COIL LOW FLOW (comes in then clears after a short time) Indications: • Low NSCW Supply Header pressure (~ 50 psig). • Low Supply and Return Header flows (~ 12,000 gpm). • NSCW Pump # 3 green and amber lights lit on hand switch. • NSCW Pump # 5 red light lit on hand switch. SS Enters AOP 18021-C, LOSS OF NUCLEAR SERVICE COOLING WATER SYSTEM.
	UO	1. Check if catastrophic leakage from NSCW system – EXISTS. **(NO)** RNO 1. Go to Step 6.

Event No.: 4

Event Description: NSCW pump # 3 trips (locked rotor) with NSCW pump # 5 shaft shear on auto start. The crew will have to shutdown NSCW Train A and take actions of AOP-18021-C, Loss of Nuclear Service Cooling Water System.

Time	Position	Applicant's Action or Behavior
	UO	6. Verify NSCW pumps in affected train – TWO OR MORE OPERATING: • Supply header pressure greater than 70 psig. **(NO)** Train A: PI-1636 Train B: PI-1637 • Supply header flow approximately 17,000 gpm. **(NO)** Train A: FI-1640B Train B: FI-1641B RNO 6. Perform the following: a. Place affected train NSCW pump hand switches in PULL-TO-LOCK. b. Depress both Emergency Stop pushbuttons for the affected DG. **NOTE:** The following alarm illuminates when step 6.b. is performed. ALB 35-C10 DG1A DISABLED NON RESET OF EMERGENCY TRIP c. Investigate cause for trip of the running pump(s). **NOTE:** The following annunciators will illuminate when the NSCW Train A pumps are placed in PTL. ALB02-E03 NSCW TRAIN A NORM/BYP VLV MISPOSITIONED ALB04-E01 TRAIN A SYS STATUS MON PNL ALERT

Event No.: 4

Event Description: NSCW pump # 3 trips (locked rotor) with NSCW pump # 5 shaft shear on auto start. The crew will have to shutdown NSCW Train A and take actions of AOP-18021-C, Loss of Nuclear Service Cooling Water System.

Time	Position	Applicant's Action or Behavior
	UO	Step 6 RNO Continued d. Verify proper operation of UNAFFECTED NSCW train: • Two pumps running. **(YES)** • Supply header pressure greater than 70 psig: **(YES)** Train A: PI-1636 Train B: PI-1637 • Supply header temperature computer indication less than 90°F**: (YES)** Train A : TE-1642 Train B: TE-1643 • Supply header flow approximately 17,000 gpm. **(YES)** Train A: FI-1640B Train B: FI-1641B Go to Step 13.
	UO	13. Verify the following components in the UNAFFECTED train – RUNNING IF REQUIRED: CCP **(NO)** SIP **(NO)** CS Pump **(NO)** RHR Pump **(NO)** CCW Pumps **(YES, UO needs to start Train B CCW)** CREFS (CR FILTER UNIT SUPPLY AIR FAN) **(NO)** ESF Chiller **(NO)**

Op-Test No.: 2012-301 **Scenario No.: 2** **Page 4 of 8**

Event No.: 4

Event Description: NSCW pump # 3 trips (locked rotor) with NSCW pump # 5 shaft shear on auto start. The crew will have to shutdown NSCW Train A and take actions of AOP-18021-C, Loss of Nuclear Service Cooling Water System.

Time	Position	Applicant's Action or Behavior
	OATC UO	14. Place the affected train components in PULL-TO-LOCK: • CCP • SIP • CS Pump • RHR Pump • CCW Pumps • CREFs (CR FILTER UNIT SUPPLY AIR FAN) • ESF Chiller (STOP position)
	CREW	15. Swap SFP Cooling as necessary by initiating 13719, SPENT FUEL POOL COOLING AND PURIFICATION SYSTEM. **NOTE:** The crew can verify which train of SFP Cooling is running via IPC computer points. One of the crew members will call the Aux Building Operator or C & T to swap SFP Cooling Trains.
	UO	16. Isolate and repair any leaks on affected NSCW train: a. Check significant leakage from affected train - INDICATED. (NO) RNO a. Go to Step 16c. 16c. Dispatch operator(s) to locate and isolate the leak. **(N/A)**

Op-Test No.: 2012-301 **Scenario No.:** 2 **Page 5 of 8**

Event No.: 4

Event Description: NSCW pump # 3 trips (locked rotor) with NSCW pump # 5 shaft shear on auto start. The crew will have to shutdown NSCW Train A and take actions of AOP-18021-C, Loss of Nuclear Service Cooling Water System.

Time	Position	Applicant's Action or Behavior
	UO	17. Perform the following using ATTACHMENT A for hand switch numbers: a. Start fans in UNAFFECTED train: • CTB Coolers in high speed. • CTB Aux Air Cooler • Reactor Cavity Cooler b. Place fans in affected train in PULL-TO-LOCK or STOP as required: • CTB Coolers in high speed. • CTB Coolers low speed. • CTB Aux Air Cooler • Reactor Cavity Cooler **NOTE to examiner**: ATTACHMENT A – CONTAINMENT VENTILATION EQUIPMENT LIST attached at the end of event.
	UO	18. Disable automatic operation of affected DG using 13145A-1, DIESEL GENERATORS. **NOTE to examiner:** The UO will call an SO to disable Train A Diesel Generator Automatic Operation per Section 4.4.11 of 13145A-1. The SO will place the LOCAL-REMOTE switch in LOCAL and the following annunciator will illuminate on the QEAB. ALB35-E05 DG1A DISABLED ENGINE CONTROL IN LOCAL

Op-Test No.: 2012-301 **Scenario No.: 2** **Page 6 of 8**

Event No.: 4

Event Description: NSCW pump # 3 trips (locked rotor) with NSCW pump # 5 shaft shear on auto start. The crew will have to shutdown NSCW Train A and take actions of AOP-18021-C, Loss of Nuclear Service Cooling Water System.

Time	Position	Applicant's Action or Behavior
		Step 18 continued. 18. Disable automatic operation of affected DG using 13145, DIESEL GENERATORS. **NOTE to examiner**: The UO will call an SO to disable Train A Diesel Generator Automatic Operation per Section 4.4.11 of 13145-A1. The SO will place DG1A in Maintenance Mode and the following annunciator will illuminate on the QEAB. ALB35-E10 DG1A DISABLED MAINTENANCE LOCK OUT
	SS	19. Initiate the following: a. 14230, OFFSITE AC CIRCUIT VERIFICATION AND CAPACITY / CAPABILITY EVALUATION. **NOTE**: The crew will call C & T to have someone perform the AC Source Verification. b. Verify SAT energized using 13418-A(B), STANDBY AUXILIARY TRANSFORMER UNIT 1(2) TRAIN A(B) OPERATIONS. **NOTE:** The crew will dispatch an SO or call C & T to have someone verify the SAT is energized. **NOTE to examiner:** The above are 1 hour Tech Spec Actions from LCO 3.8.1 AC Sources – Operating, Condition B.

Event No.: 4

Event Description: NSCW pump # 3 trips (locked rotor) with NSCW pump # 5 shaft shear on auto start. The crew will have to shutdown NSCW Train A and take actions of AOP-18021-C, Loss of Nuclear Service Cooling Water System.

<table>
<tr><th>Time</th><th>Position</th><th>Applicant's Action or Behavior</th></tr>
<tr><td></td><td>SS</td><td>
20. Initiate the following as appropriate:

TS 3.7.8
TS 3.7.9

NOTE to examiner: LCO 3.7.8 below. LCO 3.7.9 is N/A.

LCO 3.7.8 Two NSCW trains shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, and 4.
ACTIONS
<table>
<tr><th>CONDITION</th><th>REQUIRED ACTION</th><th>COMPLETION TIME</th></tr>
<tr><td>A. One NSCW train inoperable</td><td>----------NOTES----------
1. Enter applicable Conditions and Required Actions of LCO 3.8.1, "AC Sources – Operating." For emergency diesel generator made inoperable by NSCW system.
2. Enter applicable Conditions and Required Actions of LCO 3.4.6, "RCS Loops – MODE 4," for residual heat removal loops made inoperable by NSCW system.

A.1 Restore NSCW System to OPERABLE status.</td><td>72 hours.</td></tr>
<tr><td>B. Required Action and associated Completion Time of Condition A not met.</td><td>B.1 Be in MODE 3

AND

B.2 Be in MODE 5</td><td>6 hours

36 hours</td></tr>
</table>
</td></tr>
</table>

Op-Test No.: 2012-301 **Scenario No.: 2** **Page 8 of 8**

Event No.: 4

Event Description: NSCW pump # 3 trips (locked rotor) with NSCW pump # 5 shaft shear on auto start. The crew will have to shutdown NSCW Train A and take actions of AOP-18021-C, Loss of Nuclear Service Cooling Water System.

Time	Position	Applicant's Action or Behavior
	UO	21. Check NSCW return temperature on affected train – LESS THAN 95°F. Train A: TI-1676A Train B: TI-1677A
	SS	22. Return to procedure and step in effect.
	SS	**END OF EVENT 4, PROCEED TO EVENT 5.**

Op-Test No.: 2012-301 **Scenario No.:** 2

Event No.: 5

Event Description: Normal Charging Pump (NCP) trips, Loss of Charging flow.

Time	Position	Applicant's Action or Behavior
	OATC	Diagnose Normal Charging Pump (NCP) has tripped: Symptoms / alarms: ALB07-A05 REGEN HX LTDN HI TEMP ALB07-B06 CHARGING LINE HI/LO FLOW ALB07-C06 CHARGING PUMP OVERLOAD TRIP ALB08-F06 RCP SEAL WATER INJ LO FLOW ALB33-A05 4160V SWGR 1NA05 TROUBLE Indications: • NCP hand switch green and amber light lit. • Charging flow indicates 0 gpm on 1FI-0121A or 1FI-0121C. • Letdown flashing on 1FI-132A or 1FI-132C.
	SS	Enters 18007-C, section B Loss of Charging.
	OATC	**IMMEDIATE OPERATOR ACTIONS** B1. Isolate letdown: a. Close letdown orifice isolation valves: • HV-8149A • HV-8149B • HV-8149C b. Close letdown orifice isolation valves: • HV-0459 • HV-0460

Op-Test No.: 2012-301 **Scenario No.:** 2 **Page 2 of 5**

Event No.: 5

Event Description: **Normal Charging Pump (NCP) trips, Loss of Charging flow.**

<table>
<tr><th>Time</th><th>Position</th><th>Applicant's Action or Behavior</th></tr>
<tr><td></td><td>SS</td><td>Enters AOP 18007-C, Section B, LOSS OF CHARGING FLOW.</td></tr>
<tr><td></td><td>OATC
UO</td><td>B2. Initiate the Continuous Actions Page.</td></tr>
<tr><td></td><td>OATC</td><td>B3. Trend RCP Seal Parameters listed in ATTACHMENT A.</td></tr>
<tr><td></td><td>OATC
UO</td><td>ATTACHMENT A - RCP SEAL PARAMETER INDICATION

NOTE: The following points are accessible under IPC Group 62.
<table>
<tr><th>PARAMETER</th><th>IPC POINT</th></tr>
<tr><td>RCP Seal Injection Flow

RCP 1
RCP 2
RCP 3
RCP 4</td><td>

F0131
F0129
F0127
F0125</td></tr>
<tr><td>RCP Seal Injection Temperature
(Measured at VCT Outlet)</td><td>T0140</td></tr>
<tr><td>Number 1 Seal Leakoff High Flow

RCP 1
RCP 2
RCP 3
RCP 4</td><td>

F0161
F0160
F0159
F0158</td></tr>
<tr><td>Number 1 Seal Inlet Temperature

RCP 1
RCP 2
RCP 3
RCP 4</td><td>

T0181 / T0417
T0182 / T0437
T0183 / T0457
T0184 / T0477</td></tr>
</table></td></tr>
</table>

Op-Test No.: 2012-301 **Scenario No.:** 2 **Page 3 of 5**

Event No.: 5

Event Description: **Normal Charging Pump (NCP) trips, Loss of Charging flow.**

Time	Position	Applicant's Action or Behavior
	OATC	B4. Check charging pumps(s) – OPERATING NORMALLY: • Discharge flow trend – STABLE. • Discharge pressure trend – STABLE. • VCT level – IN NORMAL BAND. • Bus current – STABLE. • Suction pressure – STABLE. **SO will report after dispatched for the NCP and its breaker:** "NCP pump bearings hot and over current relays tripped for breaker 1NA05-08".
	OATC	B5. Locate and isolate any charging system leakage. **(N/A)**
	OATC UO	B6. Check ACCW system – IN SERVICE. **(YES)**
	OATC	B7. Check normal charging valves – OPEN: **(YES)** • HV-8105 • HV-8106 • HV-8146 or HV-8147 • HV-8485A and B • FV-121

Op-Test No.: 2012-301 **Scenario No.: 2** **Page 4 of 5**

Event No.: 5

Event Description: Normal Charging Pump (NCP) trips, Loss of Charging flow.

Time	Position	Applicant's Action or Behavior
	OATC	B8. Check normal charging flow – ESTABLISHED. **(NO)** RNO B8. Perform the following: a. WHEN normal charging flowpath can be established, THEN place normal charging and letdown in service by initiating 13006, CHEMICAL AND VOLUME CONTROL SYSTEM. **NOTE to examiner**: Step B10 will be performed AFTER the OATC places Normal Charging and Letdown in service per EVENT 6. Once event 6 is complete, return to this page for completion of the AOP for Loss of Charging actions continuing with B10. **Note to examiner: EVENT 6 is OPTIONAL at NRC Chief discretion, if option not to perform, go to Main Event # 7.** b. Go to Step B10.
	OATC	B10. Establish Seal Injection flow to all RCPs – 8 to 13 GPM. B11. Check RCP seal injection flow – ESTABLISHED. **(YES)**
	OATC	B12. Control PRZR level – IN PROGRAM BAND.

Op-Test No.: 2012-301 **Scenario No.:** 2 **Page 5 of 5**

Event No.: 5

Event Description: **Normal Charging Pump (NCP) trips, Loss of Charging flow.**

Time	Position	Applicant's Action or Behavior
	SS	B13. Initiate the following Technical Specifications and/or Technical Requirements as necessary: LCO 3.5.2 LCO 3.5.3 LCO 3.5.5 TR 13.1.2 TR 13.1.3 TR 13.1.4 **TR 13.1.5 (INFO LCO)**
	OATC	B14. Check normal charging flow – ESTABLISHED.
	OATC	B15. Return to procedure and step in effect. **NOTE to examiner: THIS COMPLETES EVENT 5 and EVENT 6 (IF event 6 was performed).** **PROCEED TO EVENT 7.**

Op-Test No.: 2012-301 **Scenario No.:** 2 **Page 1 of 10**

Event No.: 6

Event Description: **Return Normal Charging and Letdown to service after Normal Charging Pump (NCP) trip.**

Time	Position	Applicant's Action or Behavior
	OATC	***NOTE to Examiner:*** ***Student may go to Section 4.4.2 first, but it will send him to the following section with no Charging Pump running.*** **13006-1, CVCS Section 4.4.13, Restart of CCP or NCP following Loss of a Charging Pump.** **CAUTIONS** At BOL, while borating to maintain Tavg, the calculated delta boron concentration between the RCS and the last time the CCP/NCP was placed in service may be incorrect. Experience has shown that high concentrations of borated water tend to collect in the suction piping of the idle pumps, resulting in a higher boron concentration in the CCP/NCP than the RCS. This may cause and unexpected boration and temperature reduction, when the pump is placed in service or tested. Restart of a charging pump should not be delayed in order to flush the pump prior to start.
	OATC	4.4.13.1 PRIOR to starting the pump and based on the conditions described in the first caution above, a slight boration should be anticipated and a briefing on compensatory actions to offset the boration should be conducted.
	CREW	**CAUTION:** A determination should be made that loss of the Charging Pump was not due to air/gas binding before starting the same or another pump.
	OATC	4.4.13.2 Dispatch an Operator to perform pump pre-start checks. **Note to examiner:** Simbooth cue operators a CCP is ready to start.

Op-Test No.: 2012-301 **Scenario No.: 2** **Page 2 of 10**

Event No.: 6

Event Description: Return Normal Charging and Letdown to service after Normal Charging Pump (NCP) trip.

Time	Position	Applicant's Action or Behavior
	OATC	4.4.13.3 Verify VCT LEVEL 1LI-185 indicates between 30 and 80%.
	OATC	4.4.13.4 Verify OPEN VCT OUTLET ISOLATION Valves: • 1-LV-0112B • 1-LV-0112C
	OATC	4.4.13.5 Verify OPEN CCP-A & B COMMON MINIFLOW 1-HV-8110.
	OATC	4.4.13.6 IF starting a CCP perform the following: **Note to examiner:** CCP-A is in PTL due to loss of Train A NSCW. The steps for starting CCP-A are N/A. Step 4.4.13.6 for CCP-B is continued on the next page.

Op-Test No.: 2012-301 **Scenario No.:** 2 **Page 3 of 10**

Event No.: 6

Event Description: **Return Normal Charging and Letdown to service after Normal Charging Pump (NCP) trip.**

Time	Position	Applicant's Action or Behavior
	OATC	IF starting CCP-B: a. Open CCP-B SUCTION 1-HV-8471B. b. Open CCP-B MINIFLOW 1-HV-8111B. c. Verify OPEN CCP-A & B COMMON MINIFLOW 1-HV-8110 d. Close CCP-B SAFETY GRADE CHG 1-HV-0190B. e. Open CCP-B DISCHARGE ISOLATION 1-HV-8485B. f. Open CCP DISCHARGE HEADER CROSSCONNECT 1-HV-8438
		NOTE and step 4.4.13.7 are N/A.
	OATC	4.4.13.8 Set 1HC-182 for Maximum Seal Flow (0% demand).
	OATC	4.4.13.9 Verify Charging Flow Control 1FIC-121 in MAN and set to minimum.
		NOTE Normal and Alternate charging paths should be alternated over plant life to equalize thermal stress. The transfer should be performed at cold shutdown conditions to avoid thermal transients. Normal charging should be in service during even-numbered fuel cycles. Alternate charging should be in service during odd-numbered fuel cycles. Swapping nozzles at NOPT should be avoided.

Op-Test No.: 2012-301 **Scenario No.: 2** **Page 4 of 10**

Event No.: 6

Event Description: Return Normal Charging and Letdown to service after Normal Charging Pump (NCP) trip.

Time	Position	Applicant's Action or Behavior
	OATC	4.4.13.10 Verify OPEN one of the following: NORMAL CHARGING TO LOOP 1 1-HV-8146 -OR- ALTERNATE CHARGING TO LOOP 4 1HV-8147
	OATC	4.4.13.11 Verify OPEN CHARGING TO RCS ISOLATION Valves: • 1-HV-8105 • 1-HV-8106
	OATC	4.4.13.12 Verify the ALOP of the CCP to be started is running as indicated by the QMCB red indicating lamp lit.
	OATC	4.4.13.13 Start the desired CCP or NCP. CCP-A 1HS-273A OR CCP-B 1HS-274A **NOTE to examiner: CCP-B will need to be started if the crew wishes to maintain 120 gpm letdown flow.**

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Event No.: 6

Event Description: Return Normal Charging and Letdown to service after Normal Charging Pump (NCP) trip.

Time	Position	Applicant's Action or Behavior
	OATC	4.4.13.14 IF a CCP was started, verify the selected CCP ALOP red indicating lamp goes off (on QMCB) shortly after the pump is started. 4.4.13.15 is N/A.
	OATC	4.4.13.16 Simultaneously perform the following: • Adjust Seal Flow Control 1HC-182 to obtain between 8 and 13 gpm to each RCP. • Adjust Charging Flow Control 1FIC-121 to obtain the desired charging flow.
	OATC	4.4.13.17 Return to Section 4.4.2 to establish Normal Letdown and Charging.
	OATC	**13006-1, CVCS Section 4.4.2 Returning Normal Charging and Letdown to Service.**
	OATC	4.4.2.1 IF a Charging Pump is NOT in service, Go To Section 4.4.13 to start the NCP OR an available Centrifugal Charging Pump, THEN Return To this section.

Event No.: 6

Event Description: Return Normal Charging and Letdown to service after Normal Charging Pump (NCP) trip.

Time	Position	Applicant's Action or Behavior
	OATC	**NOTES:** This section also applies to returning normal charging and letdown to service following termination of safety injection. In the event letdown was isolated from the shutdown panel, a walkdown of letdown components and piping shall be performed prior to restoring normal letdown to service. Letdown is to be established as soon as possible after initiating flow through a Charging Nozzle.
	OATC	4.4.2.2 This step is N/A.
	OATC	4.4.2.3 Perform the following: a. Close LETDOWN ORIFICE Isolation Valves: • 1-HV-8149A • 1-HV-8149B • 1-HV-8149C b. Close LETDOWN ISOLATION VLV UPSTREAM AND DOWNSTREAM Valves: • 1-LV-460 • 1-LV-459 c. Close PZR AUX SPRAY VALVE 1-HV-8145. d. Open CVCS LETDOWN PIPE BREAK PROT ISOLATION 1-HV-15214.

Event No.: 6

Event Description: Return Normal Charging and Letdown to service after Normal Charging Pump (NCP) trip.

Time	Position	Applicant's Action or Behavior
	OATC	4.4.2.3 Continued e. Open RCS LETDOWN LINE ISO VLV IRC 1-HV-8160. f. Open RCS LETDOWN LINE ISO VLV ORC 1-HV-8152. g. Place Letdown Pressure Controller 1PIC-131 in MAN and adjust output to between 50% and 75%. h. Place LETDOWN HX OUTLET TEMP 1TIC-130 in MAN and adjust output to the most current position as recorded on the Control Room Rounds Sheets. i. Verify PRESSURIZER LEVEL 1LR-459 greater than 17%. **NOTE:** If Normal Charging and Letdown are being returned to service as directed from Section 4.4.15, one of the valves in Substep j. and both valves in Step 4.4.2.4 will already be open. j. Verify one of the following are OPEN: NORMAL CHARGING TO LOOP 1 1-HV-8146 (even-numbered fuel cycle) -OR- ALTERNATE CHARGING TO LOOP 4 1-HV- 8147 (odd-numbered fuel cycle)

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Event No.: 6

Event Description: Return Normal Charging and Letdown to service after Normal Charging Pump (NCP) trip.

Time	Position	Applicant's Action or Behavior
	OATC	4.4.2.4 Verify CHARGING TO RCS ISOLATION Valves are OPEN: • 1-HV-8106 • 1-HV-8105
	OATC	4.4.2.5 Simultaneously perform the following: • Adjust 1HC-182 output to maintain between 8 and 13 gpm to each RCP. • Adjust 1FIC-121 to raise CHG FLOW 1FI-121A to between 80 and 90 gpm.
	OATC	4.4.2.6 Open LETDOWN ISOLATION VLV UPSTREAM AND DOWNSTREAM Valves by holding their handswitches in OPEN UNTIL the valves are fully open: • 1-LV-460 1HS-460 • 1-LV-459 1HS-459

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Event No.: 6

Event Description: Return Normal Charging and Letdown to service after Normal Charging Pump (NCP) trip.

Time	Position	Applicant's Action or Behavior
	OATC	4.4.2.7 Establish Letdown flow: a. Simultaneously open a Letdown Orifice and maintain pressure by performing the following: • Open one LETDOWN ORIFICE Isolation Valve by holding its handswitch in the OPEN position until fully open: 1HS-8149B (75 gpm – odd fuel cycles) OR 1HS-8149C (75 gpm – even fuel cycles) OR 1HS-8149A (45 gpm) • Adjust 1PIC-131A to maintain LETDOWN PRESS 1PI-131A between 360 and 380 psig. b. Record the letdown orifice that was placed in service in the Unit Control Log.
	OATC	4.4.2.8 WHEN LETDOWN PRESS 1PI-131A stabilizes between 360 psig, place 1PIC-131 in AUTO.
	OATC	4.4.2.9 Place LETDOWN HX OUTLET TEMP 1TIC-130 in AUTO and verify it maintains temperature less than or equal to 115°F.

Event No.: 6

Event Description: Return Normal Charging and Letdown to service after Normal Charging Pump (NCP) trip.

Time	Position	Applicant's Action or Behavior
	OATC	4.4.2.10 Verify LETDOWN REGEN HX OUT 1TI-127 indicates less than 380°F.
	OATC	4.4.2.11 Monitor 1LR-459 Pressurizer Level and Pressurizer Level Setpoint.
	OATC	4.4.2.12 Maintain Pressurizer Level within 1% of Level Setpoint using 1FIC-121.
	OATC	4.4.2.13 Place Pressurizer Level Control in automatic UNLESS it is to remain in Manual under Tagout or Caution tag: a. Verify PRZR Level Controller 1LIC-459 in AUTO. b. AFTER level has been stable within 1% of setpoint for approximately 3 minutes, place 1FIC-121 in AUTO.
	OATC	4.4.2.14 This step is N/A.
		END OF EVENT 6, RETURN TO AOP 18007-C (EVENT 5).

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Event No.: 7

Event Description: **An RCS small break LOCA will develop in the vessel head area requiring a reactor trip and safety injection. There will be complication during the LOCA. The BIT valves will fail to open automatically or manually. SIP B will not auto start and require the OATC to manually start the pump for the only available injection flow.**

Time	Position	Applicant's Action or Behavior
	TEAM	Diagnoses an RCS leak has developed: Symptoms / alarms: • INTERMEDIATE AND HIGH RADIATION ALARMS Indications: • RE-2562 showing alarm condition on SRDC • Charging – letdown flow mismatch. • PRZR level lowering rapidly.
	SS	**Note to examiner:** The SS may or may not have time to briefly enter the AOP due to the severity of the leak. It is NOT expected the crew will have time to progress beyond step 3.b of 18004-C.
	SS / TEAM	Enters AOP-18004-C section A for RCS Leakage in Mode 1. Step A1 – SS checks crew in proper section (section A). Step A2 - SS directs initiation of Continuous Actions page.

Event No.: 7

Event Description: **An RCS small break LOCA will develop in the vessel head area requiring a reactor trip and safety injection. There will be complication during the LOCA. The BIT valves will fail to open automatically or manually. SIP B will not auto start and require the OATC to manually start the pump for the only available injection flow.**

Time	Position	Applicant's Action or Behavior
	OATC	Step A3 – Maintains PRZR level. Step A3.a – adjusts charging flow to maintain PRZR level. Step A3.b – Checks PRZR level stable or rising. **(NO)** RNO Step A3.b – Perform the following: 1) Isolate letdown by closing: a) Letdown Orifice Valves. b) Letdown Isolation Valves. c) Excess Letdown Valves. 2) Start an additional Charging Pump as necessary. 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. **Note to examiner:** The crew may trip the Reactor and actuate SI prior to reaching the procedure steps due to degrading plant conditions:

Event No.: 7

Event Description: **An RCS small break LOCA will develop in the vessel head area requiring a reactor trip and safety injection. There will be complication during the LOCA. The BIT valves will fail to open automatically or manually. SIP B will not auto start and require the OATC to manually start the pump for the only available injection flow.**

Time	Position	Applicant's Action or Behavior
	CREW SS	Performs Immediate Operator Actions per 19000-C, E-0 Reactor Trip or Safety Injection. 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 SS	4. Check if SI is actuated. **(YES)** • Any SI annunciators – LIT • SI ACTUATED BPLP window – LIT Go to Step 6.

Event No.: 7

Event Description: **An RCS small break LOCA will develop in the vessel head area requiring a reactor trip and safety injection. There will be complication during the LOCA. The BIT valves will fail to open automatically or manually. SIP B will not auto start and require the OATC to manually start the pump for the only available injection flow.**

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 • UO Initial Actions Page **NOTE: SS initiates step 8 after OATC/UO Initial Actions completed.**

Event No.: 7

Event Description: **An RCS small break LOCA will develop in the vessel head area requiring a reactor trip and safety injection. There will be complication during the LOCA. The BIT valves will fail to open automatically or manually. SIP B will not auto start and require the OATC to manually start the pump for the only available injection flow.**

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 **Note to examiner:** Only train B pumps will be aligning due to Train A is in PTL due to Loss of Train A NSCW. Valves, dampers, etc. will re-align.
	OATC	2. Check Containment Isolation Phase A – ACTUATED. **(YES)** • CIA MLB indication
	OATC **Critical**	3. Check ECCS Pumps and NCP status: a. CCPs RUNNING. **(YES)** b. SI Pumps – RUNNING. **(NO)** RNO **b. Start Pump B** **Note to examiner:** SIP A is in PTL due to Loss of NSCW Train A. c. RHR pumps – RUNNING. **(YES)** d. NCP – TRIPPED. **(YES)**
	OATC	4. Verify CCW Pumps – ONLY TWO RUNNING TRAIN B. **(YES)**

Event No.: 7

Event Description: **An RCS small break LOCA will develop in the vessel head area requiring a reactor trip and safety injection. There will be complication during the LOCA. The BIT valves will fail to open automatically or manually. SIP B will not auto start and require the OATC to manually start the pump for the only available injection flow.**

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 TRAIN B. b. NSCW TOWER RTN HDR BYPASS BASIN hand switches – IN AUTO: • HS-1669A
	OATC	6. Verify Containment Cooling Units: **(YES)** a. ALL RUNNING IN LOW SPEED. (Train B) • MLB indication b. NSCW Cooler isolation valves – OPEN. **(YES)** • MLB indication
	OATC	7. Check Containment Ventilation Isolation. **a.** Dampers and Valves – CLOSED. **(YES)**

Event No.: 7

Event Description: **An RCS small break LOCA will develop in the vessel head area requiring a reactor trip and safety injection. There will be complication during the LOCA. The BIT valves will fail to open automatically or manually. SIP B will not auto start and require the OATC to manually start the pump for the only available injection flow.**

Time	Position	Applicant's Action or Behavior
	OATC	**PERFORMS OATC INITIAL ACTIONS** 8. Check Containment pressure – REMAINED LESS THAN 21 PSIG. **(YES)**
	OATC	**Note to examiner:** BIT Discharge Valves will NOT open. 9. Check ECCS flows: a. BIT flow. **(NO)** RNO a. Align Valves using ATTACHMENT B. (Valves will **NOT** open) b. RCS pressure – LESS THAN 1625 PSIG. **(NO)** RNO b. Go to Step 10.
	OATC	10. Check ECCS Valve alignment – PROPER INJECTION LINEUP INDICATED ON MLBs. **(NO)** **Note to examiner:** HV-8801A / B will NOT open. The candidate may using Attachment B to align the valves. Procedure attachment B is at the end of this event but the valves will NOT open.
	OATC	11. Check ACCW pumps – AT LEAST ONE RUNNING. **(YES)**
	OATC	12. Adjust Seal Injection flow to all RCPs – 8 to 13 GPM.

Event No.: 7

Event Description: **An RCS small break LOCA will develop in the vessel head area requiring a reactor trip and safety injection. There will be complication during the LOCA. The BIT valves will fail to open automatically or manually. SIP B will not auto start and require the OATC to manually start the pump for the only available injection flow.**

Time	Position	Applicant's Action or Behavior
	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.**

Event No.: 7

Event Description: **An RCS small break LOCA will develop in the vessel head area requiring a reactor trip and safety injection. There will be complication during the LOCA. The BIT valves will fail to open automatically or manually. SIP B will not auto start and require the OATC to manually start the pump for the only available injection flow.**

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

Event No.: 7

Event Description: **An RCS small break LOCA will develop in the vessel head area requiring a reactor trip and safety injection. There will be complication during the LOCA. The BIT valves will fail to open automatically or manually. SIP B will not auto start and require the OATC to manually start the pump for the only available injection flow.**

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)**

Event No.: 7

Event Description: **An RCS small break LOCA will develop in the vessel head area requiring a reactor trip and safety injection. There will be complication during the LOCA. The BIT valves will fail to open automatically or manually. SIP B will not auto start and require the OATC to manually start the pump for the only available injection flow.**

Time	Position	Applicant's Action or Behavior
	UO	9. Check Main Generator Output Breakers – OPEN. **(NO)** RNO 9. Open Generator Output Breaker on affected Unit: <u>UNIT 1:</u> • Push and hold 1-PB-161710A and then place 1-HS-161710 in TRIP position. • Push and hold 1-PB-161810A and then place 1-HS-161810 in TRIP position.
	OATC UO	**BACK TO 19000-C PROCEDURE MAIN BODY** 8. Initiate the Continuous Actions Page.

Event No.: 7

Event Description: **An RCS small break LOCA will develop in the vessel head area requiring a reactor trip and safety injection. There will be complication during the LOCA. The BIT valves will fail to open automatically or manually. SIP B will not auto start and require the OATC to manually start the pump for the only available injection flow.**

Time	Position	Applicant's Action or Behavior
	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.

Event No.: 7

Event Description: **An RCS small break LOCA will develop in the vessel head area requiring a reactor trip and safety injection. There will be complication during the LOCA. The BIT valves will fail to open automatically or manually. SIP B will not auto start and require the OATC to manually start the pump for the only available injection flow.**

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 **CRITICAL**	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. **(IF YES go to step 11.c and trip RCPs. IF NOT, perform step 11.d)** RNO b. Go to Step 12. **c. Trip the RCPs.** **Note to Examiner:** Critical if RCP Trip Criteria met at this time. It may be RCP Trip Criteria will be met by Foldout Page or in the early steps of 19010-C, E-1 Loss of Reactor Or Secondary Coolant.

Event No.: 7

Event Description: **An RCS small break LOCA will develop in the vessel head area requiring a reactor trip and safety injection. There will be complication during the LOCA. The BIT valves will fail to open automatically or manually. SIP B will not auto start and require the OATC to manually start the pump for the only available injection flow.**

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.

Event No.: 7

Event Description: **An RCS small break LOCA will develop in the vessel head area requiring a reactor trip and safety injection. There will be complication during the LOCA. The BIT valves will fail to open automatically or manually. SIP B will not auto start and require the OATC to manually start the pump for the only available injection flow.**

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. **(YES)** • MAIN STEM 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: c. Check SG levels – ANY RISING IN AN UNCONTROLLED MANNER. **(NO)** RNO c. Go to Step 14.

Event Description: **An RCS small break LOCA will develop in the vessel head area requiring a reactor trip and safety injection. There will be complication during the LOCA. The BIT valves will fail to open automatically or manually. SIP B will not auto start and require the OATC to manually start the pump for the only available injection flow.**

Time	Position	Applicant's Action or Behavior
	CREW	14. Check if RCS is intact inside Containment **(NO)** • Containment radiation – NORMAL **(NO)** • Containment pressure – NORMAL **(NO)** • Containment Emergency Recirculation Sump levels – NORMAL **(NO)** RNO 14. Go to 19010-C, E-1 LOSS OF REACTOR OR SECONDARY COOLANT
	SS	Transitions to 19010-C, E-1 Loss of Reactor or Secondary Coolant. **Note to examiner:** Actions for 19010-C on following pages.

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Event No.: 7

Event Description: **Continuation of SB LOCA actions for Event 7 in 19010-C.**

Time	Position	Applicant's Action or Behavior
	OATC UO	1. Initiate the following: • Continuous Actions and Foldout Page. • Critical Safety Function Status Trees per 19200-C, F-O CRITICAL SAFETY FUNCTION 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 **Critical**	4. 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. **(YES)** c. **Stop all RCPs.** **Note to examiner:** Critical at this time IF RCP Trip Criteria was not met previously in E-0.

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Event No.: 7

Event Description: **Continuation of SB LOCA actions for Event 7 in 19010-C.**

Time	Position	Applicant's Action or Behavior
	OATC	5. Check ACCW Pumps – AT LEAST ONE RUNNING. **(YES)**
	UO	6. Place Containment Hydrogen Monitors in service by initiating 13130, POST-ACCIDENT HYDROGEN CONTROL. **NOTE to examiners: Crew may call C & T to perform this.**
	UO	7. Check SGs secondary pressure boundaries: a. Identify faulted SG(s): __ ANY SG PRESSURE LOWERING IN AN UNCONTROLLED MANNER. **(NO)** -OR- __ ANY SG COMPLETELY DEPRESSURIZED. **(NO)** RNO a. Go to Step 8.

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Event No.: 7

Event Description: **Continuation of SB LOCA actions for Event 7 in 19010-C.**

Time	Position	Applicant's Action or Behavior
	UO	8. Check intact SG levels: a. NR level – AT LEAST ONE GREATER THAN 10% (32% ADVERSE. 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 9.

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Event No.: 7

Event Description: Continuation of SB LOCA actions for Event 7 in 19010-C.

Time	Position	Applicant's Action or Behavior
	UO	9. Check SG Tubes intact: a. Direct Chemistry to take periodic activity samples of all SGs one at a time. b. Secondary radiation – NORMAL. **(YES)** • MAIN STM LINE MONITORS • RE-13120 (SG 1) • RE-13121 (SG 2) • RE-13122 (SG 3) • RE-13119 (SG 4) • CNDSR AIR EJCTR/STM RAD MONITORS • RE-12839C • RE-12839D (if on scale) • RE-12839E (if on scale) • STM GEN LIQ PROCESS RAD: • RE-0019 (Sample) • RE-0021 (Blowdown) • SG sample radiation. c. Check SG levels – ANY RISING IN AN UNCONTROLLED MANNER. **(NO)** RNO c. Go to Step 10.

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Event No.: 7

Event Description: **Continuation of SB LOCA actions for Event 7 in 19010-C.**

Time	Position	Applicant's Action or Behavior
	OATC	10. 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 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. d. Any RCS WR CL temperature – LESS THAN 220°F. **(NO)** RNO d. WHEN any RCS CL temperature lowers to less than 220°F, THEN arm COPS. Go to Step 11.
	CREW	11. Check if ECCS flow should be reduced: **a.** RCS Subcooling – GREATER THAN 24°F (38°F ADVERSE). **(NO)** RNO a. Go to Step 12.

Event No.: 7

Event Description: Continuation of SB LOCA actions for Event 7 in 19010-C.

Time	Position	Applicant's Action or Behavior
	OATC	12. Check if Containment Spray should be stopped: a. CS Pumps – RUNNING. **(NO)** Go to Step 13.
	CREW	**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)

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Event No.: 7

Event Description: **Continuation of SB LOCA actions for Event 7 in 19010-C.**

Time	Position	Applicant's Action or Behavior
	OATC	13. Check if RHR Pumps should be stopped: a. RHR Pumps – ANY RUNNING WITH SUCTION ALIGNED TO RWST. (YES) b. RCS pressure: 1) Greater than 300 psig. **(YES)** 2) Stable or rising. **(NO)** RNO 1) Go to Step 15.
	OATC	15. Check RCS and SG pressures: • Pressure in all SGs – STABLE OR RISING **(YES)** • RCS pressure – STABLE OR LOWERING. **(YES)**

Op-Test No.: 2012-301 **Scenario No.:** 2

Event No.: 7

Event Description: Continuation of SB LOCA actions for Event 7 in 19010-C.

Time	Position	Applicant's Action or Behavior
	UO	16. Check if DGs should be stopped: a. AC Emergency Busses – ENERGIZED BY OFFSITE POWER. **(YES)** b. Reset SI, if necessary. **(YES, reset SI at this time)** c. Stop any unloaded DG and place in standby by initiating 13145, DIESEL GENERATORS. d. Check Stub Busses – ENERGIZED. **(NO)** • NB01 • NB10 RNO d. Energize Stub Busses by performing the following as necessary:

NB01	NB10
1) Open breaker NB01-01	1) Open breaker NB10-01
2) Close breaker AA02-22	2) Close breaker BA03-18
3) Close breaker NB01-01	3) Close breaker NB10-01

Event No.: 7

Event Description: Continuation of SB LOCA actions for Event 7 in 19010-C.

