DRAFT

Facility: Vogtle Scenario No.: 1 Op-Test No.: 2010-301

Examiners: Lea Operators:

NEW

Initial Conditions: 100% power, Blender automatic makeup OOS due to electrical control problems. Manual make up using section 4.6 of 13009-1 will be required. (Malfunction CV01). The SAT is in service supplying Unit 2.

Turnover: Category 5