Time	Position	Applicant's Action or Behavior
	OATC	17. Check Cold Leg recirculation capability: a. Power available to: Train A components: • HV-8811A – CNMT SUMP TO RHR PMP-A SUCTION **(YES)** • RHR Pump A - OPERABLE **(NO)** • HV-8809A – RHR PMP-A TO COLD LEG 1 & 2 ISO VLV **(YES)** • RHR Heat Exchanger A – OPERABLE **(YES)** **NOTE to examiners: Train A is NOT available due to RHR pump A is in PTL due to the Loss of NSCW.** -OR- Train B components: • HV-8811B – CNMT SUMP TO RHR PMP-B SUCTION **(YES)** • RHR Pump B - OPERABLE **(YES)** • HV-8809B – RHR PMP-B TO COLD LEG 3 & 4 ISO VLV **(YES)** • RHR Heat Exchanger B – OPERABLE **(YES)**

Event No.: 7

Event Description: Continuation of SB LOCA actions for Event 7 in 19010-C.

Time	Position	Applicant's Action or Behavior
	UO	18. Check Auxiliary Building leak detection systems: a. PLANT VENT Radiation Monitors – NORMAL: **(YES)** • RE-12442A EFFL PART • RE-12442B EFFL IODINE • RE-12442C EFFL RAD • RE-12444C RADIOGAS RAD b. Auxiliary Building break detection system on QPCP – ALL LEAK DETECTION STATUS LIGHTS NOT LIT. **(YES)**
	CREW	19. Direct Chemistry to obtain samples: • For boron, pH, and radioactivity: • RCS • Both Containment Emergency Sumps (if cold leg recirculation has been established.) • For radioactivity, hydrogen and oxygen concentrations. • Containment atmosphere

Event No.: 7

Event Description: Continuation of SB LOCA actions for Event 7 in 19010-C.

Time	Position	Applicant's Action or Behavior
	CREW	20. Evaluate plant equipment. a. Secure unnecessary plant equipment. b. Within 8 hours of SI actuation, isolate NSCW Corrosion Monitor Racks: • Close 1202-U4-179 • Close 1202-U4-180 (located in NSCTs on NSCW return header) b. Repair or make available inoperable equipment which may be required. c. Consult TSC for additional equipment to be started or actions to be taken to assist in recovery including. • H2 Monitors • CRDM Fans • Within 5 days, initiate Containment inspection/cleanup if Containment Spray actuated and was terminated prior to recirculation.

Op-Test No.: 2012-301 **Scenario No.:** 2

Event No.: 7

Event Description: Continuation of SB LOCA actions for Event 7 in 19010-C.

Time	Position	Applicant's Action or Behavior
	CREW	21. **In the event of a Design Basis Accident, the following apply concerning conservation of Ultimate Heat Sink inventory:** • IF a DBA LOCA coincident with a LOSP has occurred, THEN secure one train of NSCW within 24 hours of the initiating event per 13150, NUCLEAR SERVICE COOLING WATER SYSTEM. • IF a DBA LOCA without an LOSP has occurred and normal NSCW makeup is lost, THEN secure one train of NSCW within 24 hours of the loss of makeup capability per 13150, NUCLEAR SERVICE COOLING WATER SYSTEM. • Initiate periodic monitoring of NSCW Basin level to ensure adequate inventory is maintained for continued operation of NSCW Basin makeup. • Consult TSC as necessary for alternate sources of NSCW Basin makeup.

Op-Test No.: 2012-301 **Scenario No.:** 2 **Page 13 of 13**

Event No.: 7

Event Description: Continuation of SB LOCA actions for Event 7 in 19010-C.

Time	Position	Applicant's Action or Behavior
	SS	22. Check is RCS cooldown and depressurization is required: a. RCS pressure – GREATER THAN 300 PSIG. **(YES)** b. Go to 19012-C, ES-1.2 POST LOCA COOLDOWN AND DEPRESSURIZATION.
	THE END	**THIS IS THE END OF EVENT 7.** **AND** **THE END OF THE SCENARIO. (unless stopped earlier by NRC)**

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.

SIMULATOR REACTIVITY BRIEFING SHEET

Shift: **Day** Date: **Today** Burnup: **10,000** MWD/MTU Core Life: **MOL**

MINIMUM SHIFT REACTIVITY INFORMATION TO BE BRIEFED

Power: **100** Rod Motion: **Rods in automatic..**

Current Temperature Control Strategy: **Dilution**

Currently Making Up: **30** gallons every **as needed**

The desired Tavg operating band is 585.3 ± 0.05°F

CVCS makeup boric acid flow per 100 gallon makeup (FI-110A): **13.1** gallons/100
CVCS makeup pot setting (FIC-110): **3.28**

BTRS Strategy: **None**
AFD Strategy: **Maintain on target ± 1 AFD units**

Reactivity System Components Degraded/OOS:

None

Activities Expected That May Affect Core Reactivity (Reactivity Focus Items):

None.

CURRENT CORE REACTIVIITY PARAMETERS

Boron worth: **8.4** pcm/ppm PCM per 1% power change: **17.3** pcm/%

Current MTC values HFP: **-15.7** pcm/°F HZP: **-2.3** pcm/°F

Current BAST C_b: **7,000** ppm Current RCS C_b: **917** ppm

Boration required per	degree °F:	**19**	gallons
	1% power change:	**21**	gallons
	10% power change:	**207**	gallons
	30% power change:	**622**	gallons
Dilution required per	degree °F:	**125**	gallons
	1% power change:	**138**	gallons

Boration required for stuck rods (154 ppm/rod): **3,188** gallons for 2 stuck rods
4,846 gallons for 3 stuck rods

**If more than 3 rods are stuck, begin emergency boration and calculate gallons for actual number of stuck rods.*

Human Performance Tools

Peer Check	Three-Way Communication	Self-Verification (STAR)
Pre-Job Briefing	Phonetic Alphabet	Timeout
Procedure Use (placekeeping)	One Minute Matters (situational awareness)	

Valid for Cycle 17, PTDB Tab 1.0 revision 28.0 and Tab 16.0 revision 18.0

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

Examiners: Meeks Operators: _____
Bates _____
Capehart _____

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 FU 13 Condition E and LCO 3.3.2 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 FU 6 Condition E, LCO 3.3.1 FU 8a Condition M,** **LCO 3.3.1 FU 8b Condition E, LCO 3.3.2 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 FU 13 Condition E

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.

Technical Specifications:

None

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 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) 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 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.

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 and 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]
	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]
	OATC / UO	E4. Initiate the Continuous Actions Page.

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 and 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>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>E. One channel inoperable</td><td>E.1 Place channel in trip.
OR
E.2 Be in MODE 3.</td><td>72 hours

78 hours</td></tr>
</table>
</td></tr>
</table>

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 and unaffected level channel and returns SG # 4 MFRV to Auto.

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.

Op-Test No.: 2012-301 **Scenario No.:** 3 **Page 1 of 6**

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** **Page 2 of 6**

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 UO	A3. Check pipe break protection valves – OPEN. • HV-15214 **(NO)** • HV-8160 **(NO)** RNO 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.

Op-Test No.: 2012-301 **Scenario No.:** 3 **Page 3 of 6**

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	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 **Page 4 of 6**

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. **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 **Page 5 of 6**

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. 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.
	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 **Page 6 of 6**

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

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.

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.

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.

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)

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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.

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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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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.
	OATC	C9. Place PORVs in AUTO and verify proper operation.
	OATC	C10. Return PRZR pressure Master Controller to AUTO.

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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.**

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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 6 OTΔT — E 8a Low PRZR pressure — M 8b High PRZR pressure — E • TS 3.3.2 ESFAS Function — Condition 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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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.**

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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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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

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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.

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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."

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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.

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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 **Page 1 of 6**

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.

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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.

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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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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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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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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.

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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.

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>

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).

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 at end of this event.
	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.

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** **Page 1 of 12**

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 SS	Performs Immediate Operator Actions per 19000-C, E-0 Reactor Trip or Safety Injection. 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 SS	4. Check if SI is actuated. **(YES)** • Any SI annunciators – LIT • SI ACTUATED BPLP window – LIT Go to Step 6.

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 • UO Initial Actions Page **NOTE: SS initiates step 8 after OATC/UO Initial Actions completed.**

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)**

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)**

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	**Note to examiner:** BIT Discharge Valves will NOT open. 9. Check ECCS flows: a. BIT flow **(YES)** b. RCS pressure – LESS THAN 1625 PSIG. **(NO)** RNO b. 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.**

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.

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)**

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** 8. Initiate the Continuous Actions Page.

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	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.

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.

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.

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 STEM 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 **Page 1 of 13**

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.

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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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	8. Verify SG Blowdown Isolation Valves – CLOSED WITH HANDSWITCHES IN CLOSE POSTION.
	OATC	9. Isolate flow from the ruptured SG(s) by closing its Main Steamline isolation and Bypass Valves.

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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	10. Check ruptured SG(s) level: a. SG NR level – GREATER THAN 10% (32% ADVERSE). **(YES)** b. Step feed flow to ruptured SG(s).
	Critical	**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 **Page 5 of 13**

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 steamp 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.

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Event No.: 7

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

<table>
<tr><th>Time</th><th>Position</th><th>Applicant's Action or Behavior</th></tr>
<tr><td></td><td>OATC</td><td>15. Check at least one RCP – RUNNING. (YES)</td></tr>
<tr><td></td><td>SS</td><td>16. Determine required core exit temperature for cooldown.
<table>
<tr><th>Lowest Ruptured SG Pressure (psig)</th><th>Core Exit Temperature (°F)</th></tr>
<tr><td>1200 and greater</td><td>530</td></tr>
<tr><td>1100 to 1199</td><td>518</td></tr>
<tr><td>1000 to 1099</td><td>506</td></tr>
<tr><td>900 to 999</td><td>493</td></tr>
<tr><td>800 to 899</td><td>479</td></tr>
<tr><td>700 to 799</td><td>463</td></tr>
<tr><td>600 to 699</td><td>445</td></tr>
<tr><td>500 to 599</td><td>424</td></tr>
<tr><td>400 to 499</td><td>399</td></tr>
<tr><td>300 to 399</td><td>366</td></tr>
<tr><td>290 to 299</td><td>350</td></tr>
<tr><td></td><td></td></tr>
</table>
Note to examiner: Expect to pick either 518 or 506.</td></tr>
</table>

Op-Test No.: 2012-301 **Scenario No.:** 3 **Page 7 of 13**

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.

Op-Test No.: 2012-301 **Scenario No.:** 3 **Page 8 of 13**

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.

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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.

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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. **(NO)** RNO b. Go to Step 26.
	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.

Op-Test No.: 2012-301 **Scenario No.:** 3 **Page 11 of 13**

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: 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)**

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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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.
		END OF EVENT 7, END OF SCENARIO # 3.

target ZERO Every day, every job, safely.	**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.

SIMULATOR REACTIVITY BRIEFING SHEET

Shift: **Day** Date: **Today** Burnup: **10,000** MWD/MTU Core Life: **MOL**

MINIMUM SHIFT REACTIVITY INFORMATION TO BE BRIEFED

Power: **100** Rod Motion: **Rods in automatic..**

Current Temperature Control Strategy: **Dilution**

Currently Making Up: **30** gallons every **as needed**

The desired Tavg operating band is 585.3 ± 0.05°F

CVCS makeup boric acid flow per 100 gallon makeup (FI-110A): **13.1** gallons/100
CVCS makeup pot setting (FIC-110): **3.28**

BTRS Strategy: **None**
AFD Strategy: **Maintain on target ± 1 AFD units**

Reactivity System Components Degraded/OOS:

None

Activities Expected That May Affect Core Reactivity (Reactivity Focus Items):

None.

CURRENT CORE REACTIVIITY PARAMETERS

Boron worth: **8.4** pcm/ppm PCM per 1% power change: **17.3** pcm/%

Current MTC values HFP: **-15.7** pcm/°F HZP: **-2.3** pcm/°F

Current BAST C_b: **7,000** ppm Current RCS C_b: **917** ppm

Boration required per	degree °F:	**19**	gallons
	1% power change:	**21**	gallons
	10% power change:	**207**	gallons
	30% power change:	**622**	gallons
Dilution required per	degree °F:	**125**	gallons
	1% power change:	**138**	gallons

Boration required for stuck rods (154 ppm/rod): **3,188** gallons for 2 stuck rods
4,846 gallons for 3 stuck rods

**If more than 3 rods are stuck, begin emergency boration and calculate gallons for actual number of stuck rods.*

Human Performance Tools

Peer Check	Three-Way Communication	Self-Verification (STAR)
Pre-Job Briefing	Phonetic Alphabet	Timeout
Procedure Use (placekeeping)	One Minute Matters (situational awareness)	

Valid for Cycle 17, PTDB Tab 1.0 revision 28.0 and Tab 16.0 revision 18.0

Appendix D	Scenario Outline	Form ES-D-1

Facility: Vogtle Scenario No.: 5 Op-Test No.: 2012-301

Examiners: Meeks Operators: _____
Bates _____
Capehart _____

Initial Conditions: The plant is at 69% power, BOL, steady state operations, control rods in automatic. (Base IC # 38, snapped to IC # 185 for HL17 NRC Exam)

Equipment OOS: None

Turnover: The plant is at 69% power, MFPT B has just been returned to service, a chemistry hold is in effect. Once chemistry hold lifted, per 12004-C, Power Operation (Mode 1), raise power to 100%. Containment mini-purge is in service for a Containment entry on the next shift. Safety Injection Pump "A" is tagged out for motor repair.

Preloaded Malfunctions:

IA09B - Air Compressor # 2 auto start failures.
IA09D - Air Compressor # 4 auto start failures.
cs:trip(1) – (new malfunction) CS pump # 1 trip
testmalf(2) – (new malfunction) CS pump # 2 discharge valve fails to open
testmalf(3) – (new malfunction) Failure of containment coolers to start in slow speed.
FW17F FWI failure to close loop # 2 MFIV – manual closure allowed.
SIP "A" Tagged Out

Overrides

Note to Simbooth Operator – Place Containment Mini-Purge in service.

Event No.	Malf. No.	Event Type*	Event Description
T1	new RD15 @1.0	C-OATC C-SS	Uncontrolled outward rod motion in automatic at maximum speed, selector switch to manual will stop rod motion.
T2	N/A	R-OATC R-SS N-UO	Initiates power ascent from 69% per UOP-12004-C direction. Raises turbine load per UOP-12004-C direction.
T3	new malf (7)	C-UO C-SS	Running IA compressor # 3 trips with failure of standby air compressors to automatically start.
T4	CC03A @50%	C-UO C-SS TS-SS	CCW Train A pipe break with trip of all CCW pumps. **LCO 3.7.7, Condition A**

Event No.	Malf. No.	Event Type*	Event Description
T5	RC11D	TS-SS	RCS Loop # 4 flow transmitter fails down scale low. **LCO 3.3.1 FU10a Condition N**
T6	EL13D ALB34 D07 1DD1I4	C-UO C-SS TS-SS	Loss of 120V Vital Instrument Panel DY1B, may be re-energized from the regulated transformer. **LCO 3.8.7 Condition A, LCO 3.8.9 Condition B** **LCO 3.3.1 FU16c, d, e Condition S**
7	N/A	N-OATC N-SS	Places Excess Letdown into service.
T8	new malf (4)	C-OATC C-SS	PRZR Spray Valve loop # 4 fails open, manual closure allowed.
T9	MS04B 0-45% 60 sec ramp	M-ALL	Faulted SG # 2 IRC.
10	Preload	C-OATC C-SS **Critical**	CS pump B discharge valve fails to automatically open. Either opening the CS pump B discharge valve OR starting at least one train of containment coolers in low speed will satisfy this step.
11	Preload	C-UO C-SS **Critical**	Containment coolers fail to start in slow speed. Either opening the CS pump B discharge valve OR starting at least one train of containment coolers in low speed will satisfy this step.
12	Preload	C-UO C-SS **Critical**	Failure of Loop # 2 MFIV to automatically close on faulted SG # 2. Manual isolation of loop # 2 MFIV is allowed.

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

Event 1:

Uncontrolled outward rod motion of CBD while in automatic.

Verifiable Actions:

OATC – Places control rods in manual to stop uncontrolled outward rod motion of CBD and uncontrolled power increase and overpower condition and/or reactor trip.

UO – Restores Tavg to program by adjusting turbine load.

Technical Specifications:

None

Event 2:

Power ascent per UOP-12004-C, Power Operations.

Verifiable Actions:

UO – Manipulates turbine controls to raise power.

OATC – Adjusts RCS boron concentration and control rods as necessary to control reactor power and to maintain AFD in limits.

Technical Specifications:

None

Event 3:

Air compressor # 3 trips with standby air compressors # 2 and # 4 failing to automatically start.

Verifiable Actions:

UO – Starts air compressor # 4 (or # 2).

Technical Specifications:

None

Event 4:

CCW Train A pipe break resulting in a trip of all Train A CCW pumps.

Verifiable Actions:

UO – Starts CCW Train B.

UO – Places all Train A CCW pumps in PTL.

UO – Isolates makeup to Train A CCW by placing LV-1850 Demin Water To CCW TK to close.

Technical Specifications:

LCO 3.7.7 Component Cooling Water System, Condition A

Event 5:

RCS loop flow transmitter FT-444 fails low.

Verifiable Actions:

None, this is an additional Technical Specification for the SS.

Technical Specifications:

LCO 3.3.1 Reactor Trip System Instrumentation, FU10a, Condition N
INFO LCO 3.3.1 Reactor Trip System Instrumentation, FU 10b

Event 6:

A loss of 120V AC vital bus 1DY1B will occur.

Verifiable Actions:

OATC – Manually isolates letdown stopping a letdown leak to the PRT by closing the Letdown Orifice Isolation Valves and by closing the Letdown Isolation Valves.

OATC – Adjusts seal injection to 8 – 13 gpm per RCP by adjusting Seal Controller HC-182.

OATC - Maintains charging flow approximately 10 gpm greater than seal injection flow by controlling FIC-0121 Charging Flow Controller.

OATC – Selects an unaffected channel for PRZR Pressure Control on 1PS-455F PRZR PRESSURE CNTL SELECT.

OATC – Selects unaffected channel on 1TS-412T T-AVG DEFEAT SEL.

OATC – Selects unaffected channel on 1TS-411F DELTA T DEFEAT SEL.

UO – Places ROD STOP BYPASS switch to BYPASS PRN44 position.

OATC – Adjust control rods to restore Tavg to Tref .

UO – Places SGBD isolation valves in closed with the hand switches in closed.

Technical Specifications:

LCO 3.3.1 Reactor Trip System (RTS) Instrumentation FU16c,d,e Condition S
LCO 3.8.7 Inverters – Operating Condition A
LCO 3.8.9 Distribution Systems – Operating Condition B

Event # 7

Place Excess Letdown in service to control PRZR level below PRZR high level reactor trip set point.

Verifiable Actions:

OATC – Places Excess Letdown in service by performing the following:

- Sets 1HC-123 to closed (0% demand).
- Opens Excess Letdown Isolation valves 1-HV-8153 / 1-HV-8154.
- Adjusts 1HC-123 to establish maximum allowable Excess Letdown flow (~30 gpm).
- Adjusts 1FIC-121 and 1HC-182 to control charging and seal injection flows.

Technical Specifications:

None

Event 8:

PRZR Spray valve loop # 4 fails open.

Verifiable Actions:

OATC – Manually closes loop # 4 PRZR Spray valve to prevent a reactor trip and safety injection on PRZR low pressure. Also, prevents a DNB event.

OATC – Operates PRZR heaters to raise PRZR pressure.

Technical Specifications:

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

Event # 9, 10, 11, 12

DBA Main Steam Line break inside Containment.

Verifiable Actions:

OATC – Manually actuates reactor trip from both reactor trip switches when RTB B fails to open.

OATC – Manually opens Containment Spray Discharge Valve 1HV-9001B.

UO – Manually closes MFIV for loop # 2.

UO – Manually starts all Containment Coolers in slow speed.

UO – Manually isolates faulted SG # 2 by verifying the following valves closed:

- Main Steam line Isolation and Bypass valves
- Loop # 2 MFIV (HV-5228)
- Loop # 2 BFIV (HV15197)
- HV-5132 SG # 2 from MDAFW PMP-B
- HV-5125 SG # 2 from TDAFW
- HV-3009 (SG 2) LP-2 MS SPLY TO AUX FW TD PMP-1
- SG ARV PV-3010(SG 2)
- SGBD hand switches
- SG Sample Valves

The scenario may be stopped after transition to 19010-C or 19011-C with chief examiner approval.

CRITICAL TASKS:

1) Start at least 4 Containment Coolers in slow speed to cooldown and depressurize Containment to prevent challenge to the Containment barrier which could result in an uncontrolled release to the environment by completion of Operator Initial Actions of 19000-C.

OR

Opens Containment Spray Train B discharge isolation HV-9001B to cooldown and depressurize Containment to prevent challenge to the Containment barrier which could result in an uncontrolled release to the environment per Foldout Page of 19000-C or step 8 of OATC Operator Initial Actions (if CNMT is > 21.5 psig).

2) Failure of Loop # 2 MFIV (HS-5228) to automatically close, manual closure required by the UO no later than step 4 of UO Initial Operator Actions. Closure of the valve will limit feed flow to the faulted SG. This will limit the Containment pressure rise and challenge to the Containment barrier which could result in an uncontrolled release to the environment.

3) Isolates SG # 2 to limit RCS cool down and potential RCS Integrity (PTC) condition. This will also limit the Containment pressure rise and challenge to the Containment barrier which could result in an uncontrolled release to the environment. These actions will be done no later than the 19020-C procedure step which calls for the action.

- **HV-5132 SG # 2 from MDAFW PMP-B**
- **HV-5125 SG # 2 from TDAFW**
- **HV-3009 (SG 2) LP-2 MS SPLY TO AUX FW TD PMP-1.**

Op-Test No.: 2012-301 **Scenario No.:** 5

Event No.: 1

Event Description: Uncontrolled Outward Rod Motion. Control rods will begin stepping out at 72 steps per minute and the OATC will take his IOA actions of 18003-C Rod Control Malfunction and place rods in Manual which will stop the outward rod motion.

Time	Position	Applicant's Action or Behavior
	OATC	Diagnoses the Uncontrolled Outward Rod Motion. Symptoms / alarms: • No annunciators are associated with this event. Indications: • Rod motion with invalid demand from the Automatic Rod Control System. • Outward rod motion in automatic. (auto outward motion is defeated at Plant Vogtle although internal failures could cause this to happen).
	OATC	**IMMEDIATE OPERATOR ACTIONS** B1. Stop uncontrolled Rod motion by performing the following: a. Place ROD BANK SELECTOR SWITCH in MAN position. b. Place the Rod Motion Switch in hold. B2. Check Rod motion – STOPPED. **Note to examiner:** Rod motion will stop when placed in manual.

Op-Test No.: 2012-301 **Scenario No.: 5** **Page 2 of 2**

Event No.: 1

Event Description: Uncontrolled Outward Rod Motion. Control rods will begin stepping out at 72 steps per minute and the OATC will take his IOA actions of 18003-C Rod Control Malfunction and place rods in Manual which will stop the outward rod motion.

Time	Position	Applicant's Action or Behavior
	OATC	B3. Check the following alarms – EXTINGUISHED: **(YES)** • ALB10-C4 ROD BANK LO LIMIT • ALB10-D4 ROD BANK LO-LO LIMIT
	UO	B4. Restore Tavg to program by adjusting turbine load.
	OATC	B5. Maintain power distribution when greater than or equal to 50% power. a. AFD – WITHIN THE LIMITS OF PTDB TAB 6.0. **(YES)** b. QPTR – LESS THAN OR EQUAL TO 1.02. **(YES)**
	SS	B6. Initiate repairs of Rod Control System.
	SS	B7. Return to procedure and step in effect. **END OF EVENT 1, proceed to EVENT 2.**

Op-Test No.: 2012-301 **Scenario No.:** 5

Event No.: 2

Event Description: Reactor Power Ascension from 69% RTP to 100% RTP.

Time	Position	Applicant's Action or Behavior
	OATC	Uses 13009-1, "CVCS Reactor Makeup Control System" Section 4.7 "Frequent Dilutions While Controlling Reactor Power", as necessary to maintain Tavg matched with Tref during power ascension.
	UO	Increases turbine load in increments of 15 Mwe to 30 Mwe using load increase pushbutton at direction of OATC. Monitors Generator Output
	OATC	**13009-1, Section 4.7:** NOTES • This section can be used during power changes when necessary to frequently dilute the RCS for temperature control. The use of this section shall be authorized by the SS. • Frequent dilutions can raise VCT level to the point where VCT pressure reaches 40 psig. 1-LIC-0185 may be adjusted to allow divert to the RHT at a lower level to limit VCT pressure increase. **4.7 FREQUENT DILUTIONS WHILE CONTROLLING REACTOR POWER** 4.7.1 Determine the amount of Reactor Makeup Water necessary to accomplish the power change or accommodate the expected impact of Xenon. (Uses Reactivity Briefing Sheet to Determine # gallons - Dilution) _____ Gals H_2O **NOTE: EACH OATC WILL USE NUMBER HE/SHE IS COMFORTABLE WITH. (100 –1000 Gallons)**
	OATC	4.7.2 Verify the Reactor Makeup System is aligned for automatic operation.
	OATC	4.7.3 Start one Reactor Makeup Water Pump: RX MU WTR PMP-1 1-HS-7762 RX MU WTR PMP-2 1-HS-7763

Event No.: 2

Event Description: Reactor Power Ascension from 69% RTP to 100% RTP.

Time	Position	Applicant's Action or Behavior
	OATC	4.7.4 Place VCT MAKEUP CONTROL 1-HS-40001B in STOP.
	OATC	4.7.5 As directed by the SS, place VCT MAKEUP MODE SELECT 1-HS-40001A in either the ALT DIL or DIL position.
	OATC	4.7.6 As directed by the SS, lower pot setting on 1-LIC-0185, to limit VCT pressure increase. Initial Pot Setting:_____ New Pot Setting:_____
	OATC	4.7.7 Set TOTAL MAKEUP Integrator 1-FQI-0111 for the desired amount of Reactor M/U Water. _____ Gals H_2O
	OATC	NOTE If VCT MAKEUP MODE SELECT 1-HS-40001A was placed in the DIL position in Step 4.7.5, Step 4.7.8 may be marked N/A. 4.7.8 If required, close 1-FV-0110B as necessary to raise or maintain RCS hydrogen concentration. ***(N/A)***
	SS / OATC	4.7.9 At SS direction, dilution flow may be adjusted to desired flow using 1-FIC-0111 (record in AUTO LOG). Initial Pot Setting: _____ New Pot Setting: _____ ***NOTE: EXPECTED NOT TO CHANGE DESIRED FLOW:***
	OATC	4.7.10 Place VCT MAKEUP CONTROL 1-HS-40001B in START and verify flow is indicated on 1-FI-0110B.

Event No.: 2

Event Description: Reactor Power Ascension from 69% RTP to 100% RTP.

Time	Position	Applicant's Action or Behavior
	OATC	4.7.11 WHEN TOTAL MAKEUP Integrator 1-FQI-0111 reaches its setpoint, verify dilution stops and the following valves close: • 1-FV-0111A RX MU WTR TO BA BLENDER • 1-FV-0111B BLENDER OUTLET TO VCT • 1-FV-0110B BLENDER OUTLET TO CHARGING PUMPS SUCT
	OATC	4.7.12 Operate the Pressurizer Back-up Heaters as necessary to equalize C_b between the RCS and the Pressurizer.
	OATC	4.7.13 Monitor RCS temperature, Control Bank position, or power levels as applicable.
	OATC	**CAUTION** If frequent dilutions are to be continued past the end of the shift, step 4.7.14 should be marked N/A and this section completed to include realignment to the normal configuration. The new on coming shift can then initiate the section from the beginning to continue frequent dilution. 4.7.14 **Repeat** Steps 4.7.10 through 4.7.13 as necessary to continue power ramp and/or compensate for Xenon. ***NOTE: OATC WILL LEAVE CVCS MAKEUP SYSTEM ALIGNED PER 4.7 FOR FREQUENT DILUTIONS WHILE CONTROLLING REACTOR POWER DURING POWER ASCENSION.***
	**	**NOTE: EVENT 3 IS INITIATED WHILE OATC AND UO ARE PERFORMING ACTIONS IN EVENT 2 FOR POWER ASCENSION AT EXAMINERS DISCRETION.**

Op-Test No.: 2012-301 **Scenario No.:** 5 **Page 1 of 3**

Event No.: 3

Event Description: Air compressor # 3 trips with failure of air compressors # 2 or # 4 to automatically start.

Time	Position	Applicant's Action or Behavior
	UO	Diagnose Air Compressor # 3 has tripped: Symptoms / alarms: ALB33-F03 125V DC SWGR 1NB19 TROUBLE ALB01-B05 SERVICE AIR CMPSR TROUBLE ALB01-C06 SERVICE AIR HDR LO PRESS (delayed) Indications: • Green and amber light lit on AC # 3 hand switch.
	UO	**Response to ALB01-B05** Dispatches an operator to Panel PMEC to implement the appropriate alarm response procedure per 17210-1, "Annunciator Response Procedures for ALB on PMEC Air Compressors Control Panel". 1. Check QMCB indications AND start a standby Air Compressor if necessary to maintain service air header pressure above 100 psig.
	UO	**Response to ALB32-F03** 1. Attempt to determine cause of alarm: a. Check system indications on QEAB. b. Check for associated alarms. **Note to examiner:** It is obvious AC # 3 has tripped, the UO may dispatch an electrician or maintenance to trouble shoot the breaker.

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Event No.: 3

Event Description: **Air compressor # 3 trips with failure of air compressors # 2 or # 4 to automatically start.**

Time	Position	Applicant's Action or Behavior
		Note to Simbooth Operator: Report back that window D03 is illuminated on the PMEC panel for **1.2401.C4.503 NO. 3. COMPRESSOR LO OIL PRESS** and per the ARP the compressor motor trips at 12 psig oil pressure and there is lots of oil on the compressor skid from an apparent oil leak.
	UO OATC	A crew member will call up air pressure trend on IPC computer. **Note to examiner:** The standby compressors should start at 100 psig prior to receipt of the ALB01-C06 alarm. It is possible the crew may start a standby compressor once instrument air pressure drops under 100 psig and ALB01-C06 will never come in.
	UO	Response to ALB01-C06 **AUTOMATIC ACTIONS** 1. Service Air Dryer Inlet Isolation Valve 1-PV-9375 closes at a service air pressure of 80 psig. 2. Any standby compressor with its hand switch in AUTO-PTL position will auto start at a discharge pressure of 100 psig decreasing.

Op-Test No.: 2012-301 **Scenario No.:** 5 **Page 3 of 3**

Event No.: 3

Event Description: Air compressor # 3 trips with failure of air compressors # 2 or # 4 to automatically start.

Time	Position	Applicant's Action or Behavior
		Response to ALB01-C06 continued. **SUBSEQUENT OPERATOR ACTIONS** 1. Check QMCB indications AND start a standby Air Compressor if necessary to maintain service air header pressure above 100 psig. 2. Dispatch an operator to check for system leaks OR excessive air usage. 3. IF pressure continues to fall AND CANNOT be restored, refer to 18028-C, "Loss of Instrument Air". 4. Refer to 13710-1, "Service Air System" and verify Air Compressors are operating properly. 5. IF equipment failure is indicated, initiate maintenance as required. **CAUTION:** Procedure 13710-1 "Service Air System" should be referenced prior to performing the following step if service air has isolated due to low pressure. 6. WHEN service air pressure is greater than 97 psig as read on 1-PI-19380 on panel PMEC, reset 1-PSL-9375. Switch is located on instrument rack 15 (1-1624-P5-R15) on Turbine Building level 1 near Powdex vessels. **Note to examiner:** ALB01-C06 will clear when step 6 is performed.
	CREW	Monitors air pressure returns to normal. **END OF EVENT 3, proceed to EVENT 4.**

Op-Test No.: 2012-301 **Scenario No.:** 5

Event No.: 4

Event Description: CCW Train A will experience a pipe break with an eventual loss of surge tank level causing a trip of all CCW Train A pumps. The UO will be required to place CCW Train B in service.

Time	Position	Applicant's Action or Behavior
	UO	Diagnose CCW Train A pipe break: Symptoms / alarms: ALB61-C06 LVL A LEAK DETECTED ALB02-C05 CCW TRAIN A SURGE TK MAKE UP LVL ALB02-B05 CCW TRAIN A SURGE TK HI/LO LVL ALB02-A05 CCW TRAIN A SURGE TK LO-LO LVL ALB36-A01 4160V SWGR 1AA02 TROUBLE **Note to examiner:** ALB02-A05 and ALB36-A01 will illuminate when the pumps trip on Lo-Lo level. Indications: • Surge tank level lowering on IPC computer trend (if pulled up). • CCW pumps Train A green and amber lights on hand switches. • 1ZLB-11 CCW PMP RM A AB LVL LSH-9780 (QPCP)
	SS	Enters 18020-C, LOSS OF COMPONENT COOLING WATER.
	UO	1. Check CCW pumps in the affected train – TWO RUNNING. (NO) RNO 1. Start two CCW pumps in the affected train. **Note to examiner:** The CCW pumps won't start with the current surge tank level.

Op-Test No.: 2012-301 **Scenario No.:** 5 **Page 2 of 7**

Event No.: 4

Event Description: CCW Train A will experience a pipe break with an eventual loss of surge tank level causing a trip of all CCW Train A pumps. The UO will be required to place CCW Train B in service.

Time	Position	Applicant's Action or Behavior
	UO	2. Check CCW train operation: • Flow – APPROXIMATELY 9000 GPM. **(NO)** • Pressure – APPROXIMATELY 90 PSIG. **(NO)** RNO 2. Perform the following: a. Stop the CCW pumps in the affected train. b. Place the UNAFFECTED train in service by initiating 13715A/B, COMPONENT COOLING WATER SYSTEM.
	UO	Steps for 13715B-1, COMPONENT COOLING WATER SYSTEM TRAIN B. Selects section 4.1.2 CCW Train B Startup from Standby.
	UO	4.1.2 CCW Train B Startup from Standby. 4.1.2.1 IF the System requires venting, Go To Section 4.4.3. **(N/A)** **NOTE:** Time Delay Relay Test may be marked N/A if no task sheet for the test is in the Survey Task Sheet Binder. 4.1.2.2 IF Time Delay Relay Test is NOT being performed, mark steps 4.1.2.3, 4.1.2.5, 4.1.2.9, and 4.1.2.10 N/A. **Note to examiner:** All steps above will be marked N/A.

Op-Test No.: 2012-301 Scenario No.: 5 Page 3 of 7

Event No.: 4

Event Description: CCW Train A will experience a pipe break with an eventual loss of surge tank level causing a trip of all CCW Train A pumps. The UO will be required to place CCW Train B in service.

Time	Position	Applicant's Action or Behavior
	UO	**NOTES:** • The two selected CCW pumps should be started together to prevent runout. • If Time Delay Relay Test is required, Steps 4.1.2.4 and 4.1.2.5 should be performed simultaneously.
	UO	4.1.2.4 Simultaneously start two (2) Train B CCW Pumps: CCW Pump 2: 1-HS-1853A CCW Pump 4: 1-HS-1855A CCW Pump 6: 1-HS-1857A
	UO	4.1.2.6 Check CCW Pump Discharge Header Train B 1-PI-1875 rises to about 90 psig. 4.1.2.7 Check CCW Pump Discharge Header Train B 1-FI-1877 rises to about 9000 gpm. 4.1.2.8 Notify Chemistry of CCW Train B startup so chemicals may be added if needed and proper operation of radiation monitor may be verified. Return to 18020-C RNO step 2c.

Op-Test No.: 2012-301 **Scenario No.:** 5 **Page 4 of 7**

Event No.: 4

Event Description: CCW Train A will experience a pipe break with an eventual loss of surge tank level causing a trip of all CCW Train A pumps. The UO will be required to place CCW Train B in service.

Time	Position	Applicant's Action or Behavior
	UO	RNO 2. Perform the following: c. IF one train of CCW can NOT be placed in normal two pump operation, THEN attempt to place one train of CCW in single pump operation by initiating 13715A/B, COMPONENT COOLING WATER SYSTEM. d. Go to Step 4.
	UO	4. Verify NSCW supply header flow FI-1640B (1641B) – APPROXIMATLEY 17000 GPM. **(YES)**
	UO	5. Check RHR – REQUIRED FOR SHUTDOWN COOLING. **(NO)** RNO 5. Go to Step 9.
	UO	9. Check affected train RHR pump – INJECTING IN COLD LEG INJECTION MODE. **(NO)** RNO 9. Stop affected train RHR pump if running. **(N/A)**

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Event No.: 4

Event Description: CCW Train A will experience a pipe break with an eventual loss of surge tank level causing a trip of all CCW Train A pumps. The UO will be required to place CCW Train B in service.

Time	Position	Applicant's Action or Behavior
	UO	10. Check the following: Both extinguished: • ALB02(03)-A05 CCW TRAIN A(B) SURGE TK LO-LO LEVEL • ALB02(03)-B05 CCW TRAIN A(B) SURGE TK HI/LO LEVEL -OR- CCW TRAIN A(B) Surge Tank level – RISING. RNO 10. Verify DEMIN WTR TO CCW TK-1(2) open: UNIT 1 LV-1850 AB-203 LV-1851 AB-202 -OR- Open RX MU WTR TO CCW TK-1(2) UNIT 1 LV-1848 AB-203 LV-1849 AB-202

Op-Test No.: 2012-301 **Scenario No.: 5** **Page 6 of 7**

Event No.: 4

Event Description: CCW Train A will experience a pipe break with an eventual loss of surge tank level causing a trip of all CCW Train A pumps. The UO will be required to place CCW Train B in service.

Time	Position	Applicant's Action or Behavior
	UO	11. Check affected CCW train – NO ABNORMAL LEAKAGE. (NO) RNO 11. Isolate the leak by performing the following: a. Stop pumps in affected train and place control switches in PULL-TO-LOCK. b. Isolate makeup water to the affected train surge tank. c. Close system isolation valves as necessary.
	UO	12. Restore the affected CCW loop to service by initiating 13715A/B, COMPONENT COOLING WATER SYSTEM. RNO Initiate applicable ACTION items for TS 3.4.6 TS 3.4.7 TS 3.4.8 TS 3.5.2 TS 3.5.3 **TS 3.7.7 (this one applies)** TS 3.9.5 TS 3.9.6

Op-Test No.: 2012-301 **Scenario No.:** 5

Event No.: 4

Event Description: CCW Train A will experience a pipe break with an eventual loss of surge tank level causing a trip of all CCW Train A pumps. The UO will be required to place CCW Train B in service.

Time	Position	Applicant's Action or Behavior
	UO	13. Verify Spent Fuel Pool Cooling aligned to in-service train. **(NO)** RNO 13. Place the UNAFFECTED SFPC train in service by initiating 13719, SPENT FUEL POOL COOLING AND PURIFICATION SYSTEM. a. IF neither Train of SPF Cooling can be placed in service, THEN initiate 18030-C, LOSS OF SPENT FUEL POOL LEVEL OR COOLING. **Note to examiner:** The crew will request the ABO to place Train B SFP Cooling in service.
	UO	14. Verify Fuel Handling Building normal HVAC units – IN OPERATION: **(YES)** • 1541-A7-001(002) -AND- • 1541-N7-001(002) 15. Return to procedure and step in effect. **END OF EVENT 4, proceed to EVENT 5.**

Op-Test No.: 2012-301 **Scenario No.:** 5 **Page 1 of 3**

Event No.: 5

Event Description: RCS Loop # 4 flow transmitter fails down scale low. (FT-444), this will result in a Tech Spec call for the SS, no operator board actions.

Time	Position	Applicant's Action or Behavior
	OATC	Diagnose RCS Loop # 4 Flow FT-444 has failed low. Symptoms / alarms: ALB12-D01 RC LOOP 4 LOW FLOW ALERT Indications: • FI-444 RC FLOW LOOP 4 reading 0% flow. • RCS FLOW TRIP 90% bistable (RC LP 4 LO FLOW FB444A) is illuminated.
	SS	Enters 18001-C, Section A for FAILURE OF RCS LOOP FLOW INSTUMENTATION.
		A1. Check actual RCS flow – GREATER THAN 90% IN ALL LOOPS. **(YES)**
	OATC	A2. Identify the affected flow instrument. **(FT-444)**
	SS	A3. Notify I & C to initiate repairs.
	SS	A4. Bypass the affected instrument channel using 13509-C, BYPASS TEST INSTUMENTATION (BTI) PANEL OPERATION, if desired. **Note to examiner:** It is NOT expected the SS will bypass (BTI) at this time. I & C usually requests control room to leave instrument as is for their troubleshooting.
	OATC	A5. Check power level – GREATER THAN P-7. **(YES)**

Op-Test No.: 2012-301 **Scenario No.:** 5 **Page 2 of 3**

Event No.: 5

Event Description: RCS Loop # 4 flow transmitter fails down scale low. (FT-444), this will result in a Tech Spec call for the SS, no operator board actions.

<table>
<tr><th>Time</th><th>Position</th><th>Applicant's Action or Behavior</th></tr>
<tr><td></td><td>SS</td><td>A6. Trip affected channel bistable and place associated MASTER TEST switch in TEST position per TABLE A1 within 72 hours. (TS 3.3.1)

Note to examiner: The SS will usually wait to perform this until I & C has time to perform troubleshooting.

TABLE A1
<table>
<tr><th>SSPS INPUT</th><th>CAB</th><th>FRAME /CARD</th><th>B/S</th><th>SWITCH</th></tr>
<tr><td>FT-444 Faliure (Channel 1)
Loop 4 Low Flow Rx Trip
MASTER TEST SWITCH</td><td>1</td><td>8/65
8/76</td><td>1</td><td>FS-444A
5</td></tr>
</table></td></tr>
<tr><td></td><td>OATC</td><td>A7. Initiate the applicable actions of Technical Specification 3.3.1.
<table>
<tr><th>FUNCTION</th><th>APPLICABLE MODES</th><th>REQUIRED CHANNELS</th><th>CONDITIONS</th></tr>
<tr><td>10. Reactor Coolant Flow – Low</td><td></td><td></td><td></td></tr>
<tr><td>a. Single Loop</td><td>1(h)</td><td>3 per loop</td><td>N</td></tr>
<tr><td>b. Two Loops</td><td>1(i)</td><td>3 per loop</td><td>M</td></tr>
</table>
(h) Above the P-8 (Power Range Neutron Flux) interlock.

(i) Above the P-7 (Low Power Reactor Trips Block) interlock and below the P-8 (Power Range Neutron Flux) interlock.

Note to examiner: Table for Conditions and Required Actions and Completions Times is on the following page.</td></tr>
</table>

Op-Test No.: 2012-301 **Scenario No.: 5** **Page 3 of 3**

Event No.: 5

Event Description: RCS Loop # 4 flow transmitter fails down scale low. (FT-444), this will result in a Tech Spec call for the SS, no operator board actions.

<table>
<tr><th>Time</th><th>Position</th><th>Applicant's Action or Behavior</th></tr>
<tr><td></td><td>SS</td><td>Step A7 continued.
ACTIONS (continued)
<table>
<tr><th>CONDITION</th><th>REQUIRED ACTION</th><th>COMPLETION TIME</th></tr>
<tr><td>M. One channel inoperable.</td><td>M.1 Place channel in trip.
OR
M.2 Reduce THERMAL POWER to < P-7.</td><td>72 hours

78 hours</td></tr>
<tr><td>N. One Reactor Coolant Flow-Low (single loop) channel inoperable.</td><td>N.1 Place channel in trip.
OR
N.2 Reduce THERMAL POWER to < P-8.</td><td>72 hours

78 hours</td></tr>
</table></td></tr>
<tr><td></td><td>OATC</td><td>A8. Initiate the Continuous Actions Page.</td></tr>
<tr><td></td><td>SS</td><td>A9. Check repairs and surveillances – COMPLETE. (NO)
RNO
A9. Perform the following:
a. WHEN repairs and surveillances are complete, THEN perform step A10.
b. Return to procedure and step in effect.</td></tr>
</table>

Op-Test No.: 2012-301 **Scenario No.:** 5

Event No.: 6

Event Description: Loss of 120V AC Vital Bus 1DY1B

Time	Position	Applicant's Action or Behavior
	CREW	Diagnose Loss of Vital Instrument Panel 1DY1B. Symptoms / alarms: ALB34-B05 120V AC PNL 1DY1B TROUBLE ALB34-D07 INVERTER 1DD1I4 TROUBLE Indications: • Various other annunciators associated with Channel IV. • All channel IV trip status lights (except CNMT HI-3 PRESS and RWST LO-LO LEVEL) lit. • Letdown flow reading o gpm on 1FI-132A and 1FI-132C.
		NOTES: • Letdown isolation (1-HV-15214 will close) and steam generator blowdown will occur on Pipe Break Room Protection due to loss of temperature bistables in QPP4. • The Train B chiller will be inoperable due to loss of flow switch 1FY-1803, but may be started from the Train B Shutdown Panel. The A Train chiller should be operated if Essential Chilled Water is required.
	OATC UO	F1. Initiate the Continuous Actions Page.

Event No.: 6

Event Description: Loss of 120V AC Vital Bus 1DY1B

Time	Position	Applicant's Action or Behavior
	OATC	F2. Check 1-HV-15214 CVCS LETDOWN PIPE BREAK PROT ISOLATION – OPEN. RNO F2. Perform the following: a. Close Letdown Orifice Isolation Valves: • 1-HV-8149A • 1-HV-8149B • 1-HV-8149C b. Close Letdown Isolation Valves: • 1-LV-0459 • 1-LV-0460 **Note to examiner:** These valves will require close to terminate a CVCS Letdown leak to the PRT via relief valve. c. Control charging to: • Maintain seal injection flow to all RCPs – 8 to 13 GPM. • Maintain charging flow approximately 10 gpm greater than total seal injection flow. d. Place Excess Letdown in service by initiating 13008, CHEMICAL AND VOLUME CONTROL SYSTEM EXCESS LETDOWN. **PROCEED TO EVENT 7**, then return to this point after Excess Letdown has been placed in service.

Op-Test No.: 2012-301 **Scenario No.:** 5

Event No.: 6

Event Description: **Loss of 120V AC Vital Bus 1DY1B**

Time	Position	Applicant's Action or Behavior
	OATC	F3. Select CH455/456 on 1PS-455F PRZR PRESS CNTL SELECT. **(Already selected)**
	OATC	F4. Select DEFEAT 442 on 1TS-412T T-AVG DEFEAT SEL. F5. Select DEFEAT 441 on 1TS-411F DELTA T DEFEAT SEL. **Note to examiner:** The OATC will have to take these actions.
	OATC	F6. Restore Tavg to program value. a. Place ROD STOP BYPASS switch to BYPASS PRN44 position. b. Adjust rod position to restore Tavg to Tref.
	UO	F7. Verify SG blowdown isolation valves – CLOSED WITH HANDSWITCHES IN CLOSE.

Event No.: 6

Event Description: Loss of 120V AC Vital Bus 1DY1B

Time	Position	Applicant's Action or Behavior
	OATC	F8. Verify the following interlocks are in required state for existing unit conditions within one hour. (TS 3.3.1) **(all are as required)** • P-6 • P-7 • P-8 • P-9 • P-10 **Note to examiner:** The OATC will verify these on the BPLP status light box.
	OATC	F9. Dispatch operator to transfer Panel 1DY1B to alternate supply by initiating 13431, 120V AC 1E VITAL INSTRUMENT DISTRIBUTION SYSTEM. **Note to examiner:** 1DY1B can be placed on regulated transformer due to the inverter failure, there is no fault on the bus. **Note to Simbooth Operator:** Place 1DY1B on regulated transformer using **Remote Function EL 29** (DY1B to Reg Transformer) when requested by the crew.
	CREW	F10. Refer to ATTACHMENT F, TABLE 1 – I & C LOADS – PANEL 1DY1B to determine affected instrumentation. F11. Refer to ATTACHMENT F, TABLE 2 – PANEL 1DY1B LOAD LIST to determine additional equipment affected. **Note to examiner:** ATTACHMENT F, TABLE 1 and TABLE 2 are attached at the end of this event description.

Op-Test No.: 2012-301 **Scenario No.:** 5 **Page 5 of 8**

Event No.: 6

Event Description: Loss of 120V AC Vital Bus 1DY1B

Time	Position	Applicant's Action or Behavior
	SS UO	F12. Initiate 18002-C, NUCLEAR INSTRUMENTATION SYSTEM MALFUNCTION for failed Channel IV NIs. **Note to examiner:** N44 actions per 18002 are also attached at the end of this event.
	SS	F13. Refer to Technical Specifications and complete any applicable action statements.

FUNCTION	APPLICABLE MODES	REQUIRED CHANNELS	CONDITIONS
16. Reactor Trip System Interlocks			
c. Power Range Neutron Flux, P-8	1	4	S
d. Power Range Neutron Flux, P-9	1	4	S
d. Power Range Neutron Flux, P-10 and input To P-7	1,2	4	R

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
R. One or more channels inoperable.	R.1 Verify interlock is in required state for existing unit conditions. OR R.2 Be in MODE 3	1 hour 7 hours
S. One or more channels inoperable.	S.1 Verify interlock is in required state for existing unit conditions. OR S.2 Be in MODE 3	1 hour 7 hours

Event No.: 6

Event Description: Loss of 120V AC Vital Bus 1DY1B

Time	Position	Applicant's Action or Behavior
	SS	F13. Continued for Tech Spec actions. LCO 3.8.7 The required Class 1E 120 V inverters shall be OPERABLE. The NOTE is not applicable for this event. APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One required inverter inoperable.	----------NOTE---------- Enter applicable conditions and required actions of LCO 3.8.9 "Distribution Systems – Operating" with any vital bus deenergized. ---------- A.1 Restore inverter to OPERABLE status.	24 hours
B. Required Action and associated Completion.	B.1 Be in MODE 3. AND B.2 Be in MODE 5.	6 hours 36 hours

Event No.: 6

Event Description: Loss of 120V AC Vital Bus 1DY1B

<table>
<tr><th>Time</th><th>Position</th><th>Applicant's Action or Behavior</th></tr>
<tr><td></td><td></td><td>F13. Continued for Tech Spec actions.

LCO 3.8.9 The required AC, DC, and AC vital bus electrical power distribution subsystems shall be OPERABLE.

The NOTE is not applicable for this event.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS
<table>
<tr><th>CONDITION</th><th>REQUIRED ACTION</th><th>COMPLETION TIME</th></tr>
<tr><td>B. One or more AC vital bus Electrical power distribution subsystems inoperable.</td><td>B.1 Restore AC vital bus electrical power distribution subsystems to OPERABLE status.</td><td>2 hours

AND

16 hours from discovery of failure to meet LCO</td></tr>
<tr><td>D. Required Action and associated Completion Time not met.</td><td>D.1 Be in MODE 3

AND

D.2 Be in MODE 5</td><td>6 hours

36 hours</td></tr>
</table></td></tr>
<tr><td></td><td>UO</td><td>F14. Check loss of 1DY1B – DUE TO INVERTER 1DD1I4 FAILURE. (YES)</td></tr>
</table>

Op-Test No.: 2012-301 **Scenario No.:** 5

Event No.: 6

Event Description: **Loss of 120V AC Vital Bus 1DY1B**

Time	Position	Applicant's Action or Behavior
	UO	F15. Check 1DD1I4 Inverter – REPAIRED. **(NO)** RNO F15. Perform the following: a. WHEN 1DD1I4 repaired, THEN perform Steps F16 through F18. b. Go to Step F19.
	UO	F19. Check 1DY1B – RESTORED TO INVERTER SUPPLY. **(NO)** RNO F19. WHEN 1DY1B restored to inverter supply, THEN perform Step F20.
		END OF EVENT 6, proceed to EVENT 7.

Op-Test No.: 2012-301 **Scenario No.:** 5

Event No.: 6, DY1B actions for PR N44

Event Description: 18002 PR N44 actions are required to be taken per 18032 for Loss of 1DY1B.

Time	Position	Applicant's Action or Behavior
	OATC	**IMMEDIATE OPERATOR ACTIONS** B1. Place rods in manual.
	SS	Enters 18002-C, NUCLEAR INSTUMENTATION SYSTEM MALFUNCTION, section B POWER RANGE DRAWER N41, N42, N43, N44 MALFUNCTION.
	UO	B2. Terminates any load change in progress.
	OATC	B3. Checks THERMAL POWER – GREATER THAN OR EQUAL TO 75%. RNO B3. Go to Step B5.

Op-Test No.: 2012-301 **Scenario No.:** 5 **Page 2 of 3**

Event No.: 6, DY1B actions for PR N44

Event Description: 18002 PR N44 actions are required to be taken per 18032 for Loss of 1DY1B.

Time	Position	Applicant's Action or Behavior
	UO	B5. Perform the following: a. Select the affected channel on: • ROD STOP BYPASS switch. • COMPARATOR CHANNEL DEFEAT switch. • POWER MISMATCH BYPASS switch. • UPPER SECTION switch. • LOWER SECTION switch. b. Reset rate trip.
	OATC	B6. Restore Tavg to program. **Note to examiner:** It is expected the OATC will withdraw rods to restore Tavg to program, if necessary.
	OATC	B7. Place rods in AUTO if desired.
	OATC	B8. Check the operable Power Range Channel(s) indicating properly on NR-45. **(they are)**

Op-Test No.: 2012-301 **Scenario No.: 5** **Page 3 of 3**

Event No.: 6, DY1B actions for PR N44

Event Description: 18002 PR N44 actions are required to be taken per 18032 for Loss of 1DY1B.

Time	Position	Applicant's Action or Behavior
	SS	B17. Return to procedure and step in effect. **Note to examiner**: Other actions such as Tech Specs are addressed in the 120V AC 1DY1B procedure. **END OF EVENT 6 N44 ACTIONS, go back to Loss of DY1B AOP.**

Op-Test No.: 2012-301 **Scenario No.:** 5

Event No.: 7

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 to the PRT. 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

Event No.: 7

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 to the PRT. 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.

Event No.: 7

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 to the PRT. 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.

Event No.: 7

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 to the PRT. 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.

Event No.: 7

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 to the PRT. 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) **RETURN TO EVENT 6.**

Op-Test No.: 2012-301 **Scenario No.:** 5

Event No.: 8

Event Description: PRZR Spray valve for Loop 4 fails open, the OATC will have to manually close loop $ spray to prevent a reactor trip and SI.

Time	Position	Applicant's Action or Behavior
	OATC	Diagnose Spray Valve Loop 4 has failed open: Symptoms / alarms: ALB11-D02 PRZR CONTROL LO PRESS AND HEATERS ON ALB12-D03 PRZR PRESS LO PORV BLOCK Indications: • PRZR pressure lowering rapidly. • Spray Valve Loop 4 red light lit, green light out. • Spray Valve Loop 1 green light lit, red light out. • Spray Valve Loop 4 controller red light lit, demand at 100%. • PORV Block Valves 1-HV-8000A and 1-HV-8000B close. **Note to examiner:** The crew may go directly to 18000-C, "Pressurizer Spray, Safety Or Relief Valve Malfunction" OR may use the guidance from ALB11-D02 to reference them to the AOP, then transition to 18000-C.

Op-Test No.: 2012-301 **Scenario No.: 5** **Page 2 of 4**

Event No.: 8

Event Description: PRZR Spray valve for Loop 4 fails open, the OATC will have to manually close loop $ spray to prevent a reactor trip and SI.

Time	Position	Applicant's Action or Behavior
	OATC	ALB11-D02 Response 1.0 **PROBABLE CAUSE** 1. Pressurizer Pressure Control System malfunction. 2. Pressurizer Spray or Relief Valve Malfunction. 2.0 **AUTOMATIC ACTIONS** Pressurizer Backups Heaters will energize. **3.0 INITIAL OPERATOR ACTIONS** Check pressurizer pressure indications: • If an instrument failure is indicated, intitiate 18001-C, "Primary Systems Instrumentation Malfunction". • IF a failed PRZR Spray Valve, Safety Valve or PORV is indicated, intiate 18000-C, "Pressurizer Spray, Safety Or Relief Valve Malfunction". • AT 1965 psig and lowering trip RX and go to 19000-C, "E-0 REACTOR TRIP OR SAFETY INJECTION".
	OATC	**IMMEDIATE OPEATOR ACTIONS** 1. Verify PRZR Spray Valves – CLOSED. **Note to examiner:** The OATC will manually close the Loop 4 PRZR Spray Valve by taking the controller and depressing the down arrow until the green light is lit, demand is 0, and PRZR Spray Valve has a green only light lit.

Op-Test No.: 2012-301 **Scenario No.: 5** **Page 3 of 4**

Event No.: 8

Event Description: PRZR Spray valve for Loop 4 fails open, the OATC will have to manually close loop $ spray to prevent a reactor trip and SI.

Time	Position	Applicant's Action or Behavior
	SS	Enters 18000-C, PRESSURIZER SPRAY, SAFETY, OR RELIEF VALVE MALFUNCTION.
	OATC	2. Operate PRZR Heaters as necessary.
	OATC	3. Verify PRZR PORVs – CLOSED. **(YES)**
	OATC	4. Check PRZR Safety Valves – CLOSED. **(YES)**
	OATC	5. Check PIC-455A Pressurizer Master Pressure Controller – OPERATING PROPERLY: **(YES)** • Reference FIGURE 1. **Note to examiner:** FIGURE 1 attached at the end of this event.
	OATC	6. Check associated instrumentation – OPERATING PROPERLY. **(YES)**
	SS	7. Comply with applicable Technical Specifications: 3.4.1 **(only one applicable for this event)** 3.4.10 3.4.11 3.4.12 3.4.13

Op-Test No.: 2012-301 **Scenario No.: 5** **Page 4 of 4**

Event No.: 8

Event Description: PRZR Spray valve for Loop 4 fails open, the OATC will have to manually close loop $ spray to prevent a reactor trip and SI.

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

LCO 3.4.1 RCS DNB parameters for pressurizer pressure, RCS average temperature, and RCS total flow rate shall be within the limits specified below:

a. Pressurizer pressure ≥ 2199 psig;

b. RCS average temperature ≤ 592.5 F; and

c. RCS total flow rate ≥ 384,509 gpm.

APPLICABILITY: MODE 1

Note to examiner: The NOTE does not apply during this event.

ACTIONS
<table>
<tr><th>CONDITION</th><th>REQUIRED ACTION</th><th>COMPLETION TIME</th></tr>
<tr><td>A. One or more RCS DNB parameters not within limits.</td><td>A. 1 Restore RCS DNB parmeter(s) to within limit.</td><td>2 hours</td></tr>
<tr><td>C. Required Action and associated Completion Time not met.</td><td>C.1 Be in MODE 2</td><td>6 hours</td></tr>
</table></td></tr>
<tr><td></td><td>SS</td><td>8. Return to procedure and step in effect.

END OF EVENT 8, proceed to EVENT 9 (THE MAJOR).</td></tr>
</table>

Op-Test No.: 2012-301 **Scenario No.: 5** **Page 1 of 13**

Event No.: 9

Event Description: Steam generator # 2 will fault IRC with complications. CS pump A will trip on start and CS pump B discharge valve will fail to automatically open but can be opened by the OATC. The containment coolers for both trains will fail to start in slow speed but can be started by the UO. Loop 2 MFIV will also fail to automatically close but can be closed by the UO.

Time	Position	Applicant's Action or Behavior
	UO OATC	Diagnose Main Steam Line # 2 faulted IRC. Symptoms / alarms: ALB01-E06 CNMT HI TEMP ALB01-F06 CNMT HI MSTR Indications: • Containment pressure indications rapidly rising.
	OATC SS	Performs a manual reactor trip due to imminent high Containment Pressure SI at 3.8 psig on Containment Pressure. **Note to examiner:** Containment pressure rises rapidly and the crew may attempt to enter 18008-C, SECONDARY COOLANT LEAKAGE but will not have time to take significant actions.

Op-Test No.: 2012-301 **Scenario No.: 5** **Page 2 of 13**

Event No.: 9

Event Description: Steam generator # 2 will fault IRC with complications. CS pump A will trip on start and CS pump B discharge valve will fail to automatically open but can be opened by the OATC. The containment coolers for both trains will fail to start in slow speed but can be started by the UO. Loop 2 MFIV will also fail to automatically close but can be closed by the UO.

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

Op-Test No.: 2012-301 **Scenario No.: 5** **Page 3 of 13**

Event No.: 9

Event Description: Steam generator # 2 will fault IRC with complications. CS pump A will trip on start and CS pump B discharge valve will fail to automatically open but can be opened by the OATC. The containment coolers for both trains will fail to start in slow speed but can be started by the UO. Loop 2 MFIV will also fail to automatically close but can be closed by the UO.

Time	Position	Applicant's Action or Behavior
	OATC SS	4. Check if SI is actuated. **(YES)** • Any SI annunciators – LIT • SI ACTUATED BPLP window – LIT Go to Step 6.
	SS CREW	6. Initiate the Foldout Page.
	SS OATC UO	7. Perform the following: • OATC Initial Actions Page • UO Initial Actions Page **NOTE:** SS initiates step 8 after OATC/UO Initial Actions completed.

Op-Test No.: 2012-301 **Scenario No.: 5** **Page 4 of 13**

Event No.: 9

Event Description: Steam generator # 2 will fault IRC with complications. CS pump A will trip on start and CS pump B discharge valve will fail to automatically open but can be opened by the OATC. The containment coolers for both trains will fail to start in slow speed but can be started by the UO. Loop 2 MFIV will also fail to automatically close but can be closed by the UO.

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 EACH TRAIN. **(YES, Train B only)**

Op-Test No.: 2012-301 **Scenario No.: 5** **Page 5 of 13**

Event No.: 9

Event Description: Steam generator # 2 will fault IRC with complications. CS pump A will trip on start and CS pump B discharge valve will fail to automatically open but can be opened by the OATC. The containment coolers for both trains will fail to start in slow speed but can be started by the UO. Loop 2 MFIV will also fail to automatically close but can be closed by the UO.

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 EACH TRAIN. b. NSCW TOWER RTN HDR BYPASS BASIN hand switches – IN AUTO: • HS-1668A • HS-1669A
	OATC UO ***Critical***	6. Verify Containment Cooling Units: **(NO)** **a. ALL RUNNING IN LOW SPEED** • **MLB indication** **b.** NSCW Cooler isolation valves – OPEN **(YES)** • MLB indication **Note to examiner:** The UO will go back to the HVAC Panel and start all Containment Cooling Units in LOW speed.
	OATC	7. Check Containment Ventilation Isolation: **a.** Dampers and Valves – CLOSED **(YES)**

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Event No.: 9

Event Description: Steam generator # 2 will fault IRC with complications. CS pump A will trip on start and CS pump B discharge valve will fail to automatically open but can be opened by the OATC. The containment coolers for both trains will fail to start in slow speed but can be started by the UO. Loop 2 MFIV will also fail to automatically close but can be closed by the UO.

Time	Position	Applicant's Action or Behavior
	OATC	**PERFORMS OATC INITIAL ACTIONS** 8. Check Containment pressure – REMAINED LESS THAN 21 PSIG. **(NO)** RNO 8. Verify the following: a. Containment Spray actuated. ***Critical*** **b. Containment Spray Pump discharge valves open. (NO, for Train B)** **Note to examiner:** The OATC will open Containment Spray Pump Discharge Isolation HV-9001B to satisfy the ***Critical Step.*** c. Containment Spray Pumps running. (B only)
	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.

Op-Test No.: 2012-301 **Scenario No.:** 5 **Page 7 of 13**

Event No.: 9

Event Description: Steam generator # 2 will fault IRC with complications. CS pump A will trip on start and CS pump B discharge valve will fail to automatically open but can be opened by the OATC. The containment coolers for both trains will fail to start in slow speed but can be started by the UO. Loop 2 MFIV will also fail to automatically close but can be closed by the UO.

Time	Position	Applicant's Action or Behavior
	OATC	**PERFORMS OATC INITIAL ACTIONS** 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 OPERATOR ACTIONS,** return to E-0 Step 8

Op-Test No.: 2012-301 **Scenario No.:** 5 **Page 8 of 13**

Event No.: 9

Event Description: Steam generator # 2 will fault IRC with complications. CS pump A will trip on start and CS pump B discharge valve will fail to automatically open but can be opened by the OATC. The containment coolers for both trains will fail to start in slow speed but can be started by the UO. Loop 2 MFIV will also fail to automatically close but can be closed by the UO.

Time	Position	Applicant's Action or Behavior
	UO	**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). RNO 2. Establish AFW flow greater than 570 gpm by starting pumps and aligning valves as necessary.
	UO	3. Check if main steamlines should be isolated: **(YES)** a. Check for one or 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 – ONE TWO OR MORE CHANNELS OF ANY STEAMLINE. b. Verify Main Steamline Isolation and Bypass Valves – CLOSED. **(YES)**

Op-Test No.: 2012-301 **Scenario No.:** 5 **Page 9 of 13**

Event No.: 9

Event Description: Steam generator # 2 will fault IRC with complications. CS pump A will trip on start and CS pump B discharge valve will fail to automatically open but can be opened by the OATC. The containment coolers for both trains will fail to start in slow speed but can be started by the UO. Loop 2 MFIV will also fail to automatically close but can be closed by the UO.

Time	Position	Applicant's Action or Behavior
	UO *Critical*	**UO INITIAL ACTIONS** 4. Verify FW Isolation Valves closed: **(NO)** • **MFIVs (Loop 2 MFIV will be open)** • BFIVs • MFRVs • BFRVs **Note to examiner:** MFIV Loops # 2 will be open, the UO will manually close MFIV # 2 to satisfy the critical step.
	UO	5. Verify SG Blowdown isolated. **(YES)** • Place SG Blowdown isolation Valve handswitches HS-7603A, B, C, and D in the CLOSE position. **Note to examiner:** The UO will place the HS-7603 valves in the hard closed 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%.

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Event No.: 9

Event Description: Steam generator # 2 will fault IRC with complications. CS pump A will trip on start and CS pump B discharge valve will fail to automatically open but can be opened by the OATC. The containment coolers for both trains will fail to start in slow speed but can be started by the UO. Loop 2 MFIV will also fail to automatically close but can be closed by the UO.

Time	Position	Applicant's Action or Behavior
	UO	8. Verify both MFPs – TRIPPED. **(YES)**
	UO	9. Check Main Generator Output Breakers – OPEN. **(YES)** **END OF UO INITIAL ACTIONS, return to step 8 of E-0.**

Op-Test No.: 2012-301 **Scenario No.:** 5 **Page 11 of 13**

Event No.: 9

Event Description: Steam generator # 2 will fault IRC with complications. CS pump A will trip on start and CS pump B discharge valve will fail to automatically open but can be opened by the OATC. The containment coolers for both trains will fail to start in slow speed but can be started by the UO. Loop 2 MFIV will also fail to automatically close but can be closed by the UO.

Time	Position	Applicant's Action or Behavior
	OATC UO	**19000-C, E-0 actions beginning with step 8.** 8. Initiate the Continuous Actions Page.
	OATC	9. Check RCS temperature stable at or trending to 557°F. **(NO)** RNO 9. IF temperature is less than 557oF and lowering, **(it is)** 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 557oF and rising, THEN dump steam.

Op-Test No.: 2012-301 **Scenario No.: 5** **Page 12 of 13**

Event No.: 9

Event Description: Steam generator # 2 will fault IRC with complications. CS pump A will trip on start and CS pump B discharge valve will fail to automatically open but can be opened by the OATC. The containment coolers for both trains will fail to start in slow speed but can be started by the UO. Loop 2 MFIV will also fail to automatically close but can be closed by the UO.

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.
	UO	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. **(YES)** c. Stop all RCPs.

Op-Test No.: 2012-301 **Scenario No.: 5** **Page 13 of 13**

Event No.: 9

Event Description: Steam generator # 2 will fault IRC with complications. CS pump A will trip on start and CS pump B discharge valve will fail to automatically open but can be opened by the OATC. The containment coolers for both trains will fail to start in slow speed but can be started by the UO. Loop 2 MFIV will also fail to automatically close but can be closed by the UO.

Time	Position	Applicant's Action or Behavior
	UO	12. Check SGs secondary pressure boundaries: a. SG Pressures: Any lowering in an uncontrolled manner. **(YES)** -OR- Any completely depressurized. b. Go to 19020-C, E-2 FAULTED STEAM GENERATOR ISOLATION.
	SS	Transitions to 19020-C, E-2 FAULTED STEAM GENERATOR ISOLATION.

Op-Test No.: 2012-301 **Scenario No.:** 5 **Page 1 of 5**

Event No.: 9 (E-2 Actions)

Event Description: 19020-C E-2 actions for Faulted Steam Generator.

Time	Position	Applicant's Action or Behavior
	CREW SS	1. Initiate critical safety function status trees per 19200-C, F-O CRITICAL SAFETY FUNCTION STATUS TREE. 2. Initiate NMP-EP-110, EMERGENCY CLASSIFICATION DETERMINATION AND INITIAL ACTION. **Note to examiner:** The SS will call the Simbooth to have the Shift Manager implement NMP-EP-110.
	OATC	**CAUTION**: At least one SG should be available for RCS cooldown.
	UO	3. Verify Main Steamline Isolation and Bypass Valves – CLOSED. **(YES)**
	UO	4. Check SGs secondary pressure boundaries: **a.** Identify intact SG(s): **(# 1, 3, and 4 are intact)** • SG pressures – ANY STABLE OR RISING **(YES)** b. Identify faulted SG(s). ANY SG PRESSURE LOWERING IN AN UNCONTROLLED MANNER. **(YES, SG # 2)** -OR- ANY SG COMPLETELY DEPRESSURIZED. **(maybe by now, SG # 2)**

Op-Test No.: 2012-301 **Scenario No.:** 5 **Page 2 of 5**

Event No.: 9 (E-2 Actions)

Event Description: 19020-C E-2 actions for Faulted Steam Generator.

Time	Position	Applicant's Action or Behavior
	UO	5. Isolate Main Feedwater to the faulted SG(s): • Close affected MFIVs: HV-5227 (SG 1) HV-5228 (SG 2) HV-5229 (SG 3) HV-5230 (SG 4) • Close affected BFIVs: HV-15196 (SG 1) HV- 15197 (SG 2) HV- 15198 (SG 3) HV- 15199 (SG 4)
	UO ***Critical*** ***Critical***	6. Isolate Auxiliary Feedwater to the faulted SG(s): • Close affected MDAFW Pump Throttle Valves: HV-5139 – SG 1 FROM MDAFW PMP-A **HV-5132 – SG 2 FROM MDAFW PMP-B** HV-5134 – SG 3 FROM MDAFW PMP-B HV-5137 – SG 3 FROM MDAFW PMP-A • Close affected TDAFW Pump Throttle Valves: HV-5122 – SG 1 FROM TDAFW **HV-5125 – SG 2 FROM TDAFW** HV-5127 – SG 3 FROM TDAFW HV-5120 – SG 3 FROM TDAFW **Note to examiner:** The valves bolded above are critical at this time IF not already previously closed.
	UO	7. Check at least one MDAFW Pump – RUNNING AND CAPABLE OF FEEDING SG(s) NEEDED FOR RCS COOLDOWN. **(YES)**

Op-Test No.: 2012-301 **Scenario No.:** 5 **Page 3 of 5**

Event No.: 9 (E-2 Actions)

Event Description: 19020-C E-2 actions for Faulted Steam Generator.

Time	Position	Applicant's Action or Behavior
	UO ***Critical***	8. 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**
	UO	9. Verify affected SG ARV(s) – CLOSED: PV-3000 (SG 1) PV-3010 (SG 2) PV-3020 (SG 3) PV-3030 (SG 4)
	UO	10. Align SGBD valves: • Place SG Blowdown Isolation Valve handswitches in CLOSE position. • Close sample valves. HV-9451 (SG 1) HV-9452 (SG 2) HV-9453 (SG 3) HV-9454 (SG 4)
	UO	11. Verify faulted SG(s) remains isolated during subsequent recovery actions unless needed for RCS cooldown or SG activity sampling.
	UO	12. Check CST level – GREATER THAN 15%. **(YES)**

Op-Test No.: 2012-301 **Scenario No.: 5** **Page 4 of 5**

Event No.: 9 (E-2 Actions)

Event Description: 19020-C E-2 actions for Faulted Steam Generator.

Time	Position	Applicant's Action or Behavior
	UO	13. Initiate checking if SG Tubes intact: a. Direct Chemistry to take periodic activity samples of all SGs one at a time. **b.** Secondary radiation – NORMAL. **(YES)** • MAIN STM LINE MONITORS • RE-13120 (SG 1) • RE-13121 (SG 2) • RE-13122 (SG 3) • RE-13119 (SG 4) • CNDSR AIR EJCTR/STM RAD MONITORS: • RE-12839C • RE-12839D (if on scale) • RE-12839E (if on scale) • STM GEN LIQ PROCESS RAD: • RE-0019 (Sample) • RE-0021 (Blowdown) • SG sample radiation. **c.** Check SG levels – ANY RISING IN AN UNCONTROLLED MANNER **(NO)** RNO c. Go to Step 14.

Op-Test No.: 2012-301 **Scenario No.: 5** **Page 5 of 5**

Event No.: 9 (E-2 Actions)

Event Description: 19020-C E-2 actions for Faulted Steam Generator.

Time	Position	Applicant's Action or Behavior
	OATC	14. Check if ECCS flow should be reduced: a. RCS Subcooling – GREATER THAN 24°F. (38°F ADVERSE) **(YES)** b. Secondary Heat Sink: **(YES)** Total feed flow to intact SGs – GREATER THAN 570 GPM. -OR- Narrow range level in at least one intact SG – GREATER THAN 10%. (32% ADVERSE) c. RCS pressure – STABLE or RISING. **(YES)** d. PRZR level – GREATER THAN 9%. (37% ADVERSE) **(Maybe)** e. Go to 19011-C, ES-1.1 SI TERMINATION. RNO e. Go to Step 15. 15. Go to 19010-C, E-1 LOSS OF REACTOR OR SECONDARY COOLANT. **Note to examiner:** Depending on the timing and how fast the crew makes it through the procedures, PRZR level may be above 37% ADVERSE or NOT. IF > 37%, the crew will go to 19011-C, SI TERMINATION. IF < 37% ADVERSE, the crew will transition to 19010-C, E-1 LOSS OF REACTOR OR SECONDARY COOLANT.
		END OF SCENARIO, freeze the simulator if NRC Chief Examiner concurs.

target ZERO Every day, every job, safely.	**NUCLEAR SAFETY FOCUS** **TARGET ZERO**

Protected Train:		**EOOS:**	
☒	Alpha	☒	Green
☐	Bravo	☐	Yellow
		☐	Orange
		☐	Red

Plant Conditions:	69 % power BOL.
Major Activities:	A Chemistry hold is in effect preventing power ascent. Once the Chemistry hold has been lifted, initiate power ascent UOP 12004-C section 4.1 for Power Ascent at a rate not to exceed 8% per hour. Step 4.1.46 has been performed. Step 4.1.47 is the next procedure plateau. Control rods are in automatic per Operations Management direction for transient response until the power ascent is initiated.
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. ☐ MFPT B has just been placed in service after a shaft replacement. ☐ 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. ☐ Power Range high level trip bistables are set at 90%. ☐ Chemistry hold in effect, lift of Chemistry hold is imminent.

SIMULATOR REACTIVITY BRIEFING SHEET

Shift: **Day** Date: **Today** Burnup: **500** MWD/MTU Core Life: **BOL**

MINIMUM SHIFT REACTIVITY INFORMATION TO BE BRIEFED

Power: **69** Rod Motion: **Rods in automatic.**

Current Temperature Control Strategy: **Dilution**

Currently Making Up: **100** gallons every **as needed**

The desired Tavg operating band is 575.0 ± 0.05°F

CVCS makeup boric acid flow per 100 gallon makeup (FI-110A): **12.9** gallons/100
CVCS makeup pot setting (FIC-110): **3.24**

BTRS Strategy: **None**
AFD Strategy: **Maintain on target ± 1 AFD units**

Reactivity System Components Degraded/OOS:

None

Activities Expected That May Affect Core Reactivity (Reactivity Focus Items):

Power ascension in progress, dilutions with turbine load increases.

CURRENT CORE REACTIVIITY PARAMETERS

Boron worth: **7.7** pcm/ppm PCM per 1% power change: **14.5** pcm/%

Current MTC values HFP: **-13.7** pcm/°F HZP: **-1.8** pcm/°F

Current BAST C_b: **7,000** ppm Current RCS C_b: **906** ppm

Boration required per	degree °F:	**18**	gallons
	1% power change:	**19**	gallons
	10% power change:	**191**	gallons
	30% power change:	**572**	gallons
Dilution required per	degree °F:	**122**	gallons
	1% power change:	**128**	gallons

Boration required for stuck rods (154 ppm/rod): **3,182** gallons for 2 stuck rods
4,837 gallons for 3 stuck rods

**If more than 3 rods are stuck, begin emergency boration and calculate gallons for actual number of stuck rods.*

Human Performance Tools

Peer Check	Three-Way Communication	Self-Verification (STAR)
Pre-Job Briefing	Phonetic Alphabet	Timeout
Procedure Use (placekeeping)	One Minute Matters (situational awareness)	

Valid for Cycle 17, PTDB Tab 1.0 revision 28.0 and Tab 16.0 revision 18.0

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

Facility: Vogtle Scenario No.: 4 Op-Test No.: 2012-301

Examiners: Meeks Operators: _____
Bates _____
Capehart _____

Initial Conditions: The plant is at 61% power, BOL, steady state operations, control rods in automatic. (Base IC # 37, snapped to IC # 184 for HL17 NRC Exam)

Equipment OOS: MFPT B tagged out for shaft repair, awaiting parts, Safety Injection Pump "A" is tagged out for motor repair.

Turnover: Maintain 61% power per 12004-C, Power Operation (Mode 1), section 4.3. Containment mini-purge is in service for a Containment entry on the next shift.

Preloaded Malfunctions:

CV06B - Centrifugal Charging Pump Trip – Pump 2

EL19B - Emergency Diesel Fails to Start – 1B

ES01 - Failure of Automatic Reactor Trip

PR12B - PORV 456 Block Valve 8000B Auto Close Failure

C011C - Condensate Pump 3 Auto Start Failure

SI06B - Block Auto Start on SI Pump B

AF03B - MDAFW pump B coupling failure

Overrides

HS-40007 Neutral, (QMCB Panel C Reactor Trip Hand switch)

Event No.	Malf. No.	Event Type*	Event Description
T1	NI10C	I-OATC N-UO I-SS TS-SS	PR Lower Detector Fails High – Channel 43. **LCO 3.3.1 FU 2a Condition D, FU 2b Condition E, FU 3 Condition E, FU 6 Condition E, FU 16c, d, e Conditions S & R (one hour actions)**
T2	CO05A	C-UO C-SS	Condensate Pump # 1 trip with failure of Condensate Pump # 3 to automatically start.

Event No.	Malf. No.	Event Type*	Event Description
T3	PR04 @30%	C-OATC C-SS TS-SS	PORV 456 fails 30% open with HV-8000B Block Valve auto close failure. **LCO 3.4.11 Condition B (one hour actions)**
T4	CV12 @100%	I-OATC I-SS	VCT Level Transmitter LT-185 fails high.
T5	EL07A	C-UO C-SS TS-SS	Loss of Control Building 4.16 KV SWGR 1AA02. **LCO 3.8.1 Conditions A, B, and E** **LCO 3.8.9 Condition A** **LCO 3.7.5 Condition C**
T6	FW15A	C-OATC C-SS	MFPT A Shaft shears requiring a manual reactor trip. QMCB panel C reactor trip hand switch will not work, OATC will have to use panel A2 hand switch.
T7	EL03 **Critical**	C-UO C-SS	Reserve Aux Transformer 1NXRB trips on reactor trip with failure of DG1B to automatically start.
T8	AF02A Preload	M-ALL	TDAFW pump trips on over speed. MDAFW pump B coupling failure. Loss of Secondary Heat Sink.

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

Event 1:

PR NIS Channel N43 fails high resulting in inward rod motion.

Verifiable Actions:

OATC – Performs Immediate Operator Action and places control rods in manual.

UO – Defeats the failed channel by selecting N43 on the following switches.

- Rod Stop Bypass switch
- Comparator Channel Defeat switch
- Power Mismatch Bypass switch
- Upper Section switch
- Lower Section switch

UO – Resets rate trip at N43 cabinet.

OATC – Withdraws rods to restore Tavg – Tref and restore AFD to program.

Technical Specifications:

LCO 3.3.1 Reactor Trip System (RTS) Instrumentation FU 2a Condition D

LCO 3.3.1 Reactor Trip System (RTS) Instrumentation FU 2b Condition E

LCO 3.3.1 Reactor Trip System (RTS) Instrumentation FU 3 Condition E

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

LCO 3.3.1 Reactor Trip System (RTS) Instrumentation FU 16c, d, and e Conditions S & R (one hour actions)

Event 2:

Condensate Pump # 1 trip with Condensate Pump # 3 failure to automatically start.

Verifiable Actions:

UO – Manually starts Condensate Pump # 3.

Technical Specifications:

None

Event 3:

PRZR PORV 456 fails open with failure of Block Valve HV-8000B to automatically close.

Verifiable Actions:

OATC – Attempts to close PORV 456, and then manually closes Block Valve HV-8000B.

Technical Specifications:

LCO 3.4.11 Pressurizer Power Operated Relief Valves (PORVs), Condition B

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

Event 4:

VCT Level Transmitter LT-185 fails high resulting in letdown divert to the RHUT.

Verifiable Actions:

OATC – Places 1-LV-112A from the RHUT position to the VCT position.

Technical Specifications:

None

Event 5:

A fault occurs on 1AA02 with DG1A starting and failing to tie.

Verifiable Actions:

UO – Emergency Trips DG1A which has not tied to the bus.

UO – Aligns the following equipment during performance of 18031-C, section A.

- Starts CCW Train B (2 pumps)
- Reduces TDAFW pump speed to not less than 1535 rpm.
- Aligns CNMT coolers so that 4 Train B coolers are running.
- Aligns the CRDM fans so that 2 fans are running.
- Swaps CNMT Aux Coolers.
- Verifies a cavity cooling unit is running.
- Ensures a reactor makeup water pump is running or in auto.

OATC – Verifies a boric acid transfer pump is running or in auto.

Technical Specifications:

These are the primary Tech Specs addressed.

LCO 3.8.1 AC Sources – Operating, Condition A (one hour action)

LCO 3.8.1 AC Sources – Operating, Condition B (one hour action)

LCO 3.8.1 AC Sources – Operating, Condition E (directs LCO 3.8.9)

LCO 3.8.9 AC Sources – Operating, Condition A

LCO 3.7.5 Auxiliary Feedwater System, Condition C

Event 6:

Main Feed Pump A shaft shears resulting in a total loss of feed water flow requiring a manual reactor trip due to the automatic reactor trip function will not work.

Verifiable Actions:

OATC – Performs a manual reactor trip using the QMCB panel A hand switch to mitigate the effects of the reactor operating with an imminent loss of heat sink.

Technical Specifications:

None

Event 7:

1NXRB (RAT 1B) trips open on reactor trip with failure of DG1B to automatically start.

Verifiable Actions:

UO – Performs IOA for E-0 step # 3 and manually starts DG1B to prevent entry into the loss of all AC power procedure.

Event 8:

The TDAFW pump will trip when the UO attempts to raise TDAFW pump speed and MDAFW pump B discharge line breaks in the pump room. These events lead to a total loss of secondary heat sink.

Verifiable Actions:

UO – Attempts to increase TDAFW pump speed using TDAFW speed controller 1PDIC-5180.

UO – Places MDAFW pump B in PTL at SS direction.

OATC – Stops all RCPs to limit heat input to limit inventory loss in the SGs.

OATC – Manually actuates SI to establish RCS feed.

OATC – Manually starts SI pump B which will not auto start on the SI signal.

OATC – Places all PRZR heaters in OFF/PTL.

OATC – Arms COPS, opens Block Valve HV-8000B after power is restored.

OATC – Opens PRZR PORV 1PV-455.

OATC – Opens all Reactor Vessel Head Vent valves.

The scenario may be stopped at the step for Initiate Attachment D with chief examiner approval.

CRITICAL TASKS:

1) Manually starts DG1B per step 3 RNO of E-0 to prevent a loss of all AC power.

2) Starts SI Pump B to provide RCS Feed Path during LOHS to ensure core heat removal no later than step 36 of 19231-C.

3) Opens PRZR PORV 1PV-455 no later than step 37d of 19231-C and opens Reactor Vessel Head Vents no later than step 38a RNO of 19231-C. Calls to align a low pressure water source to at least one intact SG per direction of step 38b RNO of 19231-C.

Note to examiner: If the SS opts to send an operator to energize PORV-456 and opens PORV-456, this will also satisfy the critical step.

Op-Test No.: 2012-301 **Scenario No.:** 4 **Page 1 of 5**

Event No.: 1

Event Description: PR N43 fails high resulting in inward rod motion, OATC will be required to place rods in Manual per IOAs of 18002, Nuclear Instrumentation System Malfunction.

Time	Position	Applicant's Action or Behavior
	OATC	Diagnoses the failure of N43 Power Range NIS. Symptoms / alarms: • ALB10-C02 POWER RANGE CHANNEL DEVIATION • ALB10-F02 POWER RANGE NEUTRON FLX RATE ALERT • ALB10-E06 RADIAL TILT (after a short delay) Indications: • Rapid inward motion of control rods in automatic control. • Green RODS IN light illuminated on vertical section of QMCB • Power Range Trip Status lights illuminated. • Erratic, inconsistent or divergent indication between PR channels.
	OATC	**IMMEDIATE OPERATOR ACTIONS** B1. Place rods in manual.
	SS	Enters 18002-C, NUCLEAR INSTUMENTATION SYSTEM MALFUNCTION, section B POWER RANGE DRAWER N41, N42, N43, N44 MALFUNCTION.
	UO	B2. Terminates any load change in progress.
	OATC	B3. Checks THERMAL POWER – GREATER THAN OR EQUAL TO 75%. RNO B3. Go to Step B5.

Op-Test No.: 2012-301 **Scenario No.:** 4 **Page 2 of 5**

Event No.: 1

Event Description: PR N43 fails high resulting in inward rod motion, OATC will be required to place rods in Manual per IOAs of 18002, Nuclear Instrumentation System Malfunction.

Time	Position	Applicant's Action or Behavior
	UO	B5. Perform the following: a. Select the affected channel on: • ROD STOP BYPASS switch. • COMPARATOR CHANNEL DEFEAT switch. • POWER MISMATCH BYPASS switch. • UPPER SECTION switch. • LOWER SECTION switch. b. Reset rate trip: **NOTE:** The UO will receive credit for a normal evolution for performance of step B5.
	OATC	B6. Restore Tavg to program. **Note to examiner:** It is expected the OATC will withdraw rods to restore Tavg to program.
	OATC	B7. Place rods in AUTO if desired.
	OATC	B8. Check the operable Power Range Channel(s) indicating properly on NR-45. **(they are)**

Op-Test No.: 2012-301 **Scenario No.:** 4 **Page 3 of 5**

Event No.: 1

Event Description: PR N43 fails high resulting in inward rod motion, OATC will be required to place rods in Manual per IOAs of 18002, Nuclear Instrumentation System Malfunction.

Time	Position	Applicant's Action or Behavior
	SS	B9. Notify I & C to initiate repairs. **Note to examiner**: It is expected a crew member will call C & T for a work order, duty manager notification, and to contact I & C.
	SS	B10. Bypass affected channel NIS and NSSS grouping using 13509-C, BYPASS TEST INSTRUMENTATION (BTI) PANEL OPERATION. **Note to examiner:** It is NOT expected the SS will BTI the channel, I & C usually likes to leave the channel as is for troubleshooting and it will be bypassed at their request.
	OATC	B11. Within one hour, check the following interlocks are in required state for existing unit conditions: (TS 3.3.1) **(they are)** • P-7 • P-8 • P-9 • P-10

Op-Test No.: 2012-301 **Scenario No.:** 4 **Page 4 of 5**

Event No.: 1

Event Description: PR N43 fails high resulting in inward rod motion, OATC will be required to place rods in Manual per IOAs of 18002, Nuclear Instrumentation System Malfunction.

<table>
<tr><th>Time</th><th>Position</th><th>Applicant's Action or Behavior</th></tr>
<tr><td></td><td>SS</td><td>B12. Within 72 hours, place the inoperable Power Range Channel in trip by performing the following: (TS 3.3.1)

a. Remove the AC Control Power Fuses on the affected drawer.

b. Trip Overtemperature bistable for the affected channel.

<table>
<tr><th>CHANNEL</th><th>CAB</th><th>FRAME /CARD</th><th>B/S</th><th>SWITCHES</th></tr>
<tr><td>N-41</td><td>1
1</td><td>8/22
8/22</td><td>3
4</td><td>TS-411C
TS-411D</td></tr>
<tr><td>N-42</td><td>2
2</td><td>8/22
8/22</td><td>3
4</td><td>TS-421C
TS-421D</td></tr>
<tr><td>N-43</td><td>3
3</td><td>8/22
8/22</td><td>3
4</td><td>TS-431C
TS-431D</td></tr>
<tr><td>N-44</td><td>4
4</td><td>8/22
8/22</td><td>3
4</td><td>TS-441C
TS-441D</td></tr>
</table></td></tr>
<tr><td></td><td>SS</td><td>B13. Initiate 14915, SPECIAL CONDITIONS SURVEILLANCE LOGS.

Note to examiner: The crew will call C & T to perform this. This will be data sheet 7 for One Power Range NI Channel Inoperable.</td></tr>
</table>

Op-Test No.: 2012-301 **Scenario No.:** 4 **Page 5 of 5**

Event No.: 1

Event Description: PR N43 fails high resulting in inward rod motion, OATC will be required to place rods in Manual per IOAs of 18002, Nuclear Instrumentation System Malfunction.

Time	Position	Applicant's Action or Behavior
	SS	B14. Initiate the applicable actions of the following Technical Specifications: Table 3.3.1-1 Function 2 Table 3.3.1-1 Function 3 Table 3.3.1-1 Function 6 Table 3.3.1-1 Function 16 **Note to examiner:** • FU 2a and 2b, Conditions D and E, both 72 hour actions. • FU 3, Condition E, 72 hour action. • FU 6, Condition E, 72 hour action. • FU 16c, d, e, Conditions S and R, both 1 hour actions.
	SS	B15. This step is N/A at this time.
	SS	B16. Initiate 13501, NUCLEAR INSTRUMENTATION SYSTEM when repairs and surveillances are complete.
	SS	B17. Return to procedure and step in effect. **END OF EVENT 1, proceed to EVENT 2.**

Op-Test No.: 2012-301 **Scenario No.:** 4 **Page 1 of 3**

Event No.: 2

Event Description: Condensate Pump # 1 trips with failure of standby Condensate Pump # 3 to automatically start. This requires entry into 18016-1, Condensate and Feedwater Malfunction and the UO to manual start pump # 3.

Time	Position	Applicant's Action or Behavior
	UO	Diagnoses the trip of Condensate Pump # 1. Symptoms / alarms: • ALB17-A02 COND P-1 MOTOR OVERLOAD • ALB33-A01 13.8V SWGR 1NAA TROUBLE • ALB17-C02 COND PMP DISCH HDR LO PRESS (~ 1 ½ minutes) • MFPT A SUCTION LO PRESS (~ 4 minutes) Indications: • Green / amber lights LIT on Condensate Pump # 1 hand switch. • Lowering pressure on 1PI-4498 MFP – A & B SUCTION. • Feed flows < steam flows on all steam generators.
	SS	Enters 18016-C, CONDENSATE AND FEEDWATER MALFUNCTION section B for CONDENSATE OR HEATER DRAIN PUMP TRIP.
		NOTE: Operation of three condensate pumps will result in fast opening of the Condensate Demin System Bypass Valve PV-30223.
	UO	B1. Check condensate pumps – TWO RUNNING. **(NO)** RNO B1. Start the standby condensate pump. **Note to examiner:** There is ~ 4 minutes to diagnose the event, make the appropriate communications, and get to the step to start the pump before the MFPT trips on low suction pressure.

Op-Test No.: 2012-301 **Scenario No.:** 4 **Page 2 of 3**

Event No.: 2

Event Description: Condensate Pump # 1 trips with failure of standby Condensate Pump # 3 to automatically start. This requires entry into 18016-1, Condensate and Feedwater Malfunction and the UO to manual start pump # 3.

Time	Position	Applicant's Action or Behavior
	UO	B2. Check heater drain pumps – TWO RUNNING. **(YES)**
	OATC	B3. Check MFP Suction Pressure – GREATER THAN 275 PSIG. **(YES)**
	UO OATC	B4. Initiate the Continuous Actions Page.
	OATC	B5. Check Rated Thermal Power – NOT BEING EXCEEDED: **(NO)** • Delta T $\leq$ 100% • NIS $\leq$ 100% • UQ1118 $\leq$ 100% MWt.
	OATC	B6. Check C-7 – NOT ACTUATED. **(It is NOT)**
	OATC	B7. Adjust control roads – AS NECESSARY TO MATCH TAVG – TREF. **(no action necessary)**
	OATC	B8. Check PRZR pressure – TRENDING TO 2235 PSIG. **(YES)** B9. Check PRZR level – TRENDING TO PROGRAM VALUE. **(YES)**
	UO	B10. Check feed water heater extraction valves – OPEN. **(YES)**

Op-Test No.: 2012-301 **Scenario No.:** 4 **Page 3 of 3**

Event No.: 2

Event Description: Condensate Pump # 1 trips with failure of standby Condensate Pump # 3 to automatically start. This requires entry into 18016-1, Condensate and Feedwater Malfunction and the UO to manual start pump # 3.

Time	Position	Applicant's Action or Behavior
	UO	B11. Checks SGs NR levels – AT 65%. RNO B11. Controls SGs levels. **Note to examiner:** May have to take manual control depending upon the time to start the condensate pump.
	UO	B12. Check Condensate Pumps – ONLY TWO RUNNING. **(YES)**
	SS	B13. Return to procedure and step in effect. **END OF EVENT 2, proceed to EVENT 3.**

Op-Test No.: 2012-301 **Scenario No.: 4** **Page 1 of 4**

Event No.: 3

Event Description: PORV 456 fails partially open with failure of PORV Block Valve HV-8000B to automatically close. This will require manual action by the OATC to close the block valve and prevent a reactor trip.

Time	Position	Applicant's Action or Behavior
	OATC	Diagnoses PORV 456 has failed open. Symptoms / alarms: • ALB12-E01 PRZR RELIEF DISCH HI TEMP • ALB12-D03 PRZR PRESS LO PORV BLOCK • ALB11-D02 PRZR CONTROL LO PRESS AND HEATER ON • ALB12-E02 PRZR REL TANK HI PRESS (delayed) Indications: • Green / Red lights LIT on PORV 456 hand switch. • PRZR pressure lowering on all PRZR pressure indicators.
	OATC	**IMMEDIATE OPERATOR ACTIONS** 1. Verify PRZR Spray Valves – CLOSED. **(YES)**
	SS	Enters 18000-C, PRESSURIZER SPRAY, SAFETY, OR RELIEF VALVE MALFUNCTION.
	OATC	2. Operate PRZR Heaters as necessary.

Op-Test No.: 2012-301 **Scenario No.: 4** **Page 2 of 4**

Event No.: 3

Event Description: PORV 456 fails partially open with failure of PORV Block Valve HV-8000B to automatically close. This will require manual action by the OATC to close the block valve and prevent a reactor trip.

Time	Position	Applicant's Action or Behavior
	OATC	3. Verify PRZR PORVs – CLOSED. **(NO)** RNO 3. Perform the following to isolate affected PORV as necessary. Close affected PORV Block Valve. Open affected PORV power supply breaker. AD1M-04 (PV-455) BD1M-04 (PV-456) IF PRZR pressure continues to lower, THEN go to 18004-C, REACTOR COOLANT SYSTEM LEAKAGE. **Note to examiner:** The OATC will have to close HV-8000B to stop the PRZR pressure decrease. When the block valve is closed, the PORV will go shut. The crew may or may not opt to open BD1M-04 for PV-456.
	OATC	4. Check PRZR Safety Valves – CLOSED. **(YES)**
	OATC	5. Check PIC-455A Pressurizer Master Pressure Controller – OPERATING PROPERLY. (YES) • Reference FIGURE 1. **Note to examiner:** FIGURE 1 is at the end of event description.

Op-Test No.: 2012-301 **Scenario No.: 4** **Page 3 of 4**

Event No.: 3

Event Description: PORV 456 fails partially open with failure of PORV Block Valve HV-8000B to automatically close. This will require manual action by the OATC to close the block valve and prevent a reactor trip.

<table>
<tr><th>Time</th><th>Position</th><th>Applicant's Action or Behavior</th></tr>
<tr><td></td><td>OATC</td><td>6. Check associated instrumentation – OPERATING PROPERLY. (YES)</td></tr>
<tr><td></td><td>SS</td><td>7. Comply with applicable Technical Specifications:

3.4.1
3.4.10
3.4.11
3.4.12
3.4.13

Note to examiner: It is expected the following LCOs will be entered.

LCO 3.4.1 RCS DBN parameters for pressurizer pressure, RCS average temperature, and RCS total flow rate shall be within the limits specified below:

a. Pressurizer pressure ≥ 2199 psig.
b. RCS average temperature ≤ 592.5°F.
c. RCS total flow rate ≥ 384,509 gpm.

APPLICABILITY: MODE 1

The NOTE does not apply for this event.

ACTIONS
<table>
<tr><th>CONDITION</th><th>REQUIRED ACTION</th><th>COMPLETION TIME</th></tr>
<tr><td>A. One or more RCS DNB parameters not within limits.</td><td>A.1 Restore RCS DNB parameter(s) to within limit.</td><td>2 hours.</td></tr>
</table>
</td></tr>
</table>

Op-Test No.: 2012-301 **Scenario No.: 4** **Page 4 of 4**

Event No.: 3

Event Description: PORV 456 fails partially open with failure of PORV Block Valve HV-8000B to automatically close. This will require manual action by the OATC to close the block valve and prevent a reactor trip.

<table>
<tr><th>Time</th><th>Position</th><th>Applicant's Action or Behavior</th></tr>
<tr><td></td><td>SS</td><td>Step 7 continued:

Note to examiner: It is expected the following LCOs will be entered.

LCO 3.4.11 Each PORV and associated block valve shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3.

The NOTE does not apply for this event.

ACTIONS
<table>
<tr><th>CONDITION</th><th>REQUIRED ACTION</th><th>COMPLETION TIME</th></tr>
<tr><td>B. One PORV inoperable and not capable of being manually cycled.</td><td>B.1 Close associated block valve.

AND

B.2 Remove power from associated block valve.

AND

B.3 Restore PORV to OPERABLE status.</td><td>1 hour

1 hour

72 hours</td></tr>
</table></td></tr>
<tr><td></td><td>SS</td><td>8. Return to procedure and step in effect.

END OF EVENT 3, proceed to EVENT 4.</td></tr>
</table>

Op-Test No.: 2012-301 **Scenario No.:** 4

Event No.: 4

Event Description: LT-185 VCT level transmitter will fail high resulting in an automatic divert of Letdown to the RHUT via LV-112A. The OATC will have to manually take control of LV-112A to stop the diversion of Letdown flow.

Time	Position	Applicant's Action or Behavior
	OATC	Diagnoses the failure of LT-185. Symptoms / alarms: • No alarms will illuminate for this event. Indications: • 1LV-112A amber light lit (indicates full divert to RHUT). • Auto makeup starts if LT-112 reaches 30% VCT level. • LT-112 indication lowering if pulled up on IPC computer.
		Note to examiner: The OATC may refer to ALB07-E05 VCT HI/LO LEVEL for guidance for this event. **ALB07-E05 VCT HI/LO LEVEL** **AUTOMATIC ACTIONS:** **NOTE:** VCT automatic makeup should have started at 30 percent or stopped at 50 percent. 1. Letdown flow diverts to the HUT WHEN 1-HS—0112A is in AUTO with VCT high level of 97 percent. 2. Charging Pump suction auto swaps to the Refueling Water Storage Tank (RWST) upon a Lo-Lo VCT level of 5.7 percent. 3. A summary of instrument setpoints associated with VCT levels include. **Note to examiner:** Instrument setpoint table on following page.

Op-Test No.: 2012-301 **Scenario No.:** 4 **Page 2 of 3**

Event No.: 4

Event Description: LT-185 VCT level transmitter will fail high resulting in an automatic divert of Letdown to the RHUT via LV-112A. The OATC will have to manually take control of LV-112A to stop the diversion of Letdown flow.

<table>
<tr><th>Time</th><th>Position</th><th>Applicant's Action or Behavior</th></tr>
<tr><td></td><td>OATC</td><td>
<table>
<tr><th>LI-0112</th><th>VCT LEVEL</th><th>LI-0185</th></tr>
<tr><td>Trip open 112A</td><td>97%</td><td>Modulate 112A full divert (if LIC-0185 pot @8.70)</td></tr>
<tr><td>Hi level alarm</td><td>92%</td><td></td></tr>
<tr><td>112A Trip Open signal Resets</td><td>87%</td><td>112A starts to divert (if LIC-0185 pot @8.70)</td></tr>
<tr><td>Auto Makeup stops</td><td>50%</td><td></td></tr>
<tr><td>Auto Makeup starts</td><td>30%</td><td></td></tr>
<tr><td>Low level alarm</td><td>20%</td><td>Low level alarm</td></tr>
<tr><td>RWST auto swapover</td><td>5.7%(2 of 2)</td><td>RWST auto swapover</td></tr>
</table>
</td></tr>
</table>

Op-Test No.: 2012-301 **Scenario No.:** 4 **Page 3 of 3**

Event No.: 4

Event Description: LT-185 VCT level transmitter will fail high resulting in an automatic divert of Letdown to the RHUT via LV-112A. The OATC will have to manually take control of LV-112A to stop the diversion of Letdown flow.

Time	Position	Applicant's Action or Behavior
	OATC	**Note to examiner:** The OATC may refer to ALB07-E05 VCT HI/LO LEVEL for guidance for this event. 1. Checks VCT level using 1-LI-0185 on the QMCB and compares to 1-LI-0112 on the IPC or Trend Recorder XR-40053. 2. IF equipment failure is indicated by EITHER LT-0185 OR LT-0112 failed high, perform the following: a. Place 1HS-112A to the VCT position. **NOTE:** Pump cavitation may be indicated by fluctuating discharge pressure and/or erratic flow. b. Monitor charging pump(s) for signs of cavitation. IF cavitation is observed. (1) Isolate letdown, (2) Stop any running charging pumps, (3) Initiate 18007-C Section B. c. Initiate Manual VCT Makeup per 13009-C. d. Contact maintenance to initiate repairs.
	OATC	The OATC will need to monitor auto makeup IF it has started using 1LT-0112 on the IPC computer point to ensure makeup stops at 50% VCT level. **END OF EVENT 4, proceed to EVENT 5.**

Event No.: 5

Event Description: RAT (1NXRA) supply breaker to 1AA02 will trip open due to a fault on the bus. DG-1A will start, but will not re-energize 1AA02 due to a Bus Fault. This will require the crew to complete the actions of AOP 18031-C, "Loss of Class 1E Electrical Systems". Corrective actions include reducing AFW flow to return reactor power to less than 100%, and shift electrical loads to Train "B" 1E bus 1BA03, as well as implement tech specs for loss of AC power.

Time	Position	Applicant's Action or Behavior
	CREW	Diagnose loss of power to 1AA02: Alarms: DG1A EMERGENCY START 4160V SWGR 1AA02 TROUBLE Indications: Electric fault on 1AA02. Control room lighting dims due to loss of ½ of the lights. 1AA02 white bus potential lights go out. DG-1A starts.
	SS	Enters AOP 18031-C, "Loss of Class 1E Electrical Systems."
	OATC	*1. Check power to 1E 4160V Emergency busses –AT LEAST ONE ENERGIZED: • 4160V AC 1E Busses.
	OATC	*2. Check Reactor power - LESS THAN 100%: • UQ1118 - LESS THAN OR EQUAL TO 100% MWT for the applicable unit. • NIs - LESS THAN OR EQUAL TO 100%. • ΔT - LESS THAN OR EQUAL TO 100%.

Event No.: 5

Event Description: RAT (1NXRA) supply breaker to 1AA02 will trip open due to a fault on the bus. DG-1A will start, but will not re-energize 1AA02 due to a Bus Fault. This will require the crew to complete the actions of AOP 18031-C, "Loss of Class 1E Electrical Systems". Corrective actions include reducing AFW flow to return reactor power to less than 100%, and shift electrical loads to Train "B" 1E bus 1BA03, as well as implement tech specs for loss of AC power.

Time	Position	Applicant's Action or Behavior
	UO	2. Cont. RNO *2. Perform the following: a. Reduce TDAFW pump speed to not less than 1535 rpm. b. Throttle affected MDAFW pump discharge valves. ***NOTE: MDAFW "A" WILL BE DE-ENERGIZED & NOT RUNNING*** __ IF Reactor power is still greater than 100%, THEN reduce turbine load at approximately 10 megawatt increments to maintain Reactor power less than 100%.
	UO	3. Check affected train Diesel Generator – RUNNING.
	UO	4. Check NSCW status on affected train: a. PUMPS – TWO RUNNING ***(None are running.)*** RNO 4. Perform the following. 1) Trip affected DG by depressing both EMERGENCY STOP pushbuttons. 2) Go to Section A. LOSS OF POWER WITH DG FAILING TO TIE TO BUS.

Event No.: 5

Event Description: RAT (1NXRA) supply breaker to 1AA02 will trip open due to a fault on the bus. DG-1A will start, but will not re-energize 1AA02 due to a Bus Fault. This will require the crew to complete the actions of AOP 18031-C, "Loss of Class 1E Electrical Systems". Corrective actions include reducing AFW flow to return reactor power to less than 100%, and shift electrical loads to Train "B" 1E bus 1BA03, as well as implement tech specs for loss of AC power.

Time	Position	Applicant's Action or Behavior
		18031-C, SECTION A: LOSS OF POWER WITH DG FAILING TO TIE TO BUS
	UO	A1. Verify NSCW pumps on unaffected train (B) –TWO RUNNING.
	OATC	A2. Verify charging pump – RUNNING: __ NCP. -OR- __ Unaffected train CCP.
	UO	A3. Verify CCW pumps on unaffected train – TWO RUNNING. **Note to examiner:** The UO will start 2 Train B CCW pumps at this time.
	SS / OATC	A4. Check RHR status: a. Check RHR - REQUIRED FOR SHUTDOWN COOLING. RNO A4. Go to Step A5.
	OATC / UO	A5. Initiate the Continuous Actions Page.
	UO	*A6. Check AFW status: a. Check AFW system - NEEDED TO MAINTAIN SG LEVELS. ***(NO)***

Event No.: 5

Event Description: RAT (1NXRA) supply breaker to 1AA02 will trip open due to a fault on the bus. DG-1A will start, but will not re-energize 1AA02 due to a Bus Fault. This will require the crew to complete the actions of AOP 18031-C, "Loss of Class 1E Electrical Systems". Corrective actions include reducing AFW flow to return reactor power to less than 100%, and shift electrical loads to Train "B" 1E bus 1BA03, as well as implement tech specs for loss of AC power.

Time	Position	Applicant's Action or Behavior
		RNO
	UO	a. Perform the following:
		1) Reduce TDAFW pump speed to not less than 1535 rpm.
	SS	2) Go to Step A7.
		NOTE: TDAFW PUMP SPEED SHOULD HAVE BEEN LOWERED IN STEP 2 MAIN BODY OF 18031-C, TO REDUCE REACTOR POWER TO LESS THAN 100%.
	UO	A7. Verify ACCW pump on unaffected train – RUNNING.
	UO	A8. Verify four CNMT cooling units on unaffected train running in high speed using 13120, CONTAINMENT BUILDING COOLING SYSTEM.
		NOTE: Will start Train B CNMT Coolers 3,4,7,8 on high speed using step 4.2.3 or 4.8.5 of SOP 13120-1:
		Fan 3, 1 HS 12583D Fan 7, 1 HS 12585D
		Fan 4, 1 HS 2583D Fan 8, 1 HS 2585D
	UO	A9. Verify CRDM fans on unaffected train – TWO RUNNING.
		NOTE: STARTS CRDM FAN #4 by placing 1HS-12276A to Start.
	UO	A10. Verify reactor cavity cooling unit on unaffected train – ONE RUNNING.
		NOTE: STARTS REACTOR CAVITY COOLING Fan #2 by placing 1HS-2651 to Start.

Event No.: 5

Event Description: RAT (1NXRA) supply breaker to 1AA02 will trip open due to a fault on the bus. DG-1A will start, but will not re-energize 1AA02 due to a Bus Fault. This will require the crew to complete the actions of AOP 18031-C, "Loss of Class 1E Electrical Systems". Corrective actions include reducing AFW flow to return reactor power to less than 100%, and shift electrical loads to Train "B" 1E bus 1BA03, as well as implement tech specs for loss of AC power.

Time	Position	Applicant's Action or Behavior
	UO	A11. Verify SFP cooling pump on unaffected train running using 13719, SPENT FUEL POOL COOLING AND PURIFICATION SYSTEM IPC Points: ZD3405 ZD3411 ***Note to examiner: Phones SSS to dispatch ABO to swap SFP trains.***
	UO	A12. Verify the following unaffected train Class 1E 480V load centers - ENERGIZED: <u>Train B</u> • BB06 • BB07 • BB16 • NB10
	UO	A13. Verify unaffected MCCs energized by observing - NO TROUBLE ALARMS.
	SS	A14. Open doors that have installed door stops in the following <u>AFFECTED</u> Control Building rooms: UNIT 1 • TR A B52, B55, B76 ***NOTE: Phones SSS to dispatch CBO to open Doors.***

Event No.: 5

Event Description: RAT (1NXRA) supply breaker to 1AA02 will trip open due to a fault on the bus. DG-1A will start, but will not re-energize 1AA02 due to a Bus Fault. This will require the crew to complete the actions of AOP 18031-C, "Loss of Class 1E Electrical Systems". Corrective actions include reducing AFW flow to return reactor power to less than 100%, and shift electrical loads to Train "B" 1E bus 1BA03, as well as implement tech specs for loss of AC power.

Time	Position	Applicant's Action or Behavior
	SS	A15. Initiate the following: a. 14230, OFFSITE AC CIRCUIT VERIFICATION AND CAPACITY / CAPABILITY EVALUATION. b. Verify SAT energized using 13418-A(B), STANDBY AUXILIARY TRANSFORMER UNIT 1(2) TRAIN A(B) OPERATIONS. ***NOTE: THIS STEP PERFORMS THE 1 HOUR ACTIONS FOR LCO 3.8.1 FOR OFF-SITE SOURCES AND THE SAT.***
	OATC	A16. Verify DRPI - ENERGIZED.
	UO	*A17. Check DC bus loads: a. Verify 125V DC battery loads - LESS THAN THE FOLLOWING LIMITS: • AD1B 300 AMPS – expect **200 amps** • BD1B 300 AMPS – expect 0 amps • CD1B 100 AMPS – expect **90 amps** • DD1B 80 AMPS – expect 0 amps b. Monitor all 1E battery bus voltages - REMAIN GREATER THAN 105V DC.
	UO / OATC	A18. Check Reactor Makeup System: a. Unaffected boric acid transfer pump – RUNNING OR SELECTED TO AUTO. RNO a. Manually start unaffected boric acid transfer pump as necessary. -OR- __ Place unaffected pump handswitch in AUTO *Places 1HS-277A in AUTO.*

Event No.: 5

Event Description: RAT (1NXRA) supply breaker to 1AA02 will trip open due to a fault on the bus. DG-1A will start, but will not re-energize 1AA02 due to a Bus Fault. This will require the crew to complete the actions of AOP 18031-C, "Loss of Class 1E Electrical Systems". Corrective actions include reducing AFW flow to return reactor power to less than 100%, and shift electrical loads to Train "B" 1E bus 1BA03, as well as implement tech specs for loss of AC power.

Time	Position	Applicant's Action or Behavior
	UO	A18 cont. b. Unaffected reactor makeup water pump – RUNNING OR SELECTED TO AUTO. RNO b. Perform the following: • Manually start unaffected reactor make-up water pump, as necessary. -OR- • Place unaffected pump handswitch in AUTO. *Places 1HS-7763 in AUTO.*
	UO	*A19. Verify battery charger in service for non-1E batteries: • ***ND1 (OOS)*** • ND2 • ***ND3A (OOS)*** • ND3B ***NOTE: WILL DIRECT CONTROL BUILDING OPERATOR TO PLACE BATTERY CHARGERS IN SERVICE FOR 1ND1 AND 1ND3A USING 13406-1, "125V DC NON 1E ELECTRICAL DISTRIBUTION SYSTEM" USING SECTION 4.1.3***
	UO	A20. Transfer any de-energized NYS, ***NYRS***, and ***NYR*** busses to alternate sources by initiating 13432, 120V AC NON 1E INSTRUMENT DISTRIBUTION SYSTEM. ***NOTE: 1NYRS AND 1NYR WILL NEED TO BE TRANSFERRED TO ALTERNATE POWER SOURCES.*** ***NOTE: MAIN FEED PUMP B SPEED CONTROL WILL BE LOCKED UP DUE TO LOSS OF POWER TO THE CONTROL SYSTEM RELAY. THE UO WILL USE ARP 17015-1 WINDOW C05 TO RESTORE NORMAL SPEED CONTROL AFTER POWER IS RESTORED.***

Event No.: 5

Event Description: RAT (1NXRA) supply breaker to 1AA02 will trip open due to a fault on the bus. DG-1A will start, but will not re-energize 1AA02 due to a Bus Fault. This will require the crew to complete the actions of AOP 18031-C, "Loss of Class 1E Electrical Systems". Corrective actions include reducing AFW flow to return reactor power to less than 100%, and shift electrical loads to Train "B" 1E bus 1BA03, as well as implement tech specs for loss of AC power.

Time	Position	Applicant's Action or Behavior
	UO	**REFERENCES: ARP 17015-1 WINDOW C05** ["MFPT LOSS OF FW SIGNAL"] **1.0 PROBABLE CAUSE** Failure of automatic control signal supplied to the Main Feedwater Pump Turbine (MFPT) Controllers. **2.0 AUTOMATIC ACTIONS** NONE **3.0 INITIAL OPERATOR ACTIONS** Check which pump is locked up on Signal Memory Function (SMF) at the MFPT cabinet in the North side of the Control Room. **4.0 SUBSEQUENT OPERATOR ACTIONS** NOTES • MFPT speed will be maintained at the last speed reference signal received by the SMF from the Process Control System speed reference signal. • If desirable to prevent excessive transients in the Feedwater System, the Manual Control Potentiometer at MFPT A(B) Motor Speed Changer 1 HS 3151(3152) may be adjusted to obtain zero deviation on the MFPT A(B) AUTO/MAN Transfer Deviation 1 SI 3153(3154) prior to switching to manual control. Counterclockwise raises the deviation indicator and clockwise lowers the indicator.

Event No.: 5

Event Description: RAT (1NXRA) supply breaker to 1AA02 will trip open due to a fault on the bus. DG-1A will start, but will not re-energize 1AA02 due to a Bus Fault. This will require the crew to complete the actions of AOP 18031-C, "Loss of Class 1E Electrical Systems". Corrective actions include reducing AFW flow to return reactor power to less than 100%, and shift electrical loads to Train "B" 1E bus 1BA03, as well as implement tech specs for loss of AC power.

Time	Position	Applicant's Action or Behavior
	UO	**ARP 17015-1** 1. IF the automatic control signal is lost, perform the following: a. Place MFPT A(B) Motor Speed Changer 1 HS 3151 (3152) in MAN. b. Slowly adjust speed to maintain feedwater pressure as required to maintain the Feedwater Control Valve in the controlling band. 2. IF equipment failure is indicated, initiate maintenance. 3. WHEN the automatic control signal is restored (indicated by alarm clearing), perform the following: a. Return Speed Control to automatic by adjusting 1 SIC 509B(509C) to obtain zero deviation on 1 SI 3153(3154). b. Place MFPT A(B) Motor Speed Changer 1 HS 3151(3152) in AUTO. 4. Verify SMF resets for pump previously identified as locked up on SMF. 5. Operate MFPTs per 13615 1 depending on number of pumps operating.
	SS	**18031-C** A21. Check Control Room Emergency Lighting: a. Check bus loss of power expected duration - GREATER THAN 90 MINUTES. ***(YES)*** b. Transfer emergency lighting to the unaffected unit by placing MAIN CONTROL ROOM LIGHTING LOSP TRANSFER SWITCH on AFFECTED unit to LOSP position: ***NOTE: STEP A21.b. IS PERFORMED LOCALLY.***

Event No.: 5

Event Description: RAT (1NXRA) supply breaker to 1AA02 will trip open due to a fault on the bus. DG-1A will start, but will not re-energize 1AA02 due to a Bus Fault. This will require the crew to complete the actions of AOP 18031-C, "Loss of Class 1E Electrical Systems". Corrective actions include reducing AFW flow to return reactor power to less than 100%, and shift electrical loads to Train "B" 1E bus 1BA03, as well as implement tech specs for loss of AC power.

Time	Position	Applicant's Action or Behavior
	SS	A22. Initiate applicable Technical Specification requirements listed in ATTACHMENT A. ***NOTE: THE FOLLOWING TS APPLY FROM ATTACHMENT A (page 14 & 15).***
	SS	***EXAMINER MAY PROCEED TO NEXT EVENT DUE TO TIME REQUIREMENTS FOR IDENTIFYING ALL REQUIRED TECHNICAL SPECIFICATIONS FOR THIS FAILURE AND HAVE EXAMINEE IDENTIFY TS LATER.***

LCO 3.7.5 CONDITION C AFW

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. Two AFW trains inoperable	C.1 Be in MODE 3 AND C.2 Be in MODE 4.	6 hours 12 hours

LCO 3.8.1 CONDITIONS A, B, and E AC Sources

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One required offsite circuit inoperable	A.1 Perform SR 3.8.1.1 for required OPERABLE offsite circuit. AND A.2 Declare required feature(s) with no offsite power available inoperable when its redundant required feature(s) is inoperable. AND A.3 Restore required offsite circuit to OPERABLE status.	1 hours AND Once per 8 hours thereafter 24 hours from discovery of no offsite power to one train concurrent with inoperability of redundant required feature(s) 72 hours AND 14 days from discovery of failure to meet LCO

Event No.: 5

Event Description: RAT (1NXRA) supply breaker to 1AA02 will trip open due to a fault on the bus. DG-1A will start, but will not re-energize 1AA02 due to a Bus Fault. This will require the crew to complete the actions of AOP 18031-C, "Loss of Class 1E Electrical Systems". Corrective actions include reducing AFW flow to return reactor power to less than 100%, and shift electrical loads to Train "B" 1E bus 1BA03, as well as implement tech specs for loss of AC power.

Time	Position	Applicant's Action or Behavior		
		CONDITION	REQUIRED ACTION	COMPLETION TIME
		B. One DG inoperable	B.1 Perform SR 3.8.1.1 for the required offsite circuit(s). AND B.2 Verify SAT available. AND B.3 Declare required feature(s) supported by the inoperable DG inoperable when its required redundant feature(s) is inoperable. AND B.4.1 Determine OPERABLE DG is not inoperable due to common cause failure. OR B.4.2 Perform SR 3.8.1.2 for OPERABLE DG. AND ----------NOTE---------- Required Action B.5.1 is only applicable if the combined reliability of the enhanced black-start combustion turbine generators (CTG) and the black-start diesel generator is ε 95%. Otherwise, Required Action B.5.2 applies. ---------- B.5.1 Verify an enhanced blackstart CTG is functional by verifying the CTG and the black-start diesel generator starts and achieves steady state voltage and frequency.	1 hour AND Once per 8 hours Thereafter 1 hour AND Once per 12 hours thereafter 4 hours from discovery of Condition B concurrent with inoperability of redundant required feature(s) 24 hours 24 hours 72 hours OR Within 72 hours prior to entry into Condition B

Event No.: 5

Event Description: RAT (1NXRA) supply breaker to 1AA02 will trip open due to a fault on the bus. DG-1A will start, but will not re-energize 1AA02 due to a Bus Fault. This will require the crew to complete the actions of AOP 18031-C, "Loss of Class 1E Electrical Systems". Corrective actions include reducing AFW flow to return reactor power to less than 100%, and shift electrical loads to Train "B" 1E bus 1BA03, as well as implement tech specs for loss of AC power.

Time	Position	Applicant's Action or Behavior		
		CONDITION	REQUIRED ACTION	COMPLETION TIME
		B. One DG inoperable (continuation)	OR B.5.2 Start and run at least one CTG while in Condition B. AND B.6 Restore DG to OPERABLE status.	72 hours OR Prior to entry into Condition B for preplanned maintenance 14 days from discovery of failure to meet LCO
		E. One required offsite circuit inoperable AND One DG inoperable	----------NOTE---------- Enter applicable Conditions and Required Actions of LCO 3.8.9, "Distribution Systems - Operating," when Condition E is entered with no AC power source to one or more trains. ---------- E.1 Restore required offsite circuit to OPERABLE status. OR E.2 Restore DG to OPERABLE status.	12 hours 12 hours
	SS	**LCO 3.8.9 CONDITIONS A Distribution Systems**		
		CONDITION	REQUIRED ACTION	COMPLETION TIME
		A. One or more AC electrical power distribution subsystems inoperable	A.1 Restore AC electrical power distribution subsystems to OPERABLE status.	8 hours AND 16 hours from discovery of failure to meet LCO
		NOTE: NO LOSS OF SAFETY FUNCTION (LOSF) EXISTS.		

Event No.: 5

Event Description: RAT (1NXRA) supply breaker to 1AA02 will trip open due to a fault on the bus. DG-1A will start, but will not re-energize 1AA02 due to a Bus Fault. This will require the crew to complete the actions of AOP 18031-C, "Loss of Class 1E Electrical Systems". Corrective actions include reducing AFW flow to return reactor power to less than 100%, and shift electrical loads to Train "B" 1E bus 1BA03, as well as implement tech specs for loss of AC power.

Time	Position	Applicant's Action or Behavior
		A23. Check the fault condition cleared. RNO A23. Return to Step A1. **END OF EVENT 5, proceed to MAIN EVENTS 6, 7, & 8.** **NOTE TO SIMBOOTH OPERATOR:** **It is VERY IMPORTANT to make sure that SG levels are on the LOW side of 65% NR to ensure that the crew will go to 19231-C LOHS on the Reactor trip.**

Event No.: 5

Event Description: RAT (1NXRA) supply breaker to 1AA02 will trip open due to a fault on the bus. DG-1A will start, but will not re-energize 1AA02 due to a Bus Fault. This will require the crew to complete the actions of AOP 18031-C, "Loss of Class 1E Electrical Systems". Corrective actions include reducing AFW flow to return reactor power to less than 100%, and shift electrical loads to Train "B" 1E bus 1BA03, as well as implement tech specs for loss of AC power.

ATTACHMENT A
Potential Applicable LCOs & TRs Requiring Short Term Response

LCO/TR	Mode	Limiting Condition	Required Actions
3.1.7	1-2	Lost Rod Pos Ind	Immediately enter TS 3.0.3
3.4.15	1-4	All RCS leak detection instrumentation inop	Immediately enter TS 3.0.3
3.7.10 3.7.11 3.7.12	All	Both CREFS trains in one unit inop	Immediately place other unit trains in emergency mode
3.4.6 3.4.7 3.4.8	4 5 5	Required RCS loops and/or RHR trains	Immediately restore req'd loops/trains to service
3.5.3	4	Required ECCS train inop	Immediately initiate restoration
3.8.2	5,6	Loss of required AC Source	Immediately declare required systems w/o offsite power inop or suspend fuel movement
3.8.5	5,6	Loss of required DC Sources	Immediately declare affected features inop or suspend fuel movement activities
3.9.5 3.9.6	6	RHR train requirements are not met for refueling	Immediately stop fuel movement and dilutions and restore required trains and/or water level
13.9.5	All	One or both FHB HVAC trains inop	Immediately verify remaining train operable or suspend fuel movement activities
13.1.8 13.1.9	3-5	Lost required DRPI	Immediately open RTBs
13.1.2 13.1.4	5,6	Required boric acid injection source and/or pump inop	Immediately suspend fuel movement and/or reactivity changes
3.6.3	1-4	Both CNMT pen iso valves are inop	1 hr: Isolate affected penetrations
3.8.1	*1-4*	*Loss of offsite source* *Loss of DG*	*1 hr: Complete 14230* *1 hr: Verify SAT Operable* *4 hr: Determine redundant safety features operable*
3.4.5	3	Required RCS loops inop with RTBs closed	1 hr: Restore loop or open RTBs
3.8.4	1-4	Loss of DC source due to other than inop battery	2 hrs: Restore all 4 DC sources to operable

Event No.: 5

Event Description: RAT (1NXRA) supply breaker to 1AA02 will trip open due to a fault on the bus. DG-1A will start, but will not re-energize 1AA02 due to a Bus Fault. This will require the crew to complete the actions of AOP 18031-C, "Loss of Class 1E Electrical Systems". Corrective actions include reducing AFW flow to return reactor power to less than 100%, and shift electrical loads to Train "B" 1E bus 1BA03, as well as implement tech specs for loss of AC power.

The above Technical Specifications and the following additional Specifications should be referenced for long term required actions:

3.3.2	1-2	ESFAS instrumentation	FU 6d: Loss of AFWAS from trip of both MFPs
3.3.3	1-3	PAMS instrumentation	FU 19: Loss of CNMT H2 monitor heat tracing. (Note cross train relationship; Train A heat tracing fed from Train B power. Train B heat tracing fed from Train A power.
3.3.4	1-3	Remote shutdown system	
3.4.9	1-3	Pressurizer	2 heater groups each with 150 kw capacity and capable of being powered from emergency source
3.4.16	All	RCS activity	Chemistry notified if power changed more than 15% in one hour (SR 3.4.16.2)
3.5.2	1-3	ECCS	
3.6.6	1-4	CNMT spray and CNMT clrs	
3.7.4	1-3	SG ARVs	Also affects 3.3.4
3.7.5	1-3	AFW pumps & disch vlvs	2 or more trains may be inop
3.7.7	1-4	CCW system	
3.7.8	1-4	NSCW system	
3.7.9	1-4	Ultimate heat sink	
3.7.13	1-4	Piping pen units	
3.7.14	1-4	ESF chillers	
3.8.9	1-4	Distribution Systems - OPERATING	Condition A 8 hours
13.1.3	1-4	Boration flow paths	
13.1.5	1-4	Charging pumps - operating	
13.7.4	All	Thermal barriers	
3.4.12	4-6	COPS	
ODCM	All	RE-12444, RE-12442, RE-2565, RE-2562 are affected by loss of heat tracing for sample lines.	

Op-Test No.: 2012-301 **Scenario No.:** 4

Event No.: 6, 7, and 8

Event Description: MFPT A shaft shear leading to reactor trip and complications. LOSP to 1BA03 will occur on reactor trip with failure of DG1B to auto start. The UO will manually start per IOAs of 19000-C. CCP "B" will trip on load sequence and TDAFW pump will trip on over speed when UO attempts to raise speed. MDAFW pump B will have a coupling failure.

Time	Position	Applicant's Action or Behavior
	CREW	Diagnoses that feed water flow has been lost and trips reactor. Symptoms / alarms: • ALB13-A01 STM GEN 1 FLOW MISMATCH • ALB13-B01 STM GEN 2 FLOW MISMATCH • ALB13-C01 STM GEN 3 FLOW MISMATCH • ALB13-D01 STM GEN 4 FLOW MISMATCH Indications: • All 4 steam generators feed flow at 0 and less than steam flow. • All 4 steam generators narrow range levels lowering rapidly.
	SS	Enters 18016-C CONDENSATE AND FEEDWATER MALFUNCTION section A LOSS OF MAIN FEED PUMP.
	CREW OATC	IMMEDIATE OPERATOR ACTIONS: A1. Check reactor power – LESS THAN OR EQUAL TO 70%. **(YES)**

Op-Test No.: 2012-301 **Scenario No.: 4** **Page 2 of 10**

Event No.: 6, 7, and 8

Event Description: MFPT A shaft shear leading to reactor trip and complications. LOSP to 1BA03 will occur on reactor trip with failure of DG1B to auto start. The UO will manually start per IOAs of 19000-C. CCP "B" will trip on load sequence and TDAFW pump will trip on over speed when UO attempts to raise speed. MDAFW pump B will have a coupling failure.

Time	Position	Applicant's Action or Behavior
	UO	A2. Check at least one MFP – RUNNING AND PROVIDING FLOW. **(NO)** RNO A2. Perform the following: a. Trip the reactor. b. Go to 19000-C, E-0 REACTOR TRIP OR SAFETY INJECTION. **Note to examiner:** The crew may realize there is no feed flow and manually trip the reactor without entering 18016-C.
	CREW SS	Performs Immediate Operator Actions per 19000-C, E-0 Reactor Trip or Safety Injection. 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

Op-Test No.: 2012-301 **Scenario No.: 4** **Page 3 of 10**

Event No.: 6, 7, and 8

Event Description: MFPT A shaft shear leading to reactor trip and complications. LOSP to 1BA03 will occur on reactor trip with failure of DG1B to auto start. The UO will manually start per IOAs of 19000-C. CCP "B" will trip on load sequence and TDAFW pump will trip on over speed when UO attempts to raise speed. MDAFW pump B will have a coupling failure.

Time	Position	Applicant's Action or Behavior
		Note to examiner: 1BA03 is on a condition trigger to de-energize ~ 15 seconds after the reactor trips with DG1B failure to auto start.
	UO	3. Check Power to AC Emergency Buses.
		a. AC Emergency Busses – AT LEAST ONE ENERGIZED **(NO)**
		• 4160 AC 1E Busses
		RNO
	UO ***Critical***	**a. IF conditions permit, THEN manually start a DG from the Control Room and check that the output breaker closes and energizes a bus.**
		Note to examiner: The UO should manually start DG1B.
		IF DG will not start or starts but the output breaker fails to close and energize the bus, THEN Go to 19100-C, ECA-0.0 LOSS OF ALL AC POWER.
		b. AC Emergency Busses – ALL ENERGIZED (NO)
		• 4160V AC 1E Busses • 480V AC 1E Busses
		RNO
		b. Try to restore power to de-energized AC Emergency Bus while continuing with Step 4.

Op-Test No.: 2012-301 **Scenario No.: 4** **Page 4 of 10**

Event No.: 6, 7, and 8

Event Description: MFPT A shaft shear leading to reactor trip and complications. LOSP to 1BA03 will occur on reactor trip with failure of DG1B to auto start. The UO will manually start per IOAs of 19000-C. CCP "B" will trip on load sequence and TDAFW pump will trip on over speed when UO attempts to raise speed. MDAFW pump B will have a coupling failure.

Time	Position	Applicant's Action or Behavior
	OATC	4. Check if SI is actuated. **(NO)** • Any SI annunciators – LIT **(NO)** • SI ACTUATED BPLP window – LIT **(NO)** RNO 4. Check if SI is required. **(NO)** IF one or more of the following conditions has occurred. • PRZR pressure less than or equal to 1870 psig. **(NO)** • Steam line pressure less than or equal to 585 psig. **(NO)** • Containment pressure greater than or equal to 3.8 psig. **(NO)** • Automatic alignment of ECCS equipment to injection phase. **(NO)** THEN actuate SI and go to Step 6. **(Not required)**
	UO	5. Perform the following to limit RCS cooldown: a. Check NR level in at least one SG greater than 10%. (NO) RNO a. Maintain AFW flow greater than 570 gpm and go to 19001-C, ES-0.1 REACTOR TRIP RESPONSE. **Note to examiner**: If the UO attempts to raise TDAFW flow, the TDAFW pump will trip on overspeed at this time. MDAFW pump B coupling is failed and the pump is delivering no flow.

Op-Test No.: 2012-301 **Scenario No.: 4** **Page 5 of 10**

Event No.: 6, 7, and 8

Event Description: MFPT A shaft shear leading to reactor trip and complications. LOSP to 1BA03 will occur on reactor trip with failure of DG1B to auto start. The UO will manually start per IOAs of 19000-C. CCP "B" will trip on load sequence and TDAFW pump will trip on over speed when UO attempts to raise speed. MDAFW pump B will have a coupling failure.

Time	Position	Applicant's Action or Behavior
	SS	Transitions to 19001-C, ES-0.1 REACTOR TRIP RESPONSE.
	OATC UO	1. Initiates the following • Continuous Actions and Foldout Page. • Critical Safety Function Status Trees per 19200-C, F-O CRITICAL SAFETY FUNCTION STATUS TREE. **Note to examiner**: Once it has been determined there is a valid RED PATH on HEAT SINK, the SS will transition to 19231-C, FR-H.1, RESPONSE TO LOSS OF SECONDARY HEAT SINK.
	OATC	2. IF SI actuation occurs during the procedure, THEN go to 19000-C, E-0 REACTOR TRIP OR SAFETY INJECTION.
	OATC	3. Limit RCS cooldown. a. Verify AFW flow to SGs. RNO a. Continue attempts to establish AFW flow. Go to Step 3.e. e. Verify SG Blowdown Isolation Valves – CLOSED WITH HANDSWITCES IN CLOSE.

Op-Test No.: 2012-301 **Scenario No.:** 4 **Page 6 of 10**

Event No.: 6, 7, and 8

Event Description: **MFPT A shaft shear leading to reactor trip and complications. LOSP to 1BA03 will occur on reactor trip with failure of DG1B to auto start. The UO will manually start per IOAs of 19000-C. CCP "B" will trip on load sequence and TDAFW pump will trip on over speed when UO attempts to raise speed. MDAFW pump B will have a coupling failure.**

Time	Position	Applicant's Action or Behavior
	SS	Transitions to 19231-C, FR-H.1, RESPONSE TO LOSS OF SECONDARY HEAT SINK.
		CAUTION: Feed flow should NOT be re-established to any faulted SG if a non-faulted SG is available.
	UO	1. Check total feed flow capability to SG(s): • Greater than 570 gpm available. **(NO)** -AND- • Less than 570 gpm due to Operator action. **(NO)** RNO 1. Go to Step 3.
	OATC UO SS	3. Initiate the following: • Continuous Actions Page For Prior to Establishing Bleed and Feed. • NMP-EP-110, EMERGENCY CLASSIFICATION DETERMINATION AND INITIAL ACTION.

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Event No.: 6, 7, and 8

Event Description: MFPT A shaft shear leading to reactor trip and complications. LOSP to 1BA03 will occur on reactor trip with failure of DG1B to auto start. The UO will manually start per IOAs of 19000-C. CCP "B" will trip on load sequence and TDAFW pump will trip on over speed when UO attempts to raise speed. MDAFW pump B will have a coupling failure.

Time	Position	Applicant's Action or Behavior
	OATC	4. Check if secondary heat sink is required: **a.** RCS pressure – GREATER THAN ANY NON-FAULTED SG PRESSURE. **(YES)** b. RCS WR temperature – GREATER THAN 350°F. **(YES)**
	OATC	5. Check CCP status – AT LEAST ONE AVAILABLE. **(NO)** RNO 5. Stop all RCPs. Go to Step 35. **Note to examiner:** CCP "A" is de-energized due to loss of 1AA02 and CCP "B" tripped on LOSP load sequence after reactor trip.
	OATC	35. Verify SI actuated.

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Event No.: 6, 7, and 8

Event Description: MFPT A shaft shear leading to reactor trip and complications. LOSP to 1BA03 will occur on reactor trip with failure of DG1B to auto start. The UO will manually start per IOAs of 19000-C. CCP "B" will trip on load sequence and TDAFW pump will trip on over speed when UO attempts to raise speed. MDAFW pump B will have a coupling failure.

Time	Position	Applicant's Action or Behavior
	OATC *Critical*	36. Verify RCS feed path: a. Verify ECCS Pump status: CCPs – AT LEAST ONE RUNNING. **(NO)** -OR- **SI Pumps – AT LEAST ONE RUNNING. (NO)** **Note to examiner:** The OATC will need to start SI Pump B to satisfy the critical task. b. Verify ECCS valve alignment – PROPER LINEUP INDICATED ON MLBs. **(Train B only)**
		CAUTION: During bleed and feed operation the PRT may rupture.

Op-Test No.: 2012-301 **Scenario No.:** 4 **Page 9 of 10**

Event No.: 6, 7, and 8

Event Description: MFPT A shaft shear leading to reactor trip and complications. LOSP to 1BA03 will occur on reactor trip with failure of DG1B to auto start. The UO will manually start per IOAs of 19000-C. CCP "B" will trip on load sequence and TDAFW pump will trip on over speed when UO attempts to raise speed. MDAFW pump B will have a coupling failure.

Time	Position	Applicant's Action or Behavior
	OATC	37. Establish RCS bleed path: a. Place all PRZR Heaters in OFF/PTL. b. Check power to PRZR PORV Block Valves – AVAILABLE. **(NO)** RNO
	Critical	**b. Restore power to block valves.** **Note to examiner:** Block valve 8000A has no power and is de-energized in the open position, and Block valve 8000B was closed and de-energized per Tech Spec action. The crew should dispatch someone to energize the 8000B Block valve.
	Critical	**c. Arm COPS and check PRZR PORV Block Valves – BOTH OPEN.** RNO **d. Open both PRZR PORV Block Valves.** **Note to examiner:** Once power has been restored to Block Valve 8000B, the crew should open the block valve.
	Critical	**e. Open both PRZR PORVs.** **Note to examiner**: The crew should proceed to step 38 while waiting power restoration to the Block valve HV-8000B and open the Rx. Vessel Head Vent Valves, then return and open Block Valve B and Both PORVs.

Op-Test No.: 2012-301 **Scenario No.:** 4 **Page 10 of 10**

Event No.: 6, 7, and 8

Event Description: MFPT A shaft shear leading to reactor trip and complications. LOSP to 1BA03 will occur on reactor trip with failure of DG1B to auto start. The UO will manually start per IOAs of 19000-C. CCP "B" will trip on load sequence and TDAFW pump will trip on over speed when UO attempts to raise speed. MDAFW pump B will have a coupling failure.

Time	Position	Applicant's Action or Behavior
	OATC	38. Verify adequate RCS bleed path: • COPS – ARMED • PRZR PORV Block Valves – BOTH OPEN • PRZR PORVs – BOTH OPEN RNO 38. Perform the following: a. Open Reactor Vessel Head Vent Valves: • HV-8095A – RX HEAD VENT TO LETDOWN ISOLATION VLV • HV-8095B – RX HEAD VENT TO LETDOWN ISOLATION VLV • HV-8096A – RX HEAD VENT TO LETDOWN ISOLATION VLV • HV-8096B – RX HEAD VENT TO LETDOWN ISOLATION VLV • HV-0442A – REACTOR HEAD VEN TO PRT • HV-0442B – REACTOR HEAD VENT TO PRT b. Align an available low pressure water source to at least one intact SG by initiating ATTACHMENT C. **Note to examiner:** Once an adequate bleed path has been established by opening Block Valve HV-8000B and both PORVs, the scenario may be ended. **END OF THE SCENARIO.**

target ZERO Every day, every job, safely.	**NUCLEAR SAFETY FOCUS** **TARGET ZERO**
Protected Train: ☒ Alpha ☐ Bravo	**EOOS:** ☒ Green ☐ Yellow ☐ Orange ☐ Red
Plant Conditions:	61 % power BOL.
Major Activities:	Maintain power operations per UOP 12004-C section 4.3 for power operation. Control Rods will be maintained in automatic for transient response per Operations Management direction.
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. ☐ MFPT B is tagged out for shaft replacement, expected return to service time is 96 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. ☐ Power Range high level trip bistables are set at 90%.

SIMULATOR REACTIVITY BRIEFING SHEET

Shift: **Day** Date: **Today** Burnup: **500** MWD/MTU Core Life: **BOL**

MINIMUM SHIFT REACTIVITY INFORMATION TO BE BRIEFED

Power: **60** Rod Motion: **Rods in automatic.**

Current Temperature Control Strategy: **Dilution**

Currently Making Up: **100** gallons every **as needed**

The desired Tavg operating band is 573.0 ± 0.05°F

CVCS makeup boric acid flow per 100 gallon makeup (FI-110A): **13.3** gallons/100
CVCS makeup pot setting (FIC-110): **3.33**

BTRS Strategy: **None**
AFD Strategy: **Maintain on target ± 1 AFD units**

Reactivity System Components Degraded/OOS:

None

Activities Expected That May Affect Core Reactivity (Reactivity Focus Items):

Power stable with MFPT B tagged out, rods in automatic at management direction.

CURRENT CORE REACTIVIITY PARAMETERS

Boron worth: **7.7** pcm/ppm PCM per 1% power change: **14.4** pcm/%

Current MTC values HFP: **-13.7** pcm/°F HZP: **-1.8** pcm/°F

Current BAST C_b: **7,000** ppm Current RCS C_b: **931** ppm

Boration required per
- degree °F: **18** gallons
- 1% power change: **19** gallons
- 10% power change: **190** gallons
- 30% power change: **570** gallons

Dilution required per
- degree °F: **118** gallons
- 1% power change: **124** gallons

Boration required for stuck rods (154 ppm/rod):
- **3,195** gallons for 2 stuck rods
- **4,857** gallons for 3 stuck rods

**If more than 3 rods are stuck, begin emergency boration and calculate gallons for actual number of stuck rods.*

Human Performance Tools

Peer Check	Three-Way Communication	Self-Verification (STAR)
Pre-Job Briefing	Phonetic Alphabet	Timeout
Procedure Use (placekeeping)	One Minute Matters (situational awareness)	

Valid for Cycle 17, PTDB Tab 1.0 revision 28.0 and Tab 16.0 revision 18.0

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

Facility: Vogtle Scenario No.: 6 Op-Test No.: 2012-301

Examiners: Meeks Operators: _____
Bates _____
Capehart _____

Initial Conditions: The plant is at 100% power, BOL, steady state operations, control rods in automatic. (Base IC # 10, snapped to IC # 186 for HL17 NRC Exam)

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

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

Preloaded Malfunctions:

AC03B - ACCW Pump-2 Hand switch Auto Contact Failure

AF05A, B, C Failure of all AFW pumps to automatically start

ES01- Failure of Automatic Reactor Trip

ES02 - Failure of Manual Reactor Trip

TU18 - Auto Turbine Trip Failure

Overrides

Note to Simbooth: Place Containment Mini-Purge in service.

Event No.	Malf. No.	Event Type*	Event Description
T1	AC02A	C-UO C-SS	ACCW Pump # 1 locked rotor with failure of the standby ACCW pump to automatically start.
T2	RC08A @ 100%	I-OATC I-SS TS-SS	RCP Loop 1 HL NR RTD fails high resulting in inward rod motion. **LCO 3.3.1, FU 6, 7 Condition E and LCO 3.3.2 FU 5b Condition I**
T3	RM-006	TS-SS	Cnmt Bldg Oper Lev Rad – hi Range, RE-006 fails to 100%. **LCO 3.3.3 FU 14, Condition B**
T4	PR03A (56.5-0%) Ramp 600 sec	I-OATC I-SS TS-SS	Controlling PRZR level channel LT-459 fails low over 10 minutes resulting in FIC-0121 raising charging flow. **LCO 3.3.1 FU 9, Condition M**

Event No.	Malf. No.	Event Type*	Event Description
T5	FW14 @100% Ramp 60 Seconds	I-UO I-SS	FW pressure transmitter PT-508 fails slowly high resulting in MFPT speed reducing and lowering FW flows and SG levels.
6	N/A	R-OATC N-UO R-SS	Power reduction due to MFPT B high vibrations.
T7	EL06A	M-ALL	Loss of 13.8kV bus 1NAA resulting in loss of 2 RCPs and 2 Condensate Pumps, 1 circulating water pump - ATWT.
T8	RD07 with 69 sec delay	C-OATC C-SS **Critical**	ATWT – Auto rod motion fails after ~ 1 minute.
9	Preload	C-UO C-SS **Critical**	Turbine Auto Trip failure requiring Manual Trip.
10	Preload	C-UO C-SS **Critical**	MDAFW and TDAFW pumps fail to automatically start.
T11	MS06D @50%	CREW	Main Steam Safety for Loop # 4 fails 50% open requiring an eventual transition to E-2 to attempt to isolate the faulted SG # 4.
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor			

Event 1:

ACCW pump # 1 will trip due to a locked rotor and ACCW pump # 2 will fail to automatically start.

Verifiable Actions:

UO – Starts standby ACCW pump # 2.

Technical Specifications:

None

Event 2:

RCS Loop 1 NR HL RTD fails high resulting in inward rod motion.

Verifiable Actions:

OATC – Performs IOA of 18001-C section B and verifies rods are in manual.

OATC – Selects affected loop # 3 on both the Tavg and Delta T defeat switches.

OATC – Withdraws rods to match Tavg – Tref.

Technical Specifications:

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

LCO 3.3.1 Reactor Trip System (RTS) Instrumentation FU 7 Condition E

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

Event 3:

Containment High Range Radiation monitor RE-006 fails high.

Verifiable Actions:

None, this is a Technical Specification call for the SS.

Technical Specifications:

LCO 3.3.3 Post Accident Monitoring (PAM) Instrumentation, FU 14, Condition B

Event 4:

Controlling Pressurizer level channel PT-459 fails high over 10 minutes resulting in a reduction in charging flow as FIC-0121 throttles closed.

Verifiable Actions:

OATC – Manually controls charging flow using FIC-0121 OR manually isolates letdown if flashing of letdown occurs.

Technical Specifications:

LCO 3.3.1 Reactor Trip System (RTS) Instrumentation, FU 9, Condition M

Event 5:

Feed water pressure transmitter PT-508 fails high resulting in lowering MFPT speed, lowering FW flow to all SGs, and all SG levels lowering.

Verifiable Actions:

UO – Performs IOAs of 18016-C, Section E and takes manual control of the FW valves and MFPT speed controls to control SG levels between 60 to 70%.

Technical Specifications:

None

Event 6:

A power reduction will commence due to MFPT B high vibration.

Verifiable Actions:

OATC – Borates and adjusts control rods to maintain Tavg – Tref matched and AFD on target.

UO – Lowers turbine load for power reduction.

Technical Specifications:

None

Event 7, 8, 9, 10:

A loss of 13.8 kV bus 1NAA occurs. This results in a loss of 2 RCPs, the two running condensate pumps, and trip of both MFPTs. An ATWT will occur with failure of manual or automatic trip. Main Steam Safety Valve for Loop # 4 will fail open requiring an eventual transition to 19020-C to attempt to isolate the faulted SG # 4.

Verifiable Actions:

OATC – Manually inserts control rods upon failure of automatic inward rod motion.

UO – Manually trips the turbine.

UO – Manually starts all AFW pumps.

CRITICAL TASKS:

1) **Manually inserts control rods per IOAs of 19211-C to reduce reactor power during an ATWT with a coincident loss of heat sink to protect core integrity.**

2) **Manually trip the turbine no later than step 2 RNO of 19211-C to conserve SG levels for adequate heat removal.**

3) **Starts MDAFW and TDAFW pumps no later than step 3 RNO of 19211-C to maintain SG inventory for adequate heat removal.**

Op-Test No.: 2012-301 **Scenario No.: 6** **Page 1 of 5**

Event No.: 1

Event Description: ACCW Pump # 1 will trip with ACCW Pump # 2 failing to automatically start. The UO will manually start ACCW Pump # 2.

Time	Position	Applicant's Action or Behavior
	OATC	Diagnose the trip of ACCW Pump # 1 with ACCW Pump # 2 failing to automatically start. Symptoms / alarms: • ALB04-A02 ACCW KO HDR PRESS • ALB04-B02 ACCW RX COOLANT DRN TK HX LO FLOW • ALB04-C02 ACCW EXCESS LTDN HX LO FLOW • ALB04-D02 ACCW RTN HDR FROM RCP LO FLOW • ALB04-A03 ACCW RCP 1 CLR LO FLOW • ALB04-B03 ACCW RCP 2 CLR LO FLOW • ALB04-C03 ACCW RCP 3 CLR LO FLOW • ALB04-D03 ACCW RCP 4 CLR LO FLOW • ALB07-D03 LTDN HX OUT HI TEMP • ALB07-F04 LTDN HX HI TEMP DEMIN DIVERT • ALB36-A01 4160V SWGR 1AA02 TROUBLE Indications: • ACCW Pump # 1 green and amber light lit. • High temperature on any heat exchanger serviced by ACCW. • FV-129 Divert (amber light lit) bypassing CVCS demins.
	OATC	**NOTES:** • ACCW pumps are removed from the 4.16KV Class 1E buses following simultaneous loss of offsite power and safety injection. • ACCW flow to the Seal Water Heat Exchanger is not required if RCS temperature remains less than 135°F.

Op-Test No.: 2012-301 **Scenario No.:** 6 **Page 2 of 5**

Event No.: 1

Event Description: ACCW Pump # 1 will trip with ACCW Pump # 2 failing to automatically start. The UO will manually start ACCW Pump # 2.

Time	Position	Applicant's Action or Behavior
	SS	Enters 18022-C, LOSS OF AUXILIARY COMPONENT COOLING WATER.
	UO	1. Check ACCW pumps – AT LEAST ONE RUNNING. **(NO)** RNO 1. Perform the following. **a.** Start an ACCW pump. **(YES)** b. IF an ACCW pump can NOT be started, THEN perform the following: **(N/A)** **1)** Trip the Reactor. **(N/A)** 2) WHEN Reactor is verified tripped, THEN stop all RCPs. **(N/A)** 3) Initiate 19000-C, E-0 REACTOR TRIP OR SAFETY INJECTION. **(N/A)** 4) Go to Step 3.
	UO	2. Check ACCW SPLY HDR PRESS PI-1977 – GREATER THAN 135 PSIG. **(YES)**
	UO	3. Check if ACCW flow exists through the letdown heat exchanger. • TV-130 – OPEN. (YES) • ALB07-D03 LTDN HX OUT HI TEMP – EXTINGUISHED **(YES)**

Op-Test No.: 2012-301 **Scenario No.:** 6

Event No.: 1

Event Description: ACCW Pump # 1 will trip with ACCW Pump # 2 failing to automatically start. The UO will manually start ACCW Pump # 2.

Time	Position	Applicant's Action or Behavior
	OATC UO	4. Initiate the Continuous Actions Page.
	UO	5. Check ACCW Surge Tank Level (IC L2700) – GREATER THAN 20% AND STABLE OR RISING. **(YES)**
	UO	6. Check if RCPs should be stopped: **(NO, all parameters are met)** a. Check the following RCP parameters. (using plant computer): • Motor bearing (upper or lower radial or thrust) – GREATER THAN 195°F. • Motor stator winding – GREATER THAN 311°F. • Seal water inlet – GREATER THAN 230°F. • Loss of ACCW – GREATER THAN 10 MINUTES. RNO a. Perform the following: 1) IF any parameter limit is exceeded, THEN perform Step 6.b. 2) Go to Step 7.

Op-Test No.: 2012-301 **Scenario No.:** 6 **Page 4 of 5**

Event No.: 1

Event Description: ACCW Pump # 1 will trip with ACCW Pump # 2 failing to automatically start. The UO will manually start ACCW Pump # 2.

Time	Position	Applicant's Action or Behavior
	UO	7. Check RCP thermal barrier outlet valves – OPEN. **(YES)** • HV-19051 ACCW RCP-1 THERMAL BARRIER RTN VLV • HV-19053 ACCW RCP-2 THERMAL BARRIER RTN VLV • HV-19055 ACCW RCP-3 THERMAL BARRIER RTN VLV • HV-19057 ACCW RCP-4 THERMAL BARRIER RTN VLV • HV-2041 ACCW RCPS THERMAL BARRIER RTN VLV
	UO	8. Check ACCW heat exchangers outlet temperature (IPC T2701) – LESS THAN 120°F. **(YES)**
	UO	9. Check ACCW containment isolation valves – OPEN. **(YES)** • HV-1979 ACCW SPLY HDR ORC ISO VLV • HV-1978 ACCW SPLY HDR IRC ISO VLV • HV-1974 ACCW RTN HDR IRC ISO VLV • HV-1975 ACCW RTN HDR ORC ISO VLV

Op-Test No.: 2012-301 **Scenario No.:** 6

Event No.: 1

Event Description: ACCW Pump # 1 will trip with ACCW Pump # 2 failing to automatically start. The UO will manually start ACCW Pump # 2.

Time	Position	Applicant's Action or Behavior
	UO	10. Check if ACCW is restored to service. a. Components cooled by ACCW – TEMPERATURES RETURNING TO NORMAL. **(YES)** b. Restore charging and letdown using 13006, CHEMICAL AND VOLUME CONTROL SYSTEM. **(N/A)** c. Return to procedure and step in effect.
		END OF EVENT 1, proceed to EVENT 2.

Op-Test No.: 2012-301 **Scenario No.:** 6

Event No.: 2

Event Description: RCS NR Temperature Instrument TE-411A Fails High (Thot) on loop # 1. This will require the OATC to perform IOAs by placing rods in MANUAL.

The crew will then enter AOP-18001 section B "Failure of RCS Narrow Range Temperature Instrumentation" to complete the corrective actions for this failure.

Time	Position	Applicant's Action or Behavior
	OATC	Diagnose NR Temperature Instrument Failure: (Loop 1 T_{HOT} TE-41A fails high) Symptoms / alarms: ALB12-A03 RC LOOP Delta T/AUCT Delta T HI-LO DEV ALB12-A04 RC LOOP TAVG/AUCT TAVG HI-LO DEV ALB12-A05 TAVG TREF DEVIATION ALB12-A06 OVERTEMP ΔT ALERT ALB12-B04 AUCT TAVG HIGH ALB12-B06 OVERPOWER ΔT ALERT ALB06-F01 CSFST TROUBLE ALB03-C03 OVERPOWER ΔT ROD BLOCK AND RUNBACK ALERT ALB10-E03 OVERTEMP ΔT ROD BLOCK AND RUNBACK ALERT Indications: • Loop 1 Tavg / ΔT indications deviating from other loops. • 1FIC-0121 Charging Flow Controller raising to maximum demand. • Rapid inward Control Rod motion.
	OATC SS	***18001-C Section B*** **IMMEDIATE OPERATOR ACTION** B1. Place ROD BANK SELECTOR SWITCH in MAN position. Verifies immediate operator action step B1 with OATC.
	SS	Enters AOP 18001-C, Section B.
	OATC	**Subsequent Actions** B2. Restore TAVG to program band.
	OATC	B3. Select affected loop on TS-412T TAVG DEFEAT SEL. ***Defeats 412***

Event No.: 2

Event Description: RCS NR Temperature Instrument TE-411A Fails High (Thot) on loop # 1. This will require the OATC to perform IOAs by placing rods in MANUAL.

The crew will then enter AOP-18001 section B "Failure of RCS Narrow Range Temperature Instrumentation" to complete the corrective actions for this failure.

Time	Position	Applicant's Action or Behavior
		B4. Select affected loop on TS-411F DELTA T DEFEAT SEL. **Defeats *411***
	OATC	B5. Place ROD BANK SELECTOR SWITCH in AUTO position, if desired.
	SS	B6. Notify I & C to initiate repairs. Calls SS to perform the following: • Notify Operations Duty of AOP entry • Write a Condition Report • Notify Maintenance of the failure
	SS	B7. Bypass the affected instrument channel using 13509-C, BYPASS TEST INSTRUMENTATION (BTI) PANEL OPERATION, if desired. ***NOTE: Expect the SS will NOT bypass the channel.***
	SS	B8. Trip the affected channel bistables and place the associated MASTER TEST switches in TEST position per TABLE B1 within 72 hours. (TS 3.3.1 & 3.3.2) ***NOTE: The SS is expected to leave bistables untripped during the allowed out of service time to facilitate I&C trouble shooting of the failed channel.***

Event No.: 2

Event Description: RCS NR Temperature Instrument TE-411A Fails High (Thot) on loop # 1. This will require the OATC to perform IOAs by placing rods in MANUAL.

The crew will then enter AOP-18001 section B "Failure of RCS Narrow Range Temperature Instrumentation" to complete the corrective actions for this failure.

<table>
<tr><th>Time</th><th>Position</th><th>Applicant's Action or Behavior</th></tr>
<tr><td></td><td>SS</td><td>B9. Initiate the applicable actions of:
• TS 3.3.1
• TS 3.3.2</td></tr>
<tr><td></td><td rowspan="4">SS</td><td>LCO 3.3.1 Function 6, 7 Condition E OTΔT Trip, OPΔT</td></tr>
<tr><td></td><td>
<table>
<tr><th>CONDITION</th><th>REQUIRED ACTION</th><th>COMPLETION TIME</th></tr>
<tr><td>E. One channel Inoperable.</td><td>E.1 Place channel in trip.
OR
E.2 Be in MODE 3.</td><td>72 hours

78 hours</td></tr>
</table>
</td></tr>
<tr><td></td><td>LCO 3.3.2 Function 5b. Condition I FWI</td></tr>
<tr><td></td><td>
<table>
<tr><th>CONDITION</th><th>REQUIRED ACTION</th><th>COMPLETION TIME</th></tr>
<tr><td>I. One channel Inoperable.</td><td>I.1 Place channel in trip.
OR
I.2 Be in MODE 3.</td><td>72 hours

78 hours</td></tr>
</table>
</td></tr>
<tr><td></td><td>OATC / UO</td><td>B10. Initiate the Continuous Actions Page.</td></tr>
<tr><td></td><td>SS</td><td>*B11. Check repairs and surveillances – COMPLETE. (NO)
RNO
*B11. Perform the following:
a. WHEN repairs and surveillances are complete, THEN perform Step B12.
b. Return to procedure and step in effect.
END OF EVENT 2.</td></tr>
</table>

Op-Test No.: 2012-301 **Scenario No.:** 6 **Page 1 of 6**

Event No.: 4

Event Description: PRZR level channel LT-459 will slowly fail low over ~ 10 minutes. The OATC will take manual control of FIC-0121 to stabilize charging flow and PRZR level, swap control channels, return charging flow to automatic.

Time	Position	Applicant's Action or Behavior
	OATC	Diagnose PRZR LT-459 is slowly failing low affecting charging flow: Symptoms / alarms: ALB11-D01 PRZR LO LEVEL DEVIATION ALB08-F06 RCP SEAL WATER INJ LO FLOW (may come in after swapping controlling PRZR LT channels) Indications: • PRZR LT-459 drifting low over time. • Charging flow FIC-0121 rising to maximum as indicated PRZR program level is high relative to LT-459. • PRZR level on other 2 channels rising.
	SS	Enters AOP 18001-C, Section D, FAILURE OF PRZR LEVEL INSTRUMENTATION.
	OATC UO	D1. Initiate the Continuous Actions Page.

Op-Test No.: 2012-301 **Scenario No.:** 6 **Page 2 of 6**

Event No.: 4

Event Description: PRZR level channel LT-459 will slowly fail low over ~ 10 minutes. The OATC will take manual control of FIC-0121 to stabilize charging flow and PRZR level, swap control channels, return charging flow to automatic.

Time	Position	Applicant's Action or Behavior
	OATC	D2. Check PRZR level – TRENDING TO PROGRAM LEVEL. (NO) RNO D2. IF PRZR level instrument fails high, THEN perform the following as necessary: __ Adjust charging to prevent letdown from flashing. -OR- __ Isolate letdown. IF PRZR level instrument fails low, THEN maintain charging flow approximately 10 gpm greater than total seal injection flow. **Note to examiner**: If the crew blindly follows the step for maintaining charging flow ~ 10 gpm greater than total seal injection flow, they will probably flash letdown. The crew will need to manually control charging flow to control PRZR level.
	OATC	D3. Maintain Seal Injection flow to all RCPs – 8 TO 13 GPM.
	OATC	D4. Select an unaffected channel on LS-459D PRZR LVL CNTL SELECT. **(selects 461 / 460)**
	OATC	D5. Select same channel on LS-459E PRZR LVL REC SEL as selected on LS-459D. **(selects 461)**

Op-Test No.: 2012-301 **Scenario No.:** 6 **Page 3 of 6**

Event No.: 4

Event Description: PRZR level channel LT-459 will slowly fail low over ~ 10 minutes. The OATC will take manual control of FIC-0121 to stabilize charging flow and PRZR level, swap control channels, return charging flow to automatic.

Time	Position	Applicant's Action or Behavior
	OATC	D6. Restore letdown flow by initiating 13006, CHEMICAL AND VOLUME CONTROL SYSTEM, if required. **(N/A)**
	OATC	D7. Check if PRZR heaters should be restored to service. (NO) PRZR level controlling channel – FAILED LOW. RNO D7. Go to Step D9. **Note to examiner:** The channel fails low over 10 minutes, the crew will have plenty of time to adjust charging and defeat the failed channel prior to letdown isolation. Swapping channels in time will prevent the letdown isolation.
	OATC	D9. Return PRZR level control to AUTO.
	OATC	D10. Check PRZR level is maintained at program by auto control. RNO D10. Maintain PRZR level at program using manual control.
	SS	D11. Notify I & C to initiate repairs.

Op-Test No.: 2012-301 **Scenario No.:** 6 **Page 4 of 6**

Event No.: 4

Event Description: PRZR level channel LT-459 will slowly fail low over ~ 10 minutes. The OATC will take manual control of FIC-0121 to stabilize charging flow and PRZR level, swap control channels, return charging flow to automatic.

Time	Position	Applicant's Action or Behavior
	SS	D12. Bypass the affected instrument channel using 13509-C, BYPASS TEST INSTRUMENTATION (BTI) PANEL OPERATION, if desired. **Note to examiner:** The SS will **not** BTI the channel at this time. I & C will request to leave the channel in the normal state until they have an opportunity to troubleshoot.
	OATC	D13. Trip affected channel bistable and place associated MASTER TEST switch in TEST position per TABLE D1 within 72 hours. (TS 3.3.1)
	UO	TABLE D1 **CAUTIONS** • Only one channel should be tripped. • The bistable input is placed in the tripped state by positioning the selector switch on the specified test card to TEST. • The bistable input identified by the switch number should agree with the location specified by CAB, CARD, and B/S before tripping a bistable input. If a discrepancy exists, CAB-CARD-B/S should be used, not switch number. • Bypassing another channel for Surveillance Testing with a channel inoperable is permitted provided the inoperable channel is in the tripped condition and the channel being tested is not bypassed for more than 12 hours.

Op-Test No.: 2012-301 **Scenario No.: 6** **Page 5 of 6**

Event No.: 4

Event Description: PRZR level channel LT-459 will slowly fail low over ~ 10 minutes. The OATC will take manual control of FIC-0121 to stabilize charging flow and PRZR level, swap control channels, return charging flow to automatic.

Time	Position	Applicant's Action or Behavior
	UO	SSPS INPUT / CAB / FRAME /CARD / B/S / SWITCH LT-459 Failure (Channel 1) / 1 / 8/47 / 1 / LS-459A High Level Reactor Trip / 8/73 / 7 MASTER TEST SWITCH END OF TABLE D1
	SS	D14. Initiate the applicable actions of Technical Specification 3.3.1.
	SS	Tech Spec 3.3.1

FUNCTION	APPLICALBE MODES	REQUIRED CHANNELS	CONDITIONS
9. Pressurizer Water Level - High	1(f)	3	M

(f) Above the P-7 (Low Power Reactor Trips Block) interlock.

Table 3.3.4-1 (Page 1 of 1)
Remote Shutdown System Instrumentation and Controls

Tech Spec 3.3.4

FUNCTION / INSTRUMENT OR CONTROL PARAMETER	REQUIRED NUMBER OF CHANNELS
MONITORING INSTRUMENATION	
8. Pressurizer Level	2

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more required Function inoperable.	A.1 Restore required Function to OPERABLE status.	30 days.
B. Required Action and associated Completion Time not met.	B.1 Be in MODE 3 AND B.2 Be in MODE 4	6 hours 12 hours

Op-Test No.: 2012-301 **Scenario No.: 6** **Page 6 of 6**

Event No.: 4

Event Description: PRZR level channel LT-459 will slowly fail low over ~ 10 minutes. The OATC will take manual control of FIC-0121 to stabilize charging flow and PRZR level, swap control channels, return charging flow to automatic.

<table>
<tr><th>Time</th><th>Position</th><th>Applicant's Action or Behavior</th></tr>
<tr><td></td><td>SS</td><td>Table 3.3.3-1 (page 1 of 1)
Post Accident Monitoring Instrumentation
Tech Spec 3.3.3
<table><tr><th>FUNCTION</th><th>REQUIRED CHANNELS</th><th>CONDITIONS</th></tr><tr><td>6. Pressurizer Level</td><td>2</td><td>B, G, H, J</td></tr></table>
Note to examiner: Tech Spec 3.3.3 Function 6 is an INFO LCO.</td></tr>
<tr><td></td><td>SS</td><td>D15. Check repairs and surveillances – COMPLETE.

RNO

D15. Perform the following:

a. WHEN repairs and surveillances are complete, THEN perform step D16.

b. Return to procedure and step in effect.</td></tr>
<tr><td></td><td></td><td>END OF EVENT 4, proceed to EVENT 5.</td></tr>
</table>

Op-Test No.: 2012-301 **Scenario No.:** 6

Event No.: 5

Event Description: FW flow transmitter FT-508 fails slowly high over time. This will result in MFPT speed lowering and FW flow less than steam flow. The UO will have to take manual control of MFPT Master Speed controller to control FW flow.

Time	Position	Applicant's Action or Behavior
	UO	Diagnose PT-508 failing high: Symptoms / alarms: ALB13-A06 STM GEN 1 HI/LO LVL DEVIATION ALB13-B06 STM GEN 2 HI/LO LVL DEVIATION ALB13-C06 STM GEN 3 HI/LO LVL DEVIATION ALB13-D06 STM GEN 4 HI/LO LVL DEVIATION ALB06-F01 CSFST TROUBLE Indications: • PT-508 pressure slowly rising. • MFPT speeds slowly lowering. • Steam flow / feed flow mismatches on all SGs.
	OATC	**IMMEDIATE OPERATOR ACTIONS** E1. Check steam and feed flows – MATCHED ON ALL SGs. **(NO)** RNO E1. Take manual control of the following as necessary to restore NR level between 60% and 70%. • SG feed flow valves. • MFP(s) speed.
	SS	Enters 18016-C CONDENSATE AND FEEDWATER MALFUNCTION Section E, FAILURE OF MFP SPEED CONTROL.

Op-Test No.: 2012-301 **Scenario No.: 6** **Page 2 of 4**

Event No.: 5

Event Description: FW flow transmitter FT-508 fails slowly high over time. This will result in MFPT speed lowering and FW flow less than steam flow. The UO will have to take manual control of MFPT Master Speed controller to control FW flow.

Time	Position	Applicant's Action or Behavior
	UO OATC	E2. Initiate the Continuous Actions Page.
	UO	E3. Maintain SG NR levels – GREATER THAN 41% and LESS THAN 79%. **(YES)**
	UO	E4. Check SIC-509A, B, and C MFPT SPEED CONTROL – OPERATING PROPERLY. • ALB15-C05 MFPT LOSS OF FW SIGNA – EXTINGUISHED. • Controller(s) maintaining stable MFPT speed. **(NO)** • Controller(s) maintaining MFP discharge pressure/SG pressure differential – BETWEEN 100 AND 225 PSI. **(NO)** RNO

Event No.: 5

Event Description: FW flow transmitter FT-508 fails slowly high over time. This will result in MFPT speed lowering and FW flow less than steam flow. The UO will have to take manual control of MFPT Master Speed controller to control FW flow.

Time	Position	Applicant's Action or Behavior
	UO	E4 RNO continued. E4. Perform one of the following: __ Adjust MFPT speed as necessary to maintain MFP discharge pressure/SG pressure differential between 100 and 225 psi. -OR- Transfer control to the GE Pot by performing the following: __a. Adjust SC-3151(3152) MFPT A(B) SPEED CHANGER to obtain zero deviation on SI-3153 (3154). __ b. Transfer control by placing MFPT-A(B) MOTOR SPEED CHANGER HS-3151 (3152) in MANUAL. __c. Adjust SC-3151(3152) to maintain MFP discharge pressure /SG pressure differential between 100 and 225 psig.
	UO	E5. Check PT-507 – OPERATING PROPERLY. **(YES)**
	UO	E6. Notify I & C to initiate repairs.
	UO	E7. Return feed flow controls to AUTO as necessary. **(NO)**

Op-Test No.: 2012-301 **Scenario No.: 6** **Page 4 of 4**

Event No.: 5

Event Description: FW flow transmitter FT-508 fails slowly high over time. This will result in MFPT speed lowering and FW flow less than steam flow. The UO will have to take manual control of MFPT Master Speed controller to control FW flow.

Time	Position	Applicant's Action or Behavior
	SS	E8. Check repairs and surveillances – COMPLETE. **(NO)** RNO E8. Perform the following: a. WHEN repairs and surveillances are complete, THEN perform Step E9. b. Return to procedure and step in effect.
		END OF EVENT 5, proceed to EVENT 6.

Op-Test No.: 2012-301 **Scenario No.: 6**

Event No.: 6, actions per ARP 17015-05

Event Description: MFPT B turbine vibration will rise to > 5 mils requiring entry into 18013-C Rapid Power Reduction and trip of MFPT B.

<table>
<tr><th>Time</th><th>Position</th><th>Applicant's Action or Behavior</th></tr>
<tr><td></td><td>UO</td><td>Diagnose vibration problems with MFPT B.

Symptoms / alarms:

• ALB15-D05 MFPT B HI VIB

Indications:

• MFPT B Turbine and pump vibrations rising on IPC points.</td></tr>
<tr><td></td><td>CREW</td><td>ALB15-D05

NOTE

Turbine and pump vibration may be monitored at the Bentley Nevada cabinet near MFP B or on the following Plant Computer points.

<table>
<tr><th></th><th>IPC</th><th>Bentley Nevada</th></tr>
<tr><td>1B MFPT H.P. Bearing Vibration:</td><td>"X". X0221
"Y". X0251</td><td>"X". 1XIS-5310X
"Y". 1XIS-5310Y</td></tr>
<tr><td>1B MFPT L.P. Bearing Vibration:</td><td>"X". X0222
"Y". X0252</td><td>"X". 1XIS-5311X
"Y". 1XIS-5311Y</td></tr>
<tr><td>1B MFP INBD Bearing Vibration:</td><td>"X". X0259
"Y". X0262</td><td>"X". 1XIS-4922X
"Y". 1XIS-4922Y</td></tr>
<tr><td>1B MFP OUTBD Bearing Vibration:</td><td>"X". X0261
"Y" X0262</td><td>"X". 1XIS-4923X
"Y". 1XIS-4923Y</td></tr>
</table>
</td></tr>
</table>

Op-Test No.: 2012-301 **Scenario No.:** 6

Event No.: 6, actions per ARP 17015-05

Event Description: MFPT B turbine vibration will rise to > 5 mils requiring entry into 18013-C Rapid Power Reduction and trip of MFPT B.

Time	Position	Applicant's Action or Behavior
	UO	**1.0 PROBABLE CAUSE** 1. Bearing malfunction due to loss of oil or improper cooling. 2. Bowed shaft.
	UO	**2.0 AUTOMATIC ACTIONS** NONE
	UO	**3.0 INITIAL OPERATION ACTIONS** NONE

Op-Test No.: 2012-301 **Scenario No.:** 6 **Page 3 of 8**

Event No.: 6, actions per ARP 17015-05

Event Description: MFPT B turbine vibration will rise to > 5 mils requiring entry into 18013-C Rapid Power Reduction and trip of MFPT B.

Time	Position	Applicant's Action or Behavior
	UO	**4.0 SUBSEQUENT OPERATOR ACTIONS** NOTE: A handheld vibration instrument may be used to determine levels locally. 1. Dispatch an operator to MFPT B to investigate. 2. On the Plant Computer, perform the following: a. Select the ATSI CRT Trend Display and print out a trend of the desired current Turbine parameters to determine the alarm condition. NOTES • Elevated or fluctuating bearing drain temperatures may be an indication of bearing loading and can indicate a bearing is failing. • Engineering and Maintenance should be promptly notified if any bearing drain temperatures are elevated. • Bearing oil temperatures should be maintained between 110°F and 125°F. b. Monitor lube oil and bearing oil temperatures of pump and turbine. 3. IF MFP TURBINE bearing vibration rises to 5 mils or greater, immediately reduce power and trip MFPT B per the following: • 18013-C "Rapid Power Reduction." • 18016-C "Condensate And Feedwater Malfunction."

Op-Test No.: 2012-301 **Scenario No.: 6** **Page 4 of 8**

Event No.: 6, actions per ARP 17015-05

Event Description: MFPT B turbine vibration will rise to > 5 mils requiring entry into 18013-C Rapid Power Reduction and trip of MFPT B.

Time	Position	Applicant's Action or Behavior
	UO	**4.0 SUBSEQUENT OPERATOR ACTIONS (continued)** 4. IF MFP TURBINE bearing vibration rises to 5 mils or greater, request Engineering and Maintenance to initiate local vibration monitoring and recommended compensatory actions identified in Step 7. 5. IF MFP PUMP bearing vibration rises to 5.5 mils or greater, reduce power and stop MFPT B per 12004-C, "Power Operation (Mode 1)." 6. IF MFP PUMP bearing rises to 6 mils or greater, rapidly reduce power and stop MFP B per 18013-C "Rapid Power Reduction." 7. IF MFP Turbine/Pump vibrations are elevated AND with Engineering concurrence, perform the following to reduce vibrations: a. Monitor lube oil and bearing oil temperatures on Plant Computer and maintain bearing oil temperatures between 110°F and 125°F by adjusting cooling water flow.

Op-Test No.: 2012-301 **Scenario No.: 6** **Page 5 of 8**

Event No.: 6, actions per ARP 17015-05

Event Description: MFPT B turbine vibration will rise to > 5 mils requiring entry into 18013-C Rapid Power Reduction and trip of MFPT B.

Time	Position	Applicant's Action or Behavior
	UO	**4.0 SUBSEQUENT OPERATOR ACTIONS (continued)** **CAUTIONS:** • Raising the speed of MFP A will lower the speed on the MFP B. MFP A should not exceed 5900 rpm and MFP B speed should not drop below 5100 rpm. • A bias potentiometer setpoint should not be lowered to less than 5.0. Having a setpoint of less than 5.0 will lower the maximum speed of the affected MFP. b. Reduce speed of MFP B by increasing MFP A speed as follows: (1) Slowing increase speed on MFP A by increasing the bias potentiometer on 1SIC-509B (if in auto) or by increasing speed demand on 1SIC-509B (if in manual). Allow speed on MFP B to decrease (if SIC-509C is in auto) or decrease speed demand (if SIC-509C is in manual). (2) Continue to lower speed on MFP B until the vibration alarm clears or 5100 rpm is reached.

Op-Test No.: 2012-301 **Scenario No.:** 6

Event No.: 6, actions per ARP 17015-05

Event Description: MFPT B turbine vibration will rise to > 5 mils requiring entry into 18013-C Rapid Power Reduction and trip of MFPT B.

Time	Position	Applicant's Action or Behavior
	UO	**4.0 SUBSEQUENT OPERATOR ACTIONS (continued)** NOTES: • Operational experience shows that pumps usually run with less vibration at higher seal water temperatures. • Optimal seal water temperatures are between 140°F and 160°F with Inboard/Outboard temperature difference less than 5°F. • Maintenance I & C support may be required for adjustment of MFP seal water temperature controls. c. Adjust the MFP B seal water controls to reduce vibrations as follows: (1) Establish constant communications with Control Room. (2) Select the setpoint display screen on 1-TIC-5237A and 1-TIC-5237B. **CAUTION:** Setpoint changes should be made in increments no greater than 0.4 degrees. (3) Use the up and down arrows to select the required temperature setpoint. (4) Press setpoint key on 1-TIC-5237A and 1-TIC-5237B WHEN temperature adjustment is completed. (5) Monitor SGFP Turbine and Pump vibrations.

Event No.: 6, actions per ARP 17015-05

Event Description: MFPT B turbine vibration will rise to > 5 mils requiring entry into 18013-C Rapid Power Reduction and trip of MFPT B.

Time	Position	Applicant's Action or Behavior
	UO	**4.0 SUBSEQUENT OPERATOR ACTIONS (continued)** NOTE Turbine and pump vibration may be monitored at the Bentley Nevada cabinet near MFP B or on the following Plant Computer points. 1B MFPT H.P. Bearing Vibration: "X". X0221, "Y". X0251 (IPC); "X". 1XIS-5310X, "Y". 1XIS-5310Y (Bentley Nevada) 1B MFPT L.P. Bearing Vibration: "X". X0222, "Y". X0252 (IPC); "X". 1XIS-5311X, "Y". 1XIS-5311Y (Bentley Nevada) 1B MFP INBD Bearing Vibration: "X". X0259, "Y". X0262 (IPC); "X". 1XIS-4922X, "Y". 1XIS-4922Y (Bentley Nevada) 1B MFP OUTBD Bearing Vibration: "X". X0261, "Y" X0262 (IPC); "X". 1XIS-4923X, "Y". 1XIS-4923Y (Bentley Nevada)
	UO	(6) IF further temperature adjustment is required to reduce vibration, repeat steps 2 through 5. (7) WHEN temperature adjustment is no longer required, ensure 1-T-V5237A and 1`-TV-5237B are controlling as required. d. Adjust the MFPT B Seal Water Supply Bypass 1-1305-U4-628 and 1-1305-U$-629 IF required. (1) Install caution tags on valves stating the following or equivalent: **"MFP seal water bypass valves throttled to reduce vibration on MFP B"**

Op-Test No.: 2012-301 **Scenario No.:** 6

Event No.: 6, actions per ARP 17015-05

Event Description: MFPT B turbine vibration will rise to > 5 mils requiring entry into 18013-C Rapid Power Reduction and trip of MFPT B.

Time	Position	Applicant's Action or Behavior
	UO	**4.0 SUBSEQUENT OPERATOR ACTIONS (continued)** 8. Scan ALB15 and ALB16 for associated alarms and take appropriate actions.

Op-Test No.: 2012-301 **Scenario No.:** 6

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.:** 6

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.: 6** **Page 3 of 6**

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.

Op-Test No.: 2012-301 **Scenario No.:** 6 **Page 4 of 6**

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

Op-Test No.: 2012-301 **Scenario No.: 6** **Page 5 of 6**

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>

Op-Test No.: 2012-301 **Scenario No.: 6** **Page 6 of 6**

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.

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Event No.: 6

Event Description: MFPT B turbine vibration will rise to > 5 mils requiring entry into 18013-C Rapid Power Reduction and trip of MFPT B.

<table>
<tr><th>Time</th><th>Position</th><th>Applicant's Action or Behavior</th></tr>
<tr><td></td><td>SS</td><td>18013-C, RAPID POWER REDUCTION actions.
<table><tr><td>Entry</td><td>Condition</td><td>Target</td><td>Approx. Time @ 3-5% min</td></tr><tr><td>17015-D05
17015-E01</td><td>MFPT High Vibrations</td><td><70% RTP</td><td>6 – 10 minutes</td></tr></table>
1. Perform SHUTDOWN BRIEFING.</td></tr>
<tr><td></td><td>SS</td><td><u>SHUTDOWN BRIEFING</u>
<u>METHOD</u>
• Auto rod control should be used.
• Reduce Turbine Load at approximately 3% RTP per minute (approx 36 MWe) up to 5% RTP (approx 60 MSe).
• Borate AFD within the doghouse.
• SS (or SRO designee) – Maintain supervisory oversight.
• All rod withdrawals will be approved by the SS.
• Approval for each reactivity 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.
<u>OPERATIONAL LIMITS</u>
• 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).
<u>INDUSTRY OE</u>
• 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).</td></tr>
</table>

Op-Test No.: 2012-301 **Scenario No.: 6** **Page 2 of 5**

Event No.: 6

Event Description: MFPT B turbine vibration will rise to > 5 mils requiring entry into 18013-C Rapid Power Reduction and trip of MFPT B.

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**: Step from 13009-C at the end of this event.
	OATC	5. Initiate the Continuous Actions Page.
	OATC	6. Check desired ramp rate – LESS THAN OR EQUAL TO 5%/MIN.

Op-Test No.: 2012-301 **Scenario No.:** 6 **Page 3 of 5**

Event No.: 6

Event Description: MFPT B turbine vibration will rise to > 5 mils requiring entry into 18013-C Rapid Power Reduction and trip of MFPT B.

Time	Position	Applicant's Action or Behavior
	OATC	7. Maintain Tavg within 6oF of Tref: a. Monitor Tavg/Tref deviation (UT-0495). b. Verify rods inserting as required. c. Energize Pressurizer back-up heaters as necessary.
	OATC	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 power reduction – ADEQUATE FOR PLANT CONDITIONS. c. Check RCS Tavg – GREATER THAN 551°F (TS 3.4.2). d. Check RCS Tavg – WITHIN 6oF OF TREF.
	OATC	9. Maintain PRZR Pressure – AT 2235 PSIG.
	OATC	10. Maintain PRZR Level at – PROGRAM.
	OATC	11. Maintain SG Level – BETWEEN 60% AND 70%.
	OATC	12. Notify the System Operator that a load reduction is in progress.

Op-Test No.: 2012-301 **Scenario No.:** 6 **Page 4 of 5**

Event No.: 6

Event Description: **MFPT B turbine vibration will rise to > 5 mils requiring entry into 18013-C Rapid Power Reduction and trip of MFPT B.**

Time	Position	Applicant's Action or Behavior
	SS	1. Notify SM to make the following notifications as appropriate:
		__Plant Management Notifications using 10000-C, CONDUCT OF OPERATIONS.
		__NMP-EP-110, EMERGENCY CLASSIFICATION DETERMINATION AND INITIAL ACTION.
		__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.
	UO	NOTE Attempts should be made to keep steam dumps closed if power reduction is required for Condenser problem.
	UO	14. Check Steam Dumps – CLOSED.
	UO	15. Check Turb/Gen to remain online. **(YES)**

Op-Test No.: 2012-301 **Scenario No.: 6** **Page 5 of 5**

Event No.: 6

Event Description: MFPT B turbine vibration will rise to > 5 mils requiring entry into 18013-C Rapid Power Reduction and trip of MFPT B.

Time	Position	Applicant's Action or Behavior
	SS	16. Check desired plant conditions achieved. Adequate load reduction. -OR- Plant conditions no longer required shutdown. RNO 16. WHEN desired plant conditions are achieved, THEN Go to Step 17.
	UO	17. Perform the following: a. Stabilize power level. b. Place rods in MANUAL and match Tavg with Tref. c. Maintain stable plant conditions. d. Go to 12004-C, POWER OPERATION (MODE 1) Section 4.2 and perform actions from the starting power level to ending power level.
	UO	**IF NOT ENDED PREVIOUSLY, END OF EVENT 6, proceed to EVENT 7, the main event.**

Op-Test No.: 2012-301 **Scenario No.:** 6

Event No.: 7

Event Description: ATWT with failure of auto rod motion, Turbine auto trip, auto start of all AFW pumps, and faulted Steam Generator(s) as Safeties lift and fail to reseat when the Turbine trips.

Time	Position	Applicant's Action or Behavior
	CREW	Recognizes ATWT condition by various first outs, electrical board and other QMCB annunciators. (too various to list)
	OATC	**IMMEDIATE OPERATOR ACTIONS** 1. Check Reactor Trip. **(NO)** • Rod Bottom Lights – LIT **(NO)** • Reactor Trip and Bypass Breakers – OPEN. **(NO)** • Neutron Flux – LOWERING. **(NO)** RNO 1. Trip Reactor using both Reactor trip handswitches. IF Reactor NOT tripped, THEN go to 19211-C, FR-S.1 RESPONSE TO NUCLEAR POWER GENERATION / ATWT.
	SS	Transitions to 19211-C, FR-S.1 RESPONSE TO NUCLEAR POWER GENERATION / ATWT.
		NOTE This Functional Restoration Procedure should NOT be implemented if both 4160V AC emergency buses are de-energized, 19100-C should be entered. **CAUTION** RCPs should not be tripped with Reactor power greater than 5%.

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Event No.: 7

Event Description: **ATWT with failure of auto rod motion, Turbine auto trip, auto start of all AFW pumps, and faulted Steam Generator(s) as Safeties lift and fail to reseat when the Turbine trips.**

Time	Position	Applicant's Action or Behavior
	OATC ***Critical***	**IMMEDIATE OPERATOR ACTIONS** 1. Verify Reactor trip: • Rod Bottom Lights – LIT. **(NO)** • Reactor Trip and Bypass Breakers – OPEN. **(NO)** • Neutron Flux – LOWERING. **(NO)** RNO 1. Trip Reactor using both Reactor trip handswithes. IF Reactor NOT tripped, **THEN insert Control Rods.** **Note to examiner:** Control rods will initiate inserting at 72 step per minute when the UO trips the Main Turbine, however, after ~ 1 minute, auto rod motion will fail and the OATC will have to insert rods manually at 48 steps per minute. **Manual insertion of Control rods is CRITICAL.**
	UO ***Critical***	**IMMEDIATE OPERATOR ACTIONS** **2. Verify Turbine trip:** **a. All Turbine Stop Valves – CLOSED.** **Note to examiner**: The Turbine will not automatically trip, it will only trip when performed manually by the UO.

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Event No.: 7

Event Description: ATWT with failure of auto rod motion, Turbine auto trip, auto start of all AFW pumps, and faulted Steam Generator(s) as Safeties lift and fail to reseat when the Turbine trips.

Time	Position	Applicant's Action or Behavior
	UO	3. Check AFW Pumps – RUNNING: **(NO)** • MDAFW pumps **(NO)** • TDAFW Pump, if required. **(NO)** RNO
	Critical	**Start Pumps.**
	Critical	**Open Steam Supply valve HV-5106.** **Note to examiner**: The TDAFW pump is required to be started as at least 2 SG levels will be < 10% NR.
	UO	4. Emergency borate the RCS: a. Start at least one Boric Acid Transfer Pump. b. Verify a Charging Pump is running. c. Open EMERGENCY BORATE valve HV-8104. RNO c. IF HV-8104 will NOT open, THEN open the following: • FV-110A, BA TO BLENDER • FV-110B, BLENDER OUTLET TO CHARGING PUMPS SUCT. **Note to examiner**: The UO will be asked to perform this step.

Event No.: 7

Event Description: ATWT with failure of auto rod motion, Turbine auto trip, auto start of all AFW pumps, and faulted Steam Generator(s) as Safeties lift and fail to reseat when the Turbine trips.

Time	Position	Applicant's Action or Behavior
	UO	Step 4 continued. d. Verify charging flow – GREATER THAN 42 GPM. **(may not)** e. Verify boric acid flow – GREATER THAN 30 GPM. **Note to examiner:** Due to high RCS pressure during the ATWT, it may be necessary to take control of FIC-0121 to raise charging flow to > 42 gpm. f. Check RCS pressure – LESS THAN 2335 PSIG. **(YES)** RNO **(just in case)** f. Check PRZR PORVs and Block Valves open. IF valves NOT open, THEN reduce RCS pressure to less than 2135 psig by performing the following: 1) Arm COPS. 2) Open PRZR PORVs and Block Valves as necessary.

Op-Test No.: 2012-301 **Scenario No.:** 6 **Page 5 of 9**

Event No.: 7

Event Description: ATWT with failure of auto rod motion, Turbine auto trip, auto start of all AFW pumps, and faulted Steam Generator(s) as Safeties lift and fail to reseat when the Turbine trips.

Time	Position	Applicant's Action or Behavior
	OATC	5. Check Containment Ventilation Isolation: a. Dampers and Valves – CLOSED. • CVI MLB indication. (may be)
	UO	RNO **(just in case)** a. Perform the following: 1) Close Dampers and Valves. 2) Start Piping Pen Units. **Note to examiner**: If SI has occurred, the RNO will be unnecessary, if SI has NOT occurred, the UO will perform the RNO steps at the HVAC panel.
	OATC UO	6. Initiate the following: • Continuous Action Page. • NMP-EP-110, EMERGENCY CLASSIFICATION DETERMINATION AND INTIAL ACTION.
	OATC	7. Check for SI: a. SI signal EXISTS OR ACTUATED. (YES) b. Initiate ATTACHMENT A. **Note to examiner:** ATTACHMENT A included at end of this event.

Op-Test No.: 2012-301 **Scenario No.: 6** **Page 6 of 9**

Event No.: 7

Event Description: ATWT with failure of auto rod motion, Turbine auto trip, auto start of all AFW pumps, and faulted Steam Generator(s) as Safeties lift and fail to reseat when the Turbine trips.

Time	Position	Applicant's Action or Behavior
	OATC	8. Check the following trips have occurred: a. Reactor trip. **(NO)** RNO a. Locally trip the Reactor trip and Bypass breakers. IF the trip breakers will NOT open, THEN tri the Control Rod Drive MG Set output breakers at the Reactor Trip Switchgear. **Note to examiner:** The crew is expected to call someone to perform this action: The Simbooth Operator will open the trip breakers two minutes after receiving the request. b. Turbine Trip. **(YES)**
	OATC	9. Check Reactor power: a. LESS THAN 5%. **(NO)** b. IR SUR – LESS THAN 0 DPM. **(NO)** c. Go to Step 24. **Note to examiner**: This step is a continuous action, when the trip breakers open, the crew should go to step 24 to exit this procedure.
	UO	10. Check Main Generator Output Breakers – OPEN. **(YES)**

Event No.: 7

Event Description: ATWT with failure of auto rod motion, Turbine auto trip, auto start of all AFW pumps, and faulted Steam Generator(s) as Safeties lift and fail to reseat when the Turbine trips.

Time	Position	Applicant's Action or Behavior
	UO	11. Check SG levels: a. NR level- AT LEAST ONE GREATER THAN 10%. (32% ADVERSE) RNO a. Verify total feed flow greater than 1260 gpm. IF NOT, THEN start pumps and align valves as necessary. IF all SG(s) NR levels less than 10% (32% ADVERSE) THEN maintain total feed flow greater than 1260 gpm. b. Maintain NR levels between 10% (32% ADVERSE) and 65%.
	UO	Check CST level – GREATER THAN 15%. **(YES)**

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Event No.: 7

Event Description: ATWT with failure of auto rod motion, Turbine auto trip, auto start of all AFW pumps, and faulted Steam Generator(s) as Safeties lift and fail to reseat when the Turbine trips.

Time	Position	Applicant's Action or Behavior
	OATC	13. Verify all dilution paths – ISOLATED. • RX MU WTR TO BA BLENDER, FV-111A – CLOSED. • Dispatch operator to verify CVCS RX MU WTR TO CCP A ISO, 1208-U4-183 – LOCKED CLOSED. UNIT 1 (AB-A47) UNIT 2 (AB-A82) RNO 13. Dispatch operator to close: • CVCS RX M/U WTR SUPPLY TO CVCS ISO, 1208-U4-177. UNIT 1 (AB-A47) UNIT 2 (AB-A82)
		Note to examiner: The Simbooth Operator will open the trip breakers as requested after 2 minutes or after step 13, whichever comes first. This is to ensure scenario progresses as expected.
	OATC	24. Maintain emergency boration to provide adequate shutdown margin for subsequent conditions.
	SS	25. Initiate Critical Safety Function Status Tress per 19200-C, F-O CRITICAL SAFETY FUNCTION STATUS TREE.

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Event No.: 7

Event Description: ATWT with failure of auto rod motion, Turbine auto trip, auto start of all AFW pumps, and faulted Steam Generator(s) as Safeties lift and fail to reseat when the Turbine trips.

Time	Position	Applicant's Action or Behavior
	SS	26. Return to procedure and step in effect.
		Note to examiner: The actions for E-0 are on the following pages.

Op-Test No.: 2012-301 **Scenario No.: 6** **Page 1 of 12**

Event No.: 7 Faulted SG (Code Safety Open on SG # 4)

Event Description: During the ATWT, SG Safeties will lift on all SG(s), however, safety valve Loop # 4 will fail to reseat. These are the actions for E-0.

Time	Position	Applicant's Action or Behavior
	CREW SS	Performs Immediate Operator Actions per 19000-C, E-0 Reactor Trip or Safety Injection. 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

Op-Test No.: 2012-301 **Scenario No.: 6** **Page 2 of 12**

Event No.: 7 Faulted SG (Code Safety Open on SG # 4)

Event Description: During the ATWT, SG Safeties will lift on all SG(s), however, safety valve Loop # 4 will fail to reseat. These are the actions for E-0.

Time	Position	Applicant's Action or Behavior
	OATC SS	4. Check if SI is actuated. **(YES)** • Any SI annunciators – LIT • SI ACTUATED BPLP window – LIT Go to Step 6.
	SS CREW	6. Initiate the Foldout Page.
	SS OATC UO	7. Perform the following: • OATC Initial Actions Page • UO Initial Actions Page **NOTE:** SS initiates step 8 after OATC/UO Initial Actions completed.

Op-Test No.: 2012-301 **Scenario No.: 6** **Page 3 of 12**

Event No.: 7 Faulted SG (Code Safety Open on SG # 4)

Event Description: During the ATWT, SG Safeties will lift on all SG(s), however, safety valve Loop # 4 will fail to reseat. These are the actions for E-0.

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)** **Note to Examiner**: SIP A is tagged out. c. RHR pumps – RUNNING. **(YES)** d. NCP – TRIPPED. **(YES)**
	OATC	4. Verify CCW Pumps – ONLY TWO RUNNING EACH TRAIN.

Op-Test No.: 2012-301 **Scenario No.: 6** **Page 4 of 12**

Event No.: 7 Faulted SG (Code Safety Open on SG # 4)

Event Description: During the ATWT, SG Safeties will lift on all SG(s), however, safety valve Loop # 4 will fail to reseat. These are the actions for E-0.

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 EACH TRAIN. b. NSCW TOWER RTN HDR BYPASS BASIN hand switches – IN AUTO: • HS-1668A • HS-1669A
	OATC UO ***Critical***	6. Verify Containment Cooling Units: **(YES)** a. **ALL RUNNING IN LOW SPEED.** • **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.: 6** **Page 5 of 12**

Event No.: 7 Faulted SG (Code Safety Open on SG # 4)

Event Description: During the ATWT, SG Safeties will lift on all SG(s), however, safety valve Loop # 4 will fail to reseat. These are the actions for E-0.

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.

Op-Test No.: 2012-301 **Scenario No.: 6** **Page 6 of 12**

Event No.: 7 Faulted SG (Code Safety Open on SG # 4)

Event Description: During the ATWT, SG Safeties will lift on all SG(s), however, safety valve Loop # 4 will fail to reseat. These are the actions for E-0.

Time	Position	Applicant's Action or Behavior
	OATC	**PERFORMS OATC INITIAL ACTIONS** 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 OPERATOR ACTIONS,** return to E-0 Step 8.

Op-Test No.: 2012-301 **Scenario No.: 6** **Page 7 of 12**

Event No.: 7 Faulted SG (Code Safety Open on SG # 4)

Event Description: During the ATWT, SG Safeties will lift on all SG(s), however, safety valve Loop # 4 will fail to reseat. These are the actions for E-0.

Time	Position	Applicant's Action or Behavior
	UO	**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) RNO 2. Establish AFW flow greater than 570 gpm by starting pumps and aligning valves as necessary.
	UO	3. Check if main steamlines should be isolated: **(YES)** a. Check for one or 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 – ONE TWO OR MORE CHANNELS OF ANY STEAMLINE. b. Verify Main Steamline Isolation and Bypass Valves – CLOSED. **(YES)**

Op-Test No.: 2012-301 **Scenario No.:** 6 **Page 8 of 12**

Event No.: 7 Faulted SG (Code Safety Open on SG # 4)

Event Description: During the ATWT, SG Safeties will lift on all SG(s), however, safety valve Loop # 4 will fail to reseat. These are the actions for E-0.

Time	Position	Applicant's Action or Behavior
	UO	**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. **Note to examiner:** The UO will place the HS-7603A valves in the hard closed position. • SG Sample Isolation Valves – CLOSED. **(YES)**
	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%.

Op-Test No.: 2012-301 **Scenario No.: 6** **Page 9 of 12**

Event No.: 7 Faulted SG (Code Safety Open on SG # 4)

Event Description: During the ATWT, SG Safeties will lift on all SG(s), however, safety valve Loop # 4 will fail to reseat. These are the actions for E-0.

Time	Position	Applicant's Action or Behavior
	UO	8. Verify both MFPs – TRIPPED. **(YES)**
	UO	9. Check Main Generator Output Breakers – OPEN. **(YES)** **END OF UO INITIAL ACTIONS, return to step 8 of E-0.**

Op-Test No.: 2012-301 **Scenario No.:** 6 **Page 10 of 12**

Event No.: 7 Faulted SG (Code Safety Open on SG # 4)

Event Description: During the ATWT, SG Safeties will lift on all SG(s), however, safety valve Loop # 4 will fail to reseat. These are the actions for E-0.

Time	Position	Applicant's Action or Behavior
	OATC UO	**19000-C, E-0 actions beginning with step 8.** 8. Initiate the Continuous Actions Page.
	OATC	9. Check RCS temperature stable at or trending to 557°F. **(NO)** RNO 9. IF temperature is less than 557oF and lowering, **(it is)** 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 557oF and rising, THEN dump steam.

Op-Test No.: 2012-301 **Scenario No.: 6** **Page 11 of 12**

Event No.: 7 Faulted SG (Code Safety Open on SG # 4)

Event Description: During the ATWT, SG Safeties will lift on all SG(s), however, safety valve Loop # 4 will fail to reseat. These are the actions for E-0.

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.
	UO	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. **(YES)** c. Stop all RCPs.

Op-Test No.: 2012-301 **Scenario No.:** 6 **Page 12 of 12**

Event No.: 7 Faulted SG (Code Safety Open on SG # 4)

Event Description: During the ATWT, SG Safeties will lift on all SG(s), however, safety valve Loop # 4 will fail to reseat. These are the actions for E-0.

Time	Position	Applicant's Action or Behavior
	UO	12. Check SGs secondary pressure boundaries: a. SG Pressures: Any lowering in an uncontrolled manner. **(YES)** -OR- Any completely depressurized. b. Go to 19020-C, E-2 FAULTED STEAM GENERATOR ISOLATION.
	SS	Transitions to 19020-C, E-2 FAULTED STEAM GENERATOR ISOLATION

Op-Test No.: 2012-301 **Scenario No.: 6** **Page 1 of 5**

Event No.: 7 (E-2 Actions)

Event Description: 19020-C E-2 actions for Faulted Steam Generator.

Time	Position	Applicant's Action or Behavior
	CREW SS	1. Initiate critical safety function status trees per 19200-C, F-O CRITICAL SAFETY FUNCTION STATUS TREE. 2. Initiate NMP-EP-110, EMERGENCY CLASSIFICATION DETERMINATION AND INITIAL ACTION. **Note to examiner:** The SS will call the Simbooth to have the Shift Manager implement NMP-EP-110.
	OATC	**CAUTION**: At least one SG should be available for RCS cooldown.
	UO	3. Verify Main Steamline Isolation and Bypass Valves – CLOSED. **(YES)**
	UO	4. Check SGs secondary pressure boundaries: **a.** Identify intact SG(s): **(# 1, 2, and 3 are intact)** • SG pressures – ANY STABLE OR RISING **(YES)** b. Identify faulted SG(s) ANY SG PRESSURE LOWERING IN AN UNCONTROLLED MANNER. **(YES, SG # 4)** -OR- ANY SG COMPLETELY DEPRESSURIZED. **(maybe by now, SG # 4)**

Op-Test No.: 2012-301 **Scenario No.: 6** **Page 2 of 5**

Event No.: 7 (E-2 Actions)

Event Description: 19020-C E-2 actions for Faulted Steam Generator.

Time	Position	Applicant's Action or Behavior
	UO	5. Isolate Main Feedwater to the faulted SG(s): • Close affected MFIVs: HV-5227 (SG 1) HV-5228 (SG 2) HV-5229 (SG 3) **HV-5230 (SG 4)** • Close affected BFIVs: HV-15196 (SG 1) HV- 15197 (SG 2) HV- 15198 (SG 3) **HV- 15199 (SG 4)**
	UO ***Critical*** ***Critical***	6. Isolate Auxiliary Feedwater to the faulted SG(s): • Close affected MDAFW Pump Throttle Valves: HV-5139 – SG 1 FROM MDAFW PMP-A HV-5132 – SG 2 FROM MDAFW PMP-B HV-5134 – SG 3 FROM MDAFW PMP-B **HV-5137 – SG 4 FROM MDAFW PMP-A** • Close affected TDAFW Pump Throttle Valves: HV-5122 – SG 1 FROM TDAFW HV-5125 – SG 2 FROM TDAFW HV-5127 – SG 3 FROM TDAFW **HV-5120 – SG 4 FROM TDAFW** **Note to examiner:** The valves bolded above are critical at this time IF not already previously closed.
	UO	7. Check at least one MDAFW Pump – RUNNING AND CAPABLE OF FEEDING SG(s) NEEDED FOR RCS COOLDOWN. **(YES)**

Op-Test No.: 2012-301 **Scenario No.: 6** **Page 3 of 5**

Event No.: 7 (E-2 Actions)

Event Description: 19020-C E-2 actions for Faulted Steam Generator.

Time	Position	Applicant's Action or Behavior
	UO	8. 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:** This step is N/A.
	UO	9. Verify affected SG ARV(s) – CLOSED: PV-3000 (SG 1) PV-3010 (SG 2) PV-3020 (SG 3) **PV-3030 (SG 4)**
	UO	10. Align SGBD valves: • Place SG Blowdown Isolation Valve handswitches in CLOSE position. • Close sample valves. HV-9451 (SG 1) HV-9452 (SG 2) HV-9453 (SG 3) HV-9454 (SG 4)
	UO	11. Verify faulted SG(s) remains isolated during subsequent recovery actions unless needed for RCS cooldown or SG activity sampling.
	UO	12. Check CST level – GREATER THAN 15%. **(YES)**

Op-Test No.: 2012-301 **Scenario No.:** 6 **Page 4 of 5**

Event No.: 7 (E-2 Actions)

Event Description: 19020-C E-2 actions for Faulted Steam Generator.

Time	Position	Applicant's Action or Behavior
	UO	13. Initiate checking if SG Tubes intact: a. Direct Chemistry to take periodic activity samples of all SGs one at a time. **b.** Secondary radiation – NORMAL. **(YES)** • MAIN STM LINE MONITORS • RE-13120 (SG 1) • RE-13121 (SG 2) • RE-13122 (SG 3) • RE-13119 (SG 4) • CNDSR AIR EJCTR/STM RAD MONITORS: • RE-12839C • RE-12839D (if on scale) • RE-12839E (if on scale) • STM GEN LIQ PROCESS RAD: • RE-0019 (Sample) • RE-0021 (Blowdown) • SG sample radiation. **c.** Check SG levels – ANY RISING IN AN UNCONTROLLED MANNER. **(NO)** RNO c. Go to Step 14.

Op-Test No.: 2012-301 **Scenario No.: 6** **Page 5 of 5**

Event No.: 7 (E-2 Actions)

Event Description: 19020-C E-2 actions for Faulted Steam Generator.

Time	Position	Applicant's Action or Behavior
	OATC	14. Check if ECCS flow should be reduced: a. RCS Subcooling – GREATER THAN 24°F. (38°F ADVERSE) **(YES)** b. Secondary Heat Sink: **(YES)** Total feed flow to intact SGs – GREATER THAN 570 GPM. -OR- Narrow range level in at least one intact SG – GREATER THAN 10%. (32% ADVERSE) c. RCS pressure – STABLE or RISING **(YES)** d. PRZR level – GREATER THAN 9%. (37% ADVERSE) **(YES)** e. Go to 19011-C, ES-1.1 SI TERMINATION.
		END OF SCENARIO if desired, freeze the simulator if NRC Chief Examiner concurs. **IF the NRC Chief would like to see more, steps for SI termination are attached through step 5a.**

Op-Test No.: 2012-301 **Scenario No.:** 6 **Page 1 of 2**

Event No.: 7

Event Description: **Steps for 19011-C, ES-1.1 SI Termination through step 5b.**

Time	Position	Applicant's Action or Behavior
	SS	Enters 19011-C, ES-1.1 SI Termination.
	OATC UO	1. Initiate the following: • Continuous Actions and Foldout Page. • Critical Safety Function Status Trees per 19200-C, F-O CRITICAL SAFETY FUNCTION STATUS TREE.
	SS	2. Initiate NMP-EP-110, EMERGENCY CLASSIFICATION AND DETERMINATION AND INITIAL ACTION.
	CREW	**CAUTIONS** If offsite power is lost after SI reset, action is required to restart the following 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	3. Reset SI.
	OATC	4. Verify only one CCP – RUNNING. **Note to examiner**: It is expected both CCPs will be running, usually the crew will stop CCP A.

Op-Test No.: 2012-301 **Scenario No.:** 6

Event No.: 7

Event Description: **Steps for 19011-C, ES-1.1 SI Termination through step 5b.**

Time	Position	Applicant's Action or Behavior
	UO	5. Check SGs secondary pressure boundaries: a. Any SG – FAULTED. **(YES, # 4)** b. Faulted SG – COMPLETELY DEPRESSURIZED. (NO) RNO b. Do NOT continue with this procedure until faulted SG(s) – COMPLETELY DEPRESSURIZED. Return to Step 5a. Note to examiner: It is expected SG # 4 will still be showing steam flow at this time, this will be the end of the scenario.
		END OF EVENT 7, END OF THE SCENARIO.

target ZERO Every day, every job, safely.	**NUCLEAR SAFETY FOCUS** **TARGET ZERO**
Protected Train: ☒ Alpha ☐ Bravo	**EOOS:** ☒ Green ☐ Yellow ☐ Orange ☐ Red
Plant Conditions:	100 % power BOL.
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.

SIMULATOR REACTIVITY BRIEFING SHEET

Shift: **Day** Date: **Today** Burnup: **500** MWD/MTU Core Life: **BOL**

MINIMUM SHIFT REACTIVITY INFORMATION TO BE BRIEFED

Power: **100** Rod Motion: **Rods in automatic..**

Current Temperature Control Strategy: **Boration**

Currently Making Up: **4** gallons every **as needed**

The desired Tavg operating band is 585.0 ± 0.05°F

CVCS makeup boric acid flow per 100 gallon makeup (FI-110A): **11.9** gallons/100
CVCS makeup pot setting (FIC-110): **2.96**

BTRS Strategy: **None**
AFD Strategy: **Maintain on target ± 1 AFD units**

Reactivity System Components Degraded/OOS:

None

Activities Expected That May Affect Core Reactivity (Reactivity Focus Items):

None.

CURRENT CORE REACTIVIITY PARAMETERS

Boron worth: **7.7** pcm/ppm PCM per 1% power change: **14.9** pcm/%

Current MTC values HFP: **-13.7** pcm/°F HZP: **-1.8** pcm/°F

Current BAST C_b: **7,000** ppm Current RCS C_b: **830** ppm

Boration required per			
	degree °F:	**18**	gallons
	1% power change:	**19**	gallons
	10% power change:	**192**	gallons
	30% power change:	**576**	gallons

Dilution required per			
	degree °F:	**132**	gallons
	1% power change:	**143**	gallons

Boration required for stuck rods (154 ppm/rod): **3,141** gallons for 2 stuck rods
4,775 gallons for 3 stuck rods

**If more than 3 rods are stuck, begin emergency boration and calculate gallons for actual number of stuck rods.*

Human Performance Tools

Peer Check	Three-Way Communication	Self-Verification (STAR)
Pre-Job Briefing	Phonetic Alphabet	Timeout
Procedure Use (placekeeping)	One Minute Matters (situational awareness)	

Valid for Cycle 17, PTDB Tab 1.0 revision 28.0 and Tab 16.0 revision 18.0

Appendix D	Scenario Outline	Form ES-D-1

Facility: Vogtle Scenario No.: 7 Op-Test No.: 2012-301

Examiners: Meeks Operators: _____
Bates _____
Capehart _____

Initial Conditions: The plant is at 29% power, BOL, steady state operations, control rods in manual. (Base IC # 36, snapped to IC # 187 for HL17 NRC Exam)

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

Turnover: The plant is at 29% power, Containment mini-purge is in service for a Containment entry on the next shift, raise power at < 8% per hour.

Preloaded Malfunctions:

ES19A – Block CVI Actuation Train A

ES19B - Block CVI Actuation Train B

ES10 - Train A Main Steam Line Isol Auto Actuation Failure

ES11 - Train B Main Steam line Isol Auto Actuation Failure

SI08A - RWST Sludge Mixing Valve 10957 Failure

SI08B - RWST Sludge Mixing Valve 10958 Failure

RD17D - (K-14) @ 36 steps

RD17H - (D-4) @ 24 steps

RD17L - (G-13) @ 30 steps

PR12B PORV 456 Block Valve 8000B Auto Closure Failure

Overrides

HV-8104 Emergency Borate valve shut.

Note to Simbooth: Place Containment Mini-Purge in service.

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	R-OATC R-SS N-UO	Raises power in accordance with UOP-12004-C.
T2	SG05D @100%	C-UO C-SS	SG # 4 Steam Flow indicator fails high.

Event No.	Malf. No.	Event Type*	Event Description
T3	CV04	I-OATC I-SS	Loss of Cooling to Letdown Heat Exchanger (TE-0130 fails low)
T4	new malf (9)	TS-SS	NSCW Cooling Tower Fan # 1 on Train A trips with ambient wet-bulb temperature > 63°F **LCO 3.7.9 Ultimate Heat Sink (UHS) Condition B**
T5	PR02B @100%	I-OATC I-SS TS-SS	PRZR PT-456 fails high resulting in PORV 456 failing open and block valve HV-8000B failure to auto close. **LCO 3.3.1 FU 6 Condition E, LCO 3.3.1 FU 8a Condition M, LCO 3.3.1 FU 8b Condition E, LCO 3.3.2 FU 1d Condition D, LCO 3.3.2 FU 8b Condition LCO 3.4.1 Condition A**
T6	RF TK02 95-92%	C-UO C-SS TS-SS	RWST sludge mixing line pipe break with auto closure failure. **LCO 3.5.4 Condition B and Condition D (1 hour action)** **TR 13.1.7 Condition D (Immediate TR action)**
T7 10	FW04C Preload	C-ALL N-OATC N-SS	MFRV # 3 fails shut, requiring reactor trip, 3 stuck rods. Emergency borate due to 3 stuck rods with failure of HV-8104 to open.
T8 T9 11 12	SG01C @45% FW06C @40% Preload Preload	M-ALL M-ALL C-UO C-SS **Critical** C-UO C-SS **Critical**	Ruptured Faulted SG IRC with failure of CVI to occur. Ruptured Faulted SG IRC with failure of CVI to occur. CVI actuation failure requiring manual alignment. Main Steam Line Auto Actuation Failure

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

Event 1:

Raise reactor power in accordance with UOP-12004-C.

Verifiable Actions:

OATC – Adjust RCS boron concentration and use control rods to raise reactor power.

UO – Raises turbine load to raise power.

Technical Specifications:

None

Event 2:

Steam Generator # 4 controlling steam flow FI-542 will fail low resulting in a reduction in FW flow.

Verifiable Actions:

UO – Takes manual control of the SG # 4 feed flow valves and MFP(s) speed to control SG NR levels between 60 and 70%.

UO – Selects an unaffected channel for control.

UO – Returns MFP(s) speed controls to auto.

UO – Return SG feed flow valves to auto.

Technical Specifications:

None

Event 3:

The temperature instrument TE-0130 will fail low causing TV-0130 temperature control valve to the Letdown Heat Exchanger to close causing temperature to rise. An automatic divert of CVCS Letdown around the CVCS demins on high temperature will occur (TV-0129). Letdown will be diverted straight to the VCT.

Verifiable Actions:

OATC – Verifies TV-0130 is open to control cooling water flow to the Letdown Heat Exchanger.

OATC – Realigns TV-0129 through the demins. (if high temperature divert occurred)

Technical Specifications:

None

Event 4:

NSCW Train A Cooling Tower Fan # 1 trips with wet bulb temperature > 63°F

Verifiable Actions:

None, Technical Specification call by the SS.

Technical Specifications:

LCO 3.7.9 Ultimate Heat Sink (UHS) Condition B

Event 5:

PRZR pressure channel PT-456 fails high resulting in PORV 456 failing open and lowering RCS pressure with failure of the block valve to automatically close.

Verifiable Actions:

OATC – Manually closes PORV 456 per IOAs of18001-C, Primary Instrument Malfunction, energizes PRZR heaters, places spray valves to shut.

OATC – Selects controlling channel to 455 / 458 on PS-455F PRZR PRESS CNTL SELECT.

OATC – Places PRZR heaters and spray in AUTO.

OATC – Places PORV in AUTO.

Technical Specifications:

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) Instrumentation FU1d, Condition D

LCO 3.3.2 Engineered Safety Features Actuation System (ESFAS) Instrumentation FU8b, Condition L

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

Event 6:

An RWST leak occurs with failure of RWST sludge mixing pump valves to automatically close.

Verifiable Actions:

UO – Manually closes RWST Sludge Mixing Isolation Valves (HV-10957 / HV-10958) to isolate the RWST leak to preserve RWST inventory.

Technical Specifications:

LCO 3.5.4 Refueling Water Storage Tank (RWST) Condition B and Condition D (1 hour action)

TR 13.1.7 Borated Water Sources – Operating Condition D (Immediate TR action)

Event 7, 10:

Main Feed regulating valve to SG # 3 will fail shut requiring a manual reactor trip by the crew. Following the trip, 3 control rods will be stuck partially out requiring an emergency boration. HV-8104 Emergency Boration valve will not open from the QMCB.

Verifiable Actions:

OATC – Initiates an emergency boration of the RCS from the RWST through the Normal Charging flow path by opening 1FV-110A and 1FV-110B and adjusting charging flow to obtain the required boration flow rate of 30 gpm and required charging flow rate of 42 gpm.

Event 8, 11, 12:

SGTR on SG # 3 post reactor trip. Steam Generator # 3 will develop a DBA SGTR over time after the emergency boration has been completed by the OATC. This will require an SI by the crew. The diagnosis of the SGTR is complicated by the MFRV # 3 failing closed earlier in the scenario and SG # 3 level will be low relative to the other 3 SGs. The crew will be alerted by the SJAE / SPE rad monitor (RE-12839) and be required to use SG level rise and balancing of AFW flow to diagnose the ruptured SG.

Verifiable Actions:

UO – Balances / isolates AFW flows to determine the ruptured SG # 3.

OATC – Manually actuates SI due to lowering PRZR level and RCS pressure in order to maintain RCS inventory.

Technical Specifications:

None

Event 9:

Main feed water line break IRC on the ruptured SG # 3.

Verifiable Actions:

UO – The UO will manually isolate the main steam lines.

CRITICAL TASKS:

1) Manually isolate the Main Steam lines no later than step # 3 of 19020-C to limit blow down due to SG # 3 fault to one SG. This limits the Containment pressure rise and challenge to the Containment barrier.

2) Manually closes at least one CVI damper in each flow path to prevent a radiation release flow path from the RCS via SG # 3 to the environment. CVI isolation must be performed no later than the Initial Operator Actions of 19000-C.

3) Manually isolate SG # 3 to limit blow down to one SG limiting CNMT pressure rise and Challenge to the Containment. This also limits RCS cool down and possible PTS condition by closing the following valves. These will be done no later than the procedurally directed steps of 19020-C.

- **MSIVs and Bypasses**
- **MFIVs**
- **BFIVs**
- **HV-5134 SG 3 from MDAFW PMP-B**
- **HV-5127 SG 3 from TDAFW PMP**
- **PV-3020 SG 3 ARV**
- **SGBD sample valves**
- **SGBD valves**

Op-Test No.: 2012-301 **Scenario No.:** 7 **Page 1 of 3**

Event No.: 1

Event Description: Reactor Power Ascension from 29% RTP and higher, UOP 12004-C, step 4.1.41 is the next plateau.

Time	Position	Applicant's Action or Behavior
	OATC	Uses 13009-1, "CVCS Reactor Makeup Control System" Section 4.7 "Frequent Dilutions While Controlling Reactor Power", as necessary to maintain Tavg matched with Tref during power ascension.
	UO	Increases turbine load in increments of 15 Mwe to 30 Mwe using load increase pushbutton at direction of OATC. Monitors Generator Output.
	OATC	**13009-1, Section 4.7:** NOTES • This section can be used during power changes when necessary to frequently dilute the RCS for temperature control. The use of this section shall be authorized by the SS. • Frequent dilutions can raise VCT level to the point where VCT pressure reaches 40 psig. 1-LIC-0185 may be adjusted to allow divert to the RHT at a lower level to limit VCT pressure increase. **4.7 FREQUENT DILUTIONS WHILE CONTROLLING REACTOR POWER** 4.7.1 Determine the amount of Reactor Makeup Water necessary to accomplish the power change or accommodate the expected impact of Xenon. (Uses Reactivity Briefing Sheet to Determine # gallons - Dilution) _____ Gals H_2O **NOTE: EACH OATC WILL USE NUMBER HE/SHE IS COMFORTABLE WITH. (100 –1000 Gallons)**
	OATC	4.7.2 Verify the Reactor Makeup System is aligned for automatic operation.
	OATC	4.7.3 Start one Reactor Makeup Water Pump: RX MU WTR PMP-1 1-HS-7762 RX MU WTR PMP-2 1-HS-7763

Event No.: 1

Event Description: Reactor Power Ascension from 29% RTP and higher, UOP 12004-C, step 4.1.41 is the next plateau.

Time	Position	Applicant's Action or Behavior
	OATC	4.7.4 Place VCT MAKEUP CONTROL 1-HS-40001B in STOP.
	OATC	4.7.5 As directed by the SS, place VCT MAKEUP MODE SELECT 1-HS-40001A in either the ALT DIL or DIL position.
	OATC	4.7.6 As directed by the SS, lower pot setting on 1-LIC-0185, to limit VCT pressure increase. Initial Pot Setting:_____ New Pot Setting:_____
	OATC	4.7.7 Set TOTAL MAKEUP Integrator 1-FQI-0111 for the desired amount of Reactor M/U Water. _____ Gals H_2O
	OATC	NOTE If VCT MAKEUP MODE SELECT 1-HS-40001A was placed in the DIL position in Step 4.7.5, Step 4.7.8 may be marked N/A. 4.7.8 If required, close 1-FV-0110B as necessary to raise or maintain RCS hydrogen concentration. ***(N/A)***
	SS / OATC	4.7.9 At SS direction, dilution flow may be adjusted to desired flow using 1-FIC-0111. (record in AUTO LOG). Initial Pot Setting: _____ New Pot Setting: _____ ***NOTE: EXPECTED NOT TO CHANGE DESIRED FLOW:***
	OATC	4.7.10 Place VCT MAKEUP CONTROL 1-HS-40001B in START and verify flow is indicated on 1-FI-0110B.

Event No.: 1

Event Description: Reactor Power Ascension from 29% RTP and higher, UOP 12004-C, step 4.1.41 is the next plateau.

Time	Position	Applicant's Action or Behavior
	OATC	4.7.11 WHEN TOTAL MAKEUP Integrator 1-FQI-0111 reaches its setpoint, verify dilution stops and the following valves close: • 1-FV-0111A RX MU WTR TO BA BLENDER • 1-FV-0111B BLENDER OUTLET TO VCT • 1-FV-0110B BLENDER OUTLET TO CHARGING PUMPS SUCT
	OATC	4.7.12 Operate the Pressurizer Back-up Heaters as necessary to equalize C_b between the RCS and the Pressurizer.
	OATC	4.7.13 Monitor RCS temperature, Control Bank position, or power levels as applicable.
	OATC	**CAUTION** If frequent dilutions are to be continued past the end of the shift, step 4.7.14 should be marked N/A and this section completed to include realignment to the normal configuration. The new on coming shift can then initiate the section from the beginning to continue frequent dilution. 4.7.14 **Repeat** Steps 4.7.10 through 4.7.13 as necessary to continue power ramp and/or compensate for Xenon. ***NOTE: OATC WILL LEAVE CVCS MAKEUP SYSTEM ALIGNED PER 4.7 FOR FREQUENT DILUTIONS WHILE CONTROLLING REACTOR POWER DURING POWER ASCENSION.***
	**	**NOTE: EVENT 2 IS INITIATED WHILE OATC AND UO ARE PERFORMING ACTIONS IN EVENT 2 FOR POWER ASCENSION AT EXAMINERS DISCRETION.**

Op-Test No.: 2012-301 **Scenario No.:** 7

Event No.: 2

Event Description: SG # 4 Steam Flow channel FI-542 fails high.

Time	Position	Applicant's Action or Behavior
	UO	Diagnose SG Loop # 4 Flow FI-542 has failed high. Symptoms / alarms: ALB13-D01 STM GEN 4 FLOW MISMATCH Indications: • FI-542 reading off scale high. • Steam flow indication on FI-542 reading higher than feed flow.
	UO	IMMEDIATE OPERATOR ACTIONS G1. Check steam and feed flows – MATCHED ON ALL SGs. **(NO)** RNO G1. Take manual control of the following as necessary to restore NR level between 60% and 70%. • Affected SG feed flow valves. • MFP(s) speed.
	SS	Enters AOP 18001-C, SYSTEMS INSTRUMENTATION MALFUNCTION, section G for FAILURE OF STEAM GENERATOR FLOW INSTRUMENTATION.
	UO	G2. Select an unaffected control channel. **Note to examiner:** The UO will select F543 on 1FS-542C selector switch.
	UO	G3. Return MFP(s) speed controls to AUTO.

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Event No.: 2

Event Description: SG # 4 Steam Flow channel FI-542 fails high.

Time	Position	Applicant's Action or Behavior
	UO	G4. Return SG feed flow valves to AUTO.
	UO OATC	G5. Initiate the Continuous Actions Page.
	UO	G6. Check SG level control maintains NR level – AT 65%.
	SS	G7. Notify I & C to initiate repairs.
	SS	G8. Check repairs and surveillances – COMPLETE. **(NO)** RNO G8. Perform the following: a. WHEN repairs and surveillances are complete, THEN perform step G9. b. Return to procedure and step in effect. **Note to examiner**: There are no Technical Specification actions for this malfunction.
		END OF EVENT 2, proceed to EVENT 3.

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Event No.: 3

Event Description: TE-0130 fails low, this controls ACCW cooling to the Letdown Heat Exchanger. With TE-0130 failed low, TV-0130 will throttle shut raising the actual Letdown Heat Exchanger temperature. The OATC will have to manually control TV-0130 to control ACCW flow to the Letdown Heat Exchanger.

Time	Position	Applicant's Action or Behavior
	OATC	Diagnose TE-0130 has failed low. Symptoms / alarms: ALB07-F04 LTDN HX HI TEMP DEMIN DIVERT ALB07-B04 (VOLUME CONTROL TANK OUTLET TEMP HI (delayed, or may not come in) Indications: • TE-0130 reading down scale low. • TE-0130 red UP arrow – LIT. (indicates attempting to raise letdown temperature). • Amber light on 1HS-129 LETDOWN TO DEMIN / VCT – LIT.
	OATC	**ALB07-F04 response actions:** **AUTOMATIC ACTIONS:** Letdown flow is diverted away from the Mixed Bed Demineralizers directly to the Reactor Coolant Filter.
	OATC	**INITIAL OPERATOR ACTIONS** 1. Check letdown temperature on 1-TI-0130 on the QMCB. **(failed)** 2. IF necessary, initiate 18007-C, "Chemical Volume Control System Malfunction". **(not necessary, letdown is not lost)** 3. Check for ACCW normal operation. **(TV-0130 not normal)**

Op-Test No.: 2012-301 **Scenario No.: 7** **Page 2 of 8**

Event No.: 3

Event Description: TE-0130 fails low, this controls ACCW cooling to the Letdown Heat Exchanger. With TE-0130 failed low, TV-0130 will throttle shut raising the actual Letdown Heat Exchanger temperature. The OATC will have to manually control TV-0130 to control ACCW flow to the Letdown Heat Exchanger.

Time	Position	Applicant's Action or Behavior
	OATC	**SUBSEQUENT OPERATOR ACTION** 1. Attempt to balance charging and letdown flow. 2. WHEN letdown temperature is restored, return 1-TV-0129 to the DEMIN position. 3. IF instrument or equipment failure has occurred, initiate maintenance as required. **COMPENSATORY OPERATOR ACTIONS** NONE **Note to examiner:** The OATC can control cooling flow to the VCT using TV-0130. For 120 gpm letdown flow, this is normally set to 51% (note dry erase board on SS throne). It is expected the OATC will take manual control of TV-0130 to control cooling flow. **End of 17007-F04 actions.**
	OATC	**ALB07-B04 response actions.** **PROBABLE CAUSE** 1. Low Auxiliary Component Cooling Water (ACCW) flow through the Letdown Heat Exchanger. 2. Low ACCW flow through the Excess Letdown Heat Exchanger or Seal Water Heat Exchanger if aligned to the Volume Control Tank (VCT).

Op-Test No.: 2012-301 **Scenario No.: 7** **Page 3 of 8**

Event No.: 3

Event Description: TE-0130 fails low, this controls ACCW cooling to the Letdown Heat Exchanger. With TE-0130 failed low, TV-0130 will throttle shut raising the actual Letdown Heat Exchanger temperature. The OATC will have to manually control TV-0130 to control ACCW flow to the Letdown Heat Exchanger.

Time	Position	Applicant's Action or Behavior
	OATC	**AUTOMATIC ACTIONS** NONE **INITIAL OPERATOR ACTIONS** Check normal operation of ACCW and, if necessary, initiate 18022-C, "Loss of Auxiliary Component Cooling Water".
	OATC	**SUBSEQUENT OPERATOR ACTIONS** NOTE Seal water injection flow to the Reactor Coolant Pumps (RCPs) should be maintained less than 130°F. 1. Monitor VCT outlet temperature using 1-TI-0116 on the QMCB. 2. Check letdown flow using 1-FI-0132 and temperature using 1-TI-0130 on the QMCB. 3. Adjust the charging or letdown flow if necessary to reduce the letdown temperature. 4. Return to normal operation as soon as possible per 13006-1, "CVCS Startup and Normal Operation." 5. IF equipment failure is indicated, initiate maintenance as required. **COMPENSATORY OPERATOR ACTIONS** NONE – **End of 17007-B04 actions.**

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Event No.: 3

Event Description: TE-0130 fails low, this controls ACCW cooling to the Letdown Heat Exchanger. With TE-0130 failed low, TV-0130 will throttle shut raising the actual Letdown Heat Exchanger temperature. The OATC will have to manually control TV-0130 to control ACCW flow to the Letdown Heat Exchanger.

Time	Position	Applicant's Action or Behavior
	SS	**AOP-18022-C, LOSS OF AUXILIARY COMPONENT COOLING WATER symptoms and steps.** Symptoms / alarms: • High temperature on any heat exchanger serviced by ACCW. **Note to examiner**: The SS may look at 18022-C due to the reference from ALB07-B04 if received.
	OATC	NOTES • ACCW pumps are removed from the 4.16KV Class 1E buses following simultaneous loss of offsite power and safety injection. • ACCW flow to the Seal Water Heat Exchanger is not required if RCS temperature is less than 150°F and Seal Water Heat Exchanger Return Temperature remains less than 135°F.

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Event No.: 3

Event Description: TE-0130 fails low, this controls ACCW cooling to the Letdown Heat Exchanger. With TE-0130 failed low, TV-0130 will throttle shut raising the actual Letdown Heat Exchanger temperature. The OATC will have to manually control TV-0130 to control ACCW flow to the Letdown Heat Exchanger.

Time	Position	Applicant's Action or Behavior
	OATC	1. Check ACCW pumps – AT LEAST ONE RUNNING. (YES) 2. Check ACCW SPLY HDR PRESS PI-1977 – GREATER THAN 135 PSIG. (YES) 3. Check if ACCW flow exists through the letdown heat exchanger. **(YES)** • TV-0130 OPEN. • ALB07-D03 LTDN HX OUT HI TEMP – EXTINGUISHED.
	OATC UO	4. Initiate the Continuous Actions Page.
	OATC	5. Check ACCW Surge Tank Level (IPC L2700) – GREATER THAN 20% AND STABLE OR RISING. **(YES)**

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Event No.: 3

Event Description: TE-0130 fails low, this controls ACCW cooling to the Letdown Heat Exchanger. With TE-0130 failed low, TV-0130 will throttle shut raising the actual Letdown Heat Exchanger temperature. The OATC will have to manually control TV-0130 to control ACCW flow to the Letdown Heat Exchanger.

Time	Position	Applicant's Action or Behavior
	OATC	6. Check if RCPs should be stopped: a. Check the following RCP parameters (using plant computer): • Motor bearing (upper or lower radial or thrust) – GREATER THAN 195°F. • Motor stator winding – GREATER THAN 311°F. • Seal water inlet – GREATER THAN 230°F. • Loss of ACCW – GREATER THAN 10 MINUTES. **Note to examiner:** All parameters listed are met, the RCPs do NOT require stopping. a. Perform the following. 1) IF any parameter limit is exceeded, THEN perform step 6.b. 2) Go to Step 7.

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Event No.: 3

Event Description: TE-0130 fails low, this controls ACCW cooling to the Letdown Heat Exchanger. With TE-0130 failed low, TV-0130 will throttle shut raising the actual Letdown Heat Exchanger temperature. The OATC will have to manually control TV-0130 to control ACCW flow to the Letdown Heat Exchanger.

Time	Position	Applicant's Action or Behavior
	OATC	7. Check RCP thermal barrier outlet valves – OPEN. **(YES)** • HV-19051 ACCW RCP-1 THERMAL BARRIER RTN VLV • HV-19053 ACCW RCP-2 THERMAL BARRIER RTN VLV • HV-19055 ACCW RCP-3 THERMAL BARRIER RTN VLV • HV-19057 ACCW RCP-4 THERMAL BARRIER RTN VLV • HV-2041 ACCW RCPS THERMAL BARRIER RTN VLV **Note to examiner**: All the above listed valves are open as required.
	OATC	8. Check ACCW heat exchangers outlet temperature (IPC T2701) - LESS THAN 120°F. **(YES)**
	OATC	9. Check ACCW containment isolation valves – OPEN. **(YES)** • HV-1979 ACCW SPLY HDR ORC ISO VLV • HV-1978 ACCW SPLY HDR IRC ISOL VLV • HV-1974 ACCW RTN HDR IRC ISO VLV • HV-1975 ACCW RTN HDR ORC ISO VLV **Note to examiner**: All the above listed valves are open as required.

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Event No.: 3

Event Description: TE-0130 fails low, this controls ACCW cooling to the Letdown Heat Exchanger. With TE-0130 failed low, TV-0130 will throttle shut raising the actual Letdown Heat Exchanger temperature. The OATC will have to manually control TV-0130 to control ACCW flow to the Letdown Heat Exchanger.

Time	Position	Applicant's Action or Behavior
	OATC	10. Check if ACCW is restored to service. a. Components cooled by ACCW – TERMPERATURES RETURNING TO NORMAL. **(YES)** b. Restore charging and letdown using 13006, CHEMICAL AND VOLUME CONTROL SYSTEM. **(N/A)**
	SS	c. Return to procedure and step in effect.
		END OF EVENT 3, proceed to EVENT 4.

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Event No.: 4

Event Description: Trip of NSCW Train B Cooling Tower Fan # 1, wet bulb temperature will be > 63°F requiring a Tech Spec LCO entry.

Time	Position	Applicant's Action or Behavior
	CREW	Diagnose trip of NSCW Train B Tower Fan # 1. Symptoms / alarms: ALB37-B02 480V SWGR 1BB16 TROUBLE Indications: • Green and amber light on NSCW CT Fan # 1 – LIT **Note to examiner:** The fan green and amber light will be the only indication in the control room the fan has tripped and is not readily in their peripheral vision area. IF, they don't see the light and dispatch someone to BB15 to investigate, the Simbooth Operator will report back after several minutes that **"breaker 1BB16-05 is tripped for NSCW FAN-1".**
	UO	**ALB37-B02 actions.** **PROBABLE CAUSE** 3. One of the breakers on Switchgear 1BB16 tripped due to a fault. **AUTOMATIC ACTIONS** NONE **INITIAL OPERATOR ACTIONS** NONE

Op-Test No.: 2012-301 **Scenario No.:** 7 **Page 2 of 4**

Event No.: 4

Event Description: Trip of NSCW Train B Cooling Tower Fan # 1, wet bulb temperature will be > 63°F requiring a Tech Spec LCO entry.

Time	Position	Applicant's Action or Behavior
	UO	**ALB37-B02 actions continued.** **SUBSEQUENT OPERATOR ACTIONS** 1. N/A due to not a loss of bus voltage. 2. Dispatch an operator to Switchgear 1BB16 to check for: a. Existing relay targets. b. Other abnormal conditions. c. Transformer winding high temperatures (refer to 13429-1 to check max temperature indication). **Note to examiner**. The Simbooth Operator will report back after several minutes that **"breaker 1BB16-05 is tripped for NSCW FAN-1".** **Note to examiner**: Steps 3, 4, 5, and 6 of ARP are N/A for this event.
	UO	7. IF alarm is in due to overcurrent trip of Breakers 1BB16-05, 06, 08, OR 13, (NSCW TRAIN B Cooling Tower Fans), THEN the Breaker TRIP/RESET pushbutton must be depressed and the applicable fan QMCB Handswitch must be placed in STOP THEN released to clear the alarm and amber light on associated fan handswitch. **Note to examiner**: If requested, the ABO will report the TRIP/RESET pushbutton does NOT appear to be resetting.

Op-Test No.: 2012-301 **Scenario No.: 7** **Page 3 of 4**

Event No.: 4

Event Description: Trip of NSCW Train B Cooling Tower Fan # 1, wet bulb temperature will be > 63°F requiring a Tech Spec LCO entry.

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

1. Initiate maintenance to correct problem (i.e., restore alarm).

2. IF after three days the alarm has NOT been restored, intiate 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".</td></tr>
<tr><td></td><td>SS</td><td>Technical Specifications:

3.7.9 Ultimate Heat Sink (UHS)

LCO 3.7.9 The UHS shall be OPERABLE. With ambient wet-bulb temperature > 63°F, four fans and four spray cells per train shall be OPERABLE. With ambient wet-bulb temperature ≤ 63°F, three fans and four spray cells per train shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS
<table>
<tr><th>CONDITION</th><th>REQUIRED ACTION</th><th>COMPLETION TIME</th></tr>
<tr><td>B. One NSCW cooling tower with one or more required fans and/or spray cells inoperable.</td><td>B.1 Restore fan(s) and spray cell(s) to OPERABLE status.</td><td>72 hours</td></tr>
<tr><td>D. Required Action and associated Completion Time not met.

OR

UHS inoperable for reasons other then Conditions A, B, or C</td><td>D.1 Be in MODE 3

AND

D.2 Be in MODE 5</td><td>6 hours

36 hours.</td></tr>
</table></td></tr>
</table>

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Event No.: 4

Event Description: Trip of NSCW Train B Cooling Tower Fan # 1, wet bulb temperature will be > 63°F requiring a Tech Spec LCO entry.

<table>
<tr><th>Time</th><th>Position</th><th>Applicant's Action or Behavior</th></tr>
<tr><td></td><td>SS</td><td>Technical Specification 3.7.9 UHS continued.

SURVEILLANCE REQUIREMENTS
<table><tr><th>SURVEILLANCE</th><th>FREQUENCY</th></tr><tr><td>SR 3.7.9.5 Verify ambient wet-bulb temperature ≤ 63°F when one NSCE town fan is out-of-service and daily high temperature (dry bulb) is forecasted to be > 48°F.</td><td>In accordance with the Surveillance Frequency Control Programl</td></tr></table>
Note to examiner: IF asked to perform the wet bulb surveillance, the Simbooth Operator will report back after several minutes that ambient wet-bulb temperature is 67°F. This will ensure that LCO entry is required.

The SS may request someone to perform OSP-14150-C, Wet Bulb Temperature With Psychrometer". This takes ~ 5 – 10 minutes, report back the temperature as stated about (78°F).</td></tr>
<tr><td></td><td></td><td>END OF EVENT 4, proceed to EVENT 5.</td></tr>
</table>

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Event No.: 5

Event Description: PRZR pressure channel PI-456 will fail high with the PORB Block Valve HV-8000B failing to close in automatic on low RCS pressure of 2185 psig. The OATC will be required to manually close PORV 456 or HV-8000B to prevent a Reactor trip.

Time	Position	Applicant's Action or Behavior
	OATC	Diagnose the high failure of PRZR Pressure channel PT-456. Symptoms / alarms: • ALB11-B03 PRZR HI PRESS • ALB11-C03 PRZR HI PRESS CHANNEL ALERT • ALB12-D03 PRZR PRESS LO PORV BLOCK • ALB12-E01 PRZR RELIEF DISCH HI TEMP • ALB12-F04 PV-0456A OPEN SIGNAL Indications: • PRZR Pressure channel PT-456 offscale high. • PRZR Pressure channels PT-455, 457, and 458 rapidly lowering. • Both PRZR Sprays fully shut. • All PRZR heaters on.
	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.
	CREW	Enters AOP 18001-C, Section C and verifies immediate operator actions properly completed.

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Event No.: 5

Event Description: PRZR pressure channel PI-456 will fail high with the PORB Block Valve HV-8000B failing to close in automatic on low RCS pressure of 2185 psig. The OATC will be required to manually close PORV 456 or HV-8000B to prevent a Reactor trip.

Time	Position	Applicant's Action or Behavior
	OATC	C2. Check controlling channel – OPERATING PROPERLY. **(YES)**
	OATC	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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Event No.: 5

Event Description: PRZR pressure channel PI-456 will fail high with the PORB Block Valve HV-8000B failing to close in automatic on low RCS pressure of 2185 psig. The OATC will be required to manually close PORV 456 or HV-8000B to prevent a Reactor trip.

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.
	OATC	C9. Place PORVs in AUTO and verify proper operation.
	OATC	C10. Return PRZR pressure Master Controller to AUTO.

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Event No.: 5

Event Description: PRZR pressure channel PI-456 will fail high with the PORB Block Valve HV-8000B failing to close in automatic on low RCS pressure of 2185 psig. The OATC will be required to manually close PORV 456 or HV-8000B to prevent a Reactor trip.

Time	Position	Applicant's Action or Behavior
	OATC	C11. Select same channel on PS-455G PRZR PRESS REC SEL as selected on PS-455F. ***455***
	OATC	C12. Check P-11 status light on BPLB indicates correctly for plant condition within one hour. ***OFF***
	SS	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
	SS	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.**

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Event No.: 5

Event Description: PRZR pressure channel PI-456 will fail high with the PORB Block Valve HV-8000B failing to close in automatic on low RCS pressure of 2185 psig. The OATC will be required to manually close PORV 456 or HV-8000B to prevent a Reactor trip.

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 6 OTΔT — E 8a Low PRZR pressure — M 8b High PRZR pressure — E • TS 3.3.2 ESFAS Function — Condition 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) **Note to examiner:** The SS may look at Tech Specs for the Block Valve HV-8000B which did not close in automatic. There is no Tech Spec requirement for the Block Valve to work in automatic. Manual operation only is required per Tech Spec Bases of 3.4.11.

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Event No.: 5

Event Description: PRZR pressure channel PI-456 will fail high with the PORB Block Valve HV-8000B failing to close in automatic on low RCS pressure of 2185 psig. The OATC will be required to manually close PORV 456 or HV-8000B to prevent a Reactor trip.

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 5, proceed to EVENT 6.**

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Event No.: 6

Event Description: The RWST will develop a leak resulting in lowering RWST level below the Tech Spec limit. After receipt of a QMCB annunciators, the UO will find the RWST Sludge Mixing Isolation Valves have failed to automatically close. The UO will close the valves on the QPCP and the leak will be terminated.

Time	Position	Applicant's Action or Behavior
	OATC	Diagnose RWST level is actually lowering on all channels. Symptoms / alarms: ALB06-E04 RWST LO LEVEL Indications: • RWST level lowering on LI-0990, 0991, 0992, and 0993 to less than 95%..
	OATC	**ALB06-E04 actions.** **PROBABLE CAUSE** 1. Filling of Accumulators. 2. Adding water to the Spent Fuel Pool. 3. Safety Injection (SI) actuation. 4. System leakage.
	UO	**AUTOMATIC ACTIONS** RWST Sludge Mixing Isolation Valves 1-HV-10957 (Train B, 1-LT-0991) an 1-HV-10958 (Train A, 1-LT-0990) close. **Note to examiner:** These valves are located on the QPCP and will NOT close for this event. The UO will have to manually close the valves to isolate the leak.

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Event No.: 6

Event Description: The RWST will develop a leak resulting in lowering RWST level below the Tech Spec limit. After receipt of a QMCB annunciators, the UO will find the RWST Sludge Mixing Isolation Valves have failed to automatically close. The UO will close the valves on the QPCP and the leak will be terminated.

Time	Position	Applicant's Action or Behavior
	OATC UO	**ALB06-E04 actions continued.** **INTIAL OPERATOR ACTIONS** NONE
	UO	**SUBSEQUENT OPERATOR ACTIONS** 1. IF in Modes 1, 2, 3, or 4, and SI is not in progress, stop any operation that could be removing water from the RWST. 2. IF a system leak is indicated, dispatch personnel to locate and isolate the leak. **Note to examiner.** The UO closing either HV-10957 or HV-10958 will isolate the leak for this event. 3. Restore RWST level to normal per 13701-1, "Boric Acid System".
	SS	4. Refer to Technical Specification LCO 3.5.4 and TR 13.1.7. **COMPENSATORY OPERATOR ACTIONS** NONE

Event No.: 6

Event Description: The RWST will develop a leak resulting in lowering RWST level below the Tech Spec limit. After receipt of a QMCB annunciators, the UO will find the RWST Sludge Mixing Isolation Valves have failed to automatically close. The UO will close the valves on the QPCP and the leak will be terminated.

<table>
<tr><th>Time</th><th>Position</th><th>Applicant's Action or Behavior</th></tr>
<tr><td></td><td>SS</td><td>
3.5.4 Refueling Water Storage Tank (RWST).

LCO 3.5.4 The RWST shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS
<table>
<tr><th>CONDITION</th><th>REQUIRED ACTION</th><th>COMPLETION TIME</th></tr>
<tr><td>B. One or more sludge mixing pump isolation valves inoperable.</td><td>B.1 Restore the valve(s) to OPERABLE status.</td><td>24 hours</td></tr>
<tr><td>D. RWST inoperable for reasons other than Condition A or B.</td><td>D.1 Restore RWST to OPERABLE status.</td><td>1 hour</td></tr>
<tr><td>E. Required Action and associated Completion Time of Condition A or D not met.</td><td>E.1 Be in MODe 3.

AND

E.2 Be in MODE 5</td><td>6 hours

36 hours.</td></tr>
</table>

Note to examiner: Closing the RWST sludge mixing isolations HV-10957 and HV-10958 satisfies Condition B.
</td></tr>
</table>

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Event No.: 6

Event Description: The RWST will develop a leak resulting in lowering RWST level below the Tech Spec limit. After receipt of a QMCB annunciators, the UO will find the RWST Sludge Mixing Isolation Valves have failed to automatically close. The UO will close the valves on the QPCP and the leak will be terminated.

<table>
<tr><th>Time</th><th>Position</th><th>Applicant's Action or Behavior</th></tr>
<tr><td></td><td>SS</td><td>TR 13.1.7 Borated Water Sources – Operating.

TR 13.1.7 The following borated water source(s) shall be OPERABLE as required by TR-13.1.3:

a. Boric acid storage tank.

b. The refueling water storage tank (RWST).

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS
<table>
<tr><th>CONDITION</th><th>REQUIRED ACTION</th><th>COMPLETION TIME</th></tr>
<tr><td>D. RWST inoperable.</td><td>D.1 Enter applicable Conditions of RWST Technical Specification 3.5.4.</td><td>Immediately.</td></tr>
</table></td></tr>
<tr><td></td><td></td><td>END OF EVENT 6, proceed to EVENT 7, the main event.</td></tr>
</table>

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Event No.: 7

Event Description: Main Feed Regulating Valve for loop # 3 fails shut requiring a Reactor trip. When the Reactor trips, 3 rods will stick out requiring an Emergency Boration by the OATC.

Time	Position	Applicant's Action or Behavior
	UO	Diagnose MFRV Loop # 3 has failed shut. Symptoms / alarms: ALB13-C01 STM GEN 3 FLOW MISMATCH ALB13-C06 STM GEN 3 HI/LO LVL DEVIATION (short delay) ALB13-C03 STM GEN 3 LO LEVEL (a little longer delay) ALB13-C05 STM GEN 3 LO-LO LVL ALERT (auto trip set point) Indications: • Feed flow reading 0 gpm for SG # 3 (1FI-530A / 531A). • Level lowering rapidly on SG # 3 (1LI-538, 539, 537, & 553). • MFRV # 3 green light only lit on ZLB-004. • MFRV # 3 demand at 100% and red up arrow lit on 1FIC-530.
	SS	Enters 18016-C CONDENSATE AND FEEDWATER MALFUNCTION section D MAIN FEEDWATER VALVE MALFUNCTION.

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Event No.: 7

Event Description: Main Feed Regulating Valve for loop # 3 fails shut requiring a Reactor trip. When the Reactor trips, 3 rods will stick out requiring an Emergency Boration by the OATC.

Time	Position	Applicant's Action or Behavior
	UO	**IMMEDIATE OPERATOR ACTIONS** D1. Check proper operation of BFRVs and MFRVs. RNO D1. Perform the following: • Control SG levels using the following as necessary. MFRVs BFRVs • IF SG levels cannot be maintained greater than 41%. -OR- Less than 79%, THEN perform the following: 1) Trip the reactor. 2) Go to 19000-C, E-0 REACTOR TRIP OR SAFETY INJECTION. **Note to examiner**: At > 29% power, the BFRV will NOT be able to maintain SG levels and the Reactor will be tripped manually by the OATC or will trip automatically on SG # 3 LO-LO LEVEL.
	OATC	D1 RNO – Manually trips the Reactor due to impending loss of level in SG # 3.

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Event No.: 7

Event Description: Main Feed Regulating Valve for loop # 3 fails shut requiring a Reactor trip. When the Reactor trips, 3 rods will stick out requiring an Emergency Boration by the OATC.

Time	Position	Applicant's Action or Behavior
	CREW	Transitions to 19000-C, E-0 REACTOR TRIP OR SAFETY INJECTION.
	CREW SS	Performs Immediate Operator Actions per 19000-C, E-0 Reactor Trip or Safety Injection. 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

Event No.: 7

Event Description: Main Feed Regulating Valve for loop # 3 fails shut requiring a Reactor trip. When the Reactor trips, 3 rods will stick out requiring an Emergency Boration by the OATC.

Time	Position	Applicant's Action or Behavior
	UO	4. Check if SI is actuated. **(NO)** • Any SI annunciators – LIT • SI ACTUATED BPLP window – LIT RNO 4. Check if SI is required. **(NO)** IF one or more of the following conditions has occurred. • PRZR pressure has less than or equal to 1870 psig. • Steam line pressure less than or equal to 585 psig. • Containment pressure greater than or equal to 3.8 psig. • Automatic alignment of ECCS equipment to injection phase. THEN actuate SI and go to Step 6.
	UO SS	5. Perform the following to limit RCS cooldown: a. Check NR level in at least one SG greater than 10%. RNO a. Maintain AFW flow greater than 570 gpm and go to 19001-C, ES-0.1 REACTOR TRIP RESPONSE. b. Reduce AFW flow. c. Go to 19001-C, ES-0.1 REACTOR TRIP RESPONSE.

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Event No.: 7

Event Description: Main Feed Regulating Valve for loop # 3 fails shut requiring a Reactor trip. When the Reactor trips, 3 rods will stick out requiring an Emergency Boration by the OATC.

Time	Position	Applicant's Action or Behavior
	CREW	Transitions to 19001-C, ES-0.1 REACTOR TRIP RESPONSE.
	OATC UO	1. Initiate the following: • Continuous Actions and Foldout Page. • Critical Safety Function Status Trees per 19200-C, F-O CRITICAL SAFETY FUNCTION STATUS TREE.
	CREW	2. IF SI actuation occurs during this procedure, THEN go to 19000-C, E-0 REACTOR TRIP OR SAFETY INJECTION.

Event No.: 7

Event Description: Main Feed Regulating Valve for loop # 3 fails shut requiring a Reactor trip. When the Reactor trips, 3 rods will stick out requiring an Emergency Boration by the OATC.

Time	Position	Applicant's Action or Behavior
	UO	3. Limit RCS cooldown: a. Verify AFW flow to SGs. b. Trip both MFPs. c. Check SGs NR level – AT LEAST ONE GREATER THAN 10%. RNO c. Verify total AFW flow greater than 570 gpm. Go to Step 3.e. d. Throttle total AFW flow as necessary. e. Verify SG Blowdown Isolation Valves – CLOSED WITH HANDSWITCHES IN CLOSE.
	OATC	4. Check RCS temperature stable at or trending to 557°F. With RCP(s) running – RCS AVERAGE TEMPERATURE. -OR- Without RCP(s) running – RCS WR COLD LEG TEMPERATURES.

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Event No.: 7

Event Description: Main Feed Regulating Valve for loop # 3 fails shut requiring a Reactor trip. When the Reactor trips, 3 rods will stick out requiring an Emergency Boration by the OATC.

Time	Position	Applicant's Action or Behavior
	UO	5. Check FW status: a. Average RCS temperature – LESS THAN 564°F. **(YES)** **b.** Verify FW isolation valves closed. **(YES)** • MFIVs • BFIVs • MFRVs • BFRVs
	UO	6. Check total feed flow capability to SGs – GREATER THAN 570 GPM AVAILABLE. **(YES)**
	OATC	7. Check all Rods – FULLY INSERTED. **(NO, 3 are stuck out)** RNO 7. IF two or more Rods NOT fully inserted, THEN EMERGENCY BORATE 154 ppm for each Rod not fully inserted by initiating 13009, CVCS REACTOR MAKEUP CONTROL SYSTEM. Verify adequate shutdown margin as required by Technical Specification SR 3.1.1.1. **Note to examiner:** Once OATC initiates emergency boration flow, a DBA SGTR will occur on SG # 3. E. Boration steps are on page 9 of this event.

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Event No.: 7

Event Description: Main Feed Regulating Valve for loop # 3 fails shut requiring a Reactor trip. When the Reactor trips, 3 rods will stick out requiring an Emergency Boration by the OATC.

Time	Position	Applicant's Action or Behavior
	UO	8. Check Main Generator Output Breakers – OPEN. **(YES)**
	SS	9. Perform the following: a. Check 18009-C, STEAM GENERATOR TUBE LEAK – IN EFFECT. RNO a. Go to Step 9.d. d. Check other AOPs – IN EFFECT. **(NO)** e. Initiate actions of AOPs in conjunction with remaining actions of this procedure.
	UO	10. Check PRZR level control: a. Instrument Air – AVAILABLE. **(YES)**
		Note to examiner: The DBA SGTR will have initiated by now. The crew will actuate SI and go to E-0 on lowering PRZR level and pressure.

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Event No.: 7

Event Description: Main Feed Regulating Valve for loop # 3 fails shut requiring a Reactor trip. When the Reactor trips, 3 rods will stick out requiring an Emergency Boration by the OATC.

Time	Position	Applicant's Action or Behavior
	OATC	4.9 EMERGENCY BORATION NOTE Table 1 provides a convenient tool for checking Emergency Boration flow path alternatives. **Note to examiner**: The path through HV-8104 is the preferred path. The next preferred path is the next section in the procedure, etc.
	OATC	4.9.1 Emergency Boration Through 1-HV-8104.
	OATC	4.9.1.1 Start one (1) Boric Acid Transfer Pump. 4.9.1.2 Verify a Charging Pump is running. 4.9.1.3 Open EMERGENCY BORATE valve 1-HV-8104. **Note to examiner:** 1-HV-8104 will NOT open, the candidate should proceed to section 4.9.2 Emergency Boration Through The Normal Charging Flow Path.
	OATC	4.9.2 Emergency Boration Through The Normal Charging Flow Path.
	OATC	4.9.2.1 Start one (1) Boric Acid Transfer Pump.
	OATC	4.9.2.2 Verify a Charging Pump is running.

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Event No.: 7

Event Description: Main Feed Regulating Valve for loop # 3 fails shut requiring a Reactor trip. When the Reactor trips, 3 rods will stick out requiring an Emergency Boration by the OATC.

Time	Position	Applicant's Action or Behavior
	OATC	4.9.2.3 Open the following valves: • 1-FV-0110A, BA TO BLENDER • 1-FV-0110B, BLENDER OUTLET TO CHARGING PUMPS SUCT
		NOTE The following step assumes that with 12 gpm of seal return, 30 gpm will be supplied to the RCS.
	OATC	4.9.2.4 Place 1-FIC-0121 in MANUAL.
	OATC	4.9.2.5 Adjust 1-FIC-0121 to maintain flow greater than 42 gpm.
	OATC	4.9.2.6 Verify Emergency Boration flow 1-FI-0110A is greater than 30 gpm.
	OATC	4.9.2.7 IF flow is less than 30 gpm, start the second Boric Acid Transfer Pump.
	OATC	4.9.2.8 Operate the Pressurizer Backup Heaters as necessary to equalize boron concentration between the RCS and the Pressurizer.

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Event No.: 7

Event Description: Main Feed Regulating Valve for loop # 3 fails shut requiring a Reactor trip. When the Reactor trips, 3 rods will stick out requiring an Emergency Boration by the OATC.

Time	Position	Applicant's Action or Behavior
	OATC	4.9.2.9 Check plant conditions are consistent with RCS boration: RCS Tavg may be dropping. NIS may be dropping.
		END OF EVENT 7, proceed to EVENT 8, the MAIN EVENT.

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Event No.: 8 (E-2 Actions)

Event Description: 19020-C E-2 actions for Faulted Steam Generator.

Time	Position	Applicant's Action or Behavior
	CREW SS	1. Initiate critical safety function status trees per 19200-C, F-O CRITICAL SAFETY FUNCTION STATUS TREE. 2. Initiate NMP-EP-110, EMERGENCY CLASSIFICATION DETERMINATION AND INITIAL ACTION. **Note to examiner:** The SS will call the Simbooth to have the Shift Manager implement NMP-EP-110.
	OATC	**CAUTION**: At least one SG should be available for RCS cooldown.
	UO **Critical**	3. Verify Main Steamline Isolation and Bypass Valves – CLOSED. **(NO)** **Note to examiner:** Auto actuation of the Main Steamline and Bypasses is defeated. **The UO will have to manually actuate SLI to satisfy the critical step.**
	UO	4. Check SGs secondary pressure boundaries:\ **a.** Identify intact SG(s): **(# 1, 2, and 4 are intact)** • SG pressures – ANY STABLE OR RISING. **(YES)** b. Identify faulted SG(s). ANY SG PRESSURE LOWERING IN AN UNCONTROLLED MANNER. **(YES, SG # 3)** -OR- ANY SG COMPLETELY DEPRESSURIZED. **(maybe by now, SG # 3)**

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Event No.: 8 (E-2 Actions)

Event Description: 19020-C E-2 actions for Faulted Steam Generator.

Time	Position	Applicant's Action or Behavior
	UO	5. Isolate Main Feedwater to the faulted SG(s): • Close affected MFIVs: HV-5227 (SG 1) HV-5228 (SG 2) HV-5229 (SG 3) HV-5230 (SG 4) • Close affected BFIVs: HV-15196 (SG 1) HV- 15197 (SG 2) HV- 15198 (SG 3) HV- 15199 (SG 4)
	UO **Critical** **Critical**	6. Isolate Auxiliary Feedwater to the faulted SG(s): • Close affected MDAFW Pump Throttle Valves: HV-5139 – SG 1 FROM MDAFW PMP-A HV-5132 – SG 2 FROM MDAFW PMP-B **HV-5134 – SG 3 FROM MDAFW PMP-B** HV-5137 – SG 3 FROM MDAFW PMP-A • Close affected TDAFW Pump Throttle Valves: HV-5122 – SG 1 FROM TDAFW HV-5125 – SG 2 FROM TDAFW **HV-5127 – SG 3 FROM TDAFW** HV-5120 – SG 3 FROM TDAFW **Note to examiner:** The valves bolded above are critical at this time IF not already previously closed.

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Event No.: 8 (E-2 Actions)

Event Description: 19020-C E-2 actions for Faulted Steam Generator.

Time	Position	Applicant's Action or Behavior
	UO	7. Check at least one MDAFW Pump – RUNNING AND CAPABLE OF FEEDING SG(s) NEEDED FOR RCS COOLDOWN. **(YES)**
	UO	8. Close affected TDAFW Pump Steam Supply Valve(s): **(N/A)** 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
	UO	9. Verify affected SG ARV(s) – CLOSED: PV-3000 (SG 1) PV-3010 (SG 2) PV-3020 (SG 3) PV-3030 (SG 4)
	UO	10. Align SGBD valves: • Place SG Blowdown Isolation Valve handswitches in CLOSE position. • Close sample valves. HV-9451 (SG 1) HV-9452 (SG 2) HV-9453 (SG 3) HV-9454 (SG 4)
	UO	11. Verify faulted SG(s) remains isolated during subsequent recovery actions unless needed for RCS cooldown or SG activity sampling.
	UO	12. Check CST level – GREATER THAN 15%. **(YES)**

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Event No.: 8 (E-2 Actions)

Event Description: 19020-C E-2 actions for Faulted Steam Generator.

Time	Position	Applicant's Action or Behavior
	UO	13. Initiate checking if SG Tubes intact: a. Direct Chemistry to take periodic activity samples of all SGs one at a time. **b.** Secondary radiation – NORMAL. **(NO)** • MAIN STM LINE MONITORS • RE-13120 (SG 1) • RE-13121 (SG 2) • RE-13122 (SG 3) • RE-13119 (SG 4) • CNDSR AIR EJCTR/STM RAD MONITORS: • RE-12839C • RE-12839D (if on scale) • RE-12839E (if on scale) • STM GEN LIQ PROCESS RAD: • RE-0019 (Sample) • RE-0021 (Blowdown) • SG sample radiation. **c.** Check SG levels – ANY RISING IN AN UNCONTROLLED MANNER. **(YES)**
	SS	d. Go to 19030-C, E-3 STEAM GENERATOR TUBE RUPTURE.
	SS	Transitions back to 19030-C, E-3 STEAM GENERTOR TUBE RUPTURE.

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Event No.: 8

Event Description: DBA SGTR on SG # 3 followed by a FW Line Break after transition to 19030-C, E-3 Steam Generator Tube Rupture. Based on the Foldout Page of 19030-C, the crew will transition back to 19020-C to isolate the faulted steam generator, then back to 19030-C and eventually transition to 19131-C, ECA-3.1 SGTR WITH LOSS OF REACTOR COOLANT: SUBCOOLED RECOVERY DESIRED.

Time	Position	Applicant's Action or Behavior
	OATC	Actuates SI due to inability to maintain PRZR level > 9% per Foldout Page of 19001-C, ES-0.1 REACTOR TRIP RESPONSE.
	CREW	Performs Immediate Operator Actions per 19000-C, E-0 Reactor Trip or Safety Injection.
	SS	Makes a page announcement of Reactor Trip and Safety Injection.
	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

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Event No.: 8

Event Description: DBA SGTR on SG # 3 followed by a FW Line Break after transition to 19030-C, E-3 Steam Generator Tube Rupture. Based on the Foldout Page of 19030-C, the crew will transition back to 19020-C to isolate the faulted steam generator, then back to 19030-C and eventually transition to 19131-C, ECA-3.1 SGTR WITH LOSS OF REACTOR COOLANT: SUBCOOLED RECOVERY DESIRED.

Time	Position	Applicant's Action or Behavior
	OATC	4. Check if SI is actuated. **(YES)** • Any SI annunciators – LIT • SI ACTUATED BPLP window – LIT
	SS	Go to Step 6.
	SS CREW	6. Initiate the Foldout Page.
	SS	7. Perform the following:
	OATC	• OATC Initial Actions Page
	UO	• UO Initial Actions Page
		NOTE: SS initiates step 8 after OATC/UO Initial Actions completed.

Event No.: 8

Event Description: DBA SGTR on SG # 3 followed by a FW Line Break after transition to 19030-C, E-3 Steam Generator Tube Rupture. Based on the Foldout Page of 19030-C, the crew will transition back to 19020-C to isolate the faulted steam generator, then back to 19030-C and eventually transition to 19131-C, ECA-3.1 SGTR WITH LOSS OF REACTOR COOLANT: SUBCOOLED RECOVERY DESIRED.

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)** **Note to Examiner**: SIP A is tagged out. c. RHR pumps – RUNNING. **(YES)** d. NCP – TRIPPED. **(YES)**
	OATC	4. Verify CCW Pumps – ONLY TWO RUNNING EACH TRAIN. **(YES)**

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Event No.: 8

Event Description: DBA SGTR on SG # 3 followed by a FW Line Break after transition to 19030-C, E-3 Steam Generator Tube Rupture. Based on the Foldout Page of 19030-C, the crew will transition back to 19020-C to isolate the faulted steam generator, then back to 19030-C and eventually transition to 19131-C, ECA-3.1 SGTR WITH LOSS OF REACTOR COOLANT: SUBCOOLED RECOVERY DESIRED.

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 EACH TRAIN. b. NSCW TOWER RTN HDR BYPASS BASIN hand switches – IN AUTO: • HS-1668A • HS-1669A
	OATC UO	6. Verify Containment Cooling Units: a. ALL RUNNING IN LOW SPEED. **(YES)** • MLB indication b. NSCW Cooler isolation valves – OPEN. **(YES)** • MLB indication

Event No.: 8

Event Description: DBA SGTR on SG # 3 followed by a FW Line Break after transition to 19030-C, E-3 Steam Generator Tube Rupture. Based on the Foldout Page of 19030-C, the crew will transition back to 19020-C to isolate the faulted steam generator, then back to 19030-C and eventually transition to 19131-C, ECA-3.1 SGTR WITH LOSS OF REACTOR COOLANT: SUBCOOLED RECOVERY DESIRED.

Time	Position	Applicant's Action or Behavior
		PERFORMS OATC INITIAL ACTIONS
	OATC	7. Check Containment Ventilation Isolation. a. Dampers and Valves – CLOSED. **(NO)** • CVI MLB indication
	Critical	**a. Perform the following:** **1) Close Dampers and Valves.** **2) Start Piping Pen Units.**
	OATC	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. **(NO)** RNO d. Go to Step 10.

Event No.: 8

Event Description: DBA SGTR on SG # 3 followed by a FW Line Break after transition to 19030-C, E-3 Steam Generator Tube Rupture. Based on the Foldout Page of 19030-C, the crew will transition back to 19020-C to isolate the faulted steam generator, then back to 19030-C and eventually transition to 19131-C, ECA-3.1 SGTR WITH LOSS OF REACTOR COOLANT: SUBCOOLED RECOVERY DESIRED.

Time	Position	Applicant's Action or Behavior
	OATC	**PERFORMS OATC INITIAL ACTIONS** 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 OPERATOR ACTIONS,** return to E-0 Step 8.

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Event No.: 8

Event Description: DBA SGTR on SG # 3 followed by a FW Line Break after transition to 19030-C, E-3 Steam Generator Tube Rupture. Based on the Foldout Page of 19030-C, the crew will transition back to 19020-C to isolate the faulted steam generator, then back to 19030-C and eventually transition to 19131-C, ECA-3.1 SGTR WITH LOSS OF REACTOR COOLANT: SUBCOOLED RECOVERY DESIRED.

Time	Position	Applicant's Action or Behavior
	UO	**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) RNO 2. Establish AFW flow greater than 570 gpm by starting pumps and aligning valves as necessary.

Event No.: 8

Event Description: DBA SGTR on SG # 3 followed by a FW Line Break after transition to 19030-C, E-3 Steam Generator Tube Rupture. Based on the Foldout Page of 19030-C, the crew will transition back to 19020-C to isolate the faulted steam generator, then back to 19030-C and eventually transition to 19131-C, ECA-3.1 SGTR WITH LOSS OF REACTOR COOLANT: SUBCOOLED RECOVERY DESIRED.

Time	Position	Applicant's Action or Behavior
	UO	**UO INITIAL ACTIONS** 3. Check if main steamlines should be isolated: **(NO)** a. Check for one or 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 – ONE TWO OR MORE CHANNELS OF ANY STEAMLINE. RNO a. Go to Step 4.
	UO	4. Verify FW Isolation Valves closed: **(YES)** • MFIVs • BFIVs • MFRVs • BFRVs

Event No.: 8

Event Description: DBA SGTR on SG # 3 followed by a FW Line Break after transition to 19030-C, E-3 Steam Generator Tube Rupture. Based on the Foldout Page of 19030-C, the crew will transition back to 19020-C to isolate the faulted steam generator, then back to 19030-C and eventually transition to 19131-C, ECA-3.1 SGTR WITH LOSS OF REACTOR COOLANT: SUBCOOLED RECOVERY DESIRED.

Time	Position	Applicant's Action or Behavior
	UO	**UO INITIAL ACTIONS** 5. Verify SG Blowdown isolated. **(YES)** • Place SG Blowdown isolation Valve handswitches HS-7603A, B, C, and D in the CLOSE position. **Note to examiner:** The UO will place the HS-7603A valves in the hard closed position. • SG Sample Isolation Valves – CLOSED. **(YES)**
	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%. **Note to examiner**: IF the UO suspects a SGTR into SG # 3, he may request to isolate AFW flow to SG # 3 to assist in determining which SG is ruptured.
	UO	8. Verify both MFPs – TRIPPED. **(YES)**
	UO	9. Check Main Generator Output Breakers – OPEN. **(YES)** **END OF UO INITIAL ACTIONS, return to step 8 of E-0.**

Event No.: 8

Event Description: DBA SGTR on SG # 3 followed by a FW Line Break after transition to 19030-C, E-3 Steam Generator Tube Rupture. Based on the Foldout Page of 19030-C, the crew will transition back to 19020-C to isolate the faulted steam generator, then back to 19030-C and eventually transition to 19131-C, ECA-3.1 SGTR WITH LOSS OF REACTOR COOLANT: SUBCOOLED RECOVERY DESIRED.

Time	Position	Applicant's Action or Behavior
	OATC UO	**19000-C, E-0 actions beginning with step 8.** 8. Initiate the Continuous Actions Page.
	OATC	9. Check RCS temperature stable at or trending to 557°F. **(NO)** RNO 9. IF temperature is less than 557°F and lowering, **(it is)** 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.

Event No.: 8

Event Description: DBA SGTR on SG # 3 followed by a FW Line Break after transition to 19030-C, E-3 Steam Generator Tube Rupture. Based on the Foldout Page of 19030-C, the crew will transition back to 19020-C to isolate the faulted steam generator, then back to 19030-C and eventually transition to 19131-C, ECA-3.1 SGTR WITH LOSS OF REACTOR COOLANT: SUBCOOLED RECOVERY DESIRED.

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.

Event No.: 8

Event Description: DBA SGTR on SG # 3 followed by a FW Line Break after transition to 19030-C, E-3 Steam Generator Tube Rupture. Based on the Foldout Page of 19030-C, the crew will transition back to 19020-C to isolate the faulted steam generator, then back to 19030-C and eventually transition to 19131-C, ECA-3.1 SGTR WITH LOSS OF REACTOR COOLANT: SUBCOOLED RECOVERY DESIRED.

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

Event No.: 8

Event Description: DBA SGTR on SG # 3 followed by a FW Line Break after transition to 19030-C, E-3 Steam Generator Tube Rupture. Based on the Foldout Page of 19030-C, the crew will transition back to 19020-C to isolate the faulted steam generator, then back to 19030-C and eventually transition to 19131-C, ECA-3.1 SGTR WITH LOSS OF REACTOR COOLANT: SUBCOOLED RECOVERY DESIRED.

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. **(YES, possible to see on a couple of rad monitor trends but none will be in alert)**
		
		• MAIN STM LINE MONITORS:
		  • RE-13120 (SG 1)
		  • RE-13121 (SG 2)
		  • RE-13122 (SG 3)
		  • RE-13119 (SG 4)
		
		• CNDSR AIR EJCTR/STM RAD MONITORS:
		  • RE-12839C
		  • RE-12839D (if on scale)
		  • RE-12839E (if on scale)
		
		• STEM GEN LIQ PROCESS RAD:
		  • RE-0019 (Sample)
		  • RE-0021 (Blowdown)
		
		• SG sample radiation.
		
		c. Check SG levels – ANY RISING IN AN UNCONTROLLED MANNER. **(YES)**
		
		d. Go to 19030-C, E-3 STEAM GENERATOR TUBE RUPTURE.

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Event No.: 8

Event Description: DBA SGTR on SG # 3 followed by a FW Line Break after transition to 19030-C, E-3 Steam Generator Tube Rupture. Based on the Foldout Page of 19030-C, the crew will transition back to 19020-C to isolate the faulted steam generator, then back to 19030-C and eventually transition to 19131-C, ECA-3.1 SGTR WITH LOSS OF REACTOR COOLANT: SUBCOOLED RECOVERY DESIRED.

Time	Position	Applicant's Action or Behavior
	SS	SS transitions to 19030-C, E-3 STEAM GENERATOR TUBE RUPTURE.

Op-Test No.: 2012-301 **Scenario No.: 7** **Page 1 of 2**

Event No.: 8

Event Description: DBA SGTR actions from 19030-C, E-3 STEAM GENERATOR TUBE RUPTURE to be followed by a Feedline Break IRC.

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.

Op-Test No.: 2012-301 **Scenario No.:** 7 **Page 2 of 2**

Event No.: 8

Event Description: DBA SGTR actions from 19030-C, E-3 STEAM GENERATOR TUBE RUPTURE to be followed by a Feedline Break IRC.

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 # 3 level will be rising with AFW flow throttled. Note to examiner: Once SG # 3 has been identified, the Simbooth Operator will insert a DBA Feedwater line break on SG # 3 that will require a transition back to 19020-C, E-2 FAULTED STEAM GENERATOR ISOLATION and then back to 19030-C.
	UO OATC	Recognize rising steam flow on SGs 1, 2, and 4 and lowering RCS pressure.
	SS	Transitions to 19020-C, E-2 FAULTED STEAM GENERATOR ISOLATION based on Foldout Page Criteria.

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Event No.: 8

Event Description: DBA SGTR actions from 19030-C, E-3 STEAM GENERATOR TUBE RUPTURE after return from 19020-C, E-2 FAULTED STEAM GENERATOR ISOLATION following feed line break.

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. **(YES)** c. Stop all RCPs.

Op-Test No.: 2012-301 **Scenario No.:** 7 **Page 2 of 4**

Event No.: 8

Event Description: DBA SGTR actions from 19030-C, E-3 STEAM GENERATOR TUBE RUPTURE after return from 19020-C, E-2 FAULTED STEAM GENERATOR ISOLATION following feed line break.

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 # 3 will have been previously identified.
		CAUTION: At least one SG should be maintained available for RCS cooldown.
	UO	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)

Op-Test No.: 2012-301 **Scenario No.:** 7 **Page 3 of 4**

Event No.: 8

Event Description: DBA SGTR actions from 19030-C, E-3 STEAM GENERATOR TUBE RUPTURE after return from 19020-C, E-2 FAULTED STEAM GENERATOR ISOLATION following feed line break.

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): **(N/A)** 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.
	UO	8. Verify SG Blowdown Isolation Valves – CLOSED WITH HANDSWITCHES IN CLOSE POSTION.
	OATC	9. Isolate flow from the ruptured SG(s) by closing its Main Steamline isolation and Bypass Valves.

Op-Test No.: 2012-301 **Scenario No.: 7** **Page 4 of 4**

Event No.: 8

Event Description: DBA SGTR actions from 19030-C, E-3 STEAM GENERATOR TUBE RUPTURE after return from 19020-C, E-2 FAULTED STEAM GENERATOR ISOLATION following feed line break.

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	10. Check ruptured SG(s) level: a. SG NR level – GREATER THAN 10% (32% ADVERSE). **(NO)** b. Stop feed flow to ruptured SG(s). **Note to examiner**: AFW flow should remain isolated to SG # 3 due to the CAUTIONS above.
	UO SS	11. Check ruptured SG(s) pressure – GREATER THAN 290 PSIG. **(NO)** RNO 11. Go to 19131-C, ECA-3.1 SGTR WITH LOSS OF REACTOR COOLANT SUBCOOLED RECOVERY DESIRED.
		END OF EVENT 8, END OF THE SCENARIO.

target ZERO Every day, every job, safety.	**NUCLEAR SAFETY FOCUS** **TARGET ZERO**
Protected Train: ☒ Alpha ☐ Bravo	**EOOS:** ☒ Green ☐ Yellow ☐ Orange ☐ Red
Plant Conditions:	29 % power BOL.
Major Activities:	Initiate power ascent UOP 12004-C section 4.1 for Power Ascent at a rate not to exceed 8% per hour. Step 4.1.40 has been performed. Step 4.1.41 is the next procedure plateau.
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. ☐ MFPT B will be placed in service at 55% power per UOP step 4.1.45. ☐ 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. ☐ Power Range high level trip bistables are set at 90%.

SIMULATOR REACTIVITY BRIEFING SHEET

Shift: **Day** Date: **Today** Burnup: **500** MWD/MTU Core Life: **BOL**

MINIMUM SHIFT REACTIVITY INFORMATION TO BE BRIEFED

Power: **29** Rod Motion: **Rods in automatic.**

Current Temperature Control Strategy: **Dilution**

Currently Making Up: **100** gallons every **as needed**

The desired Tavg operating band is 563.5 ± 0.05°F

CVCS makeup boric acid flow per 100 gallon makeup (FI-110A): **15.1** gallons/100
CVCS makeup pot setting (FIC-110): **3.76**

BTRS Strategy: **None**
AFD Strategy: **Maintain on target ± 1 AFD units**

Reactivity System Components Degraded/OOS:

None

Activities Expected That May Affect Core Reactivity (Reactivity Focus Items):

Power ascension in progress, dilutions with turbine load increases.

CURRENT CORE REACTIVIITY PARAMETERS

Boron worth: **7.6** pcm/ppm PCM per 1% power change: **13.8** pcm/%

Current MTC values HFP: **-13.7** pcm/°F HZP: **-1.8** pcm/°F

Current BAST C_b: **7,000** ppm Current RCS C_b: **1,054** ppm

Boration required per	degree °F:	**19**	gallons
	1% power change:	**19**	gallons
	10% power change:	**188**	gallons
	30% power change:	**563**	gallons
Dilution required per	degree °F:	**105**	gallons
	1% power change:	**106**	gallons

Boration required for stuck rods (154 ppm/rod): **3,263** gallons for 2 stuck rods
4,962 gallons for 3 stuck rods

**If more than 3 rods are stuck, begin emergency boration and calculate gallons for actual number of stuck rods.*

Human Performance Tools

Peer Check	Three-Way Communication	Self-Verification (STAR)
Pre-Job Briefing	Phonetic Alphabet	Timeout
Procedure Use (placekeeping)	One Minute Matters (situational awareness)	

Valid for Cycle 17, PTDB Tab 1.0 revision 28.0 and Tab 16.0 revision 18.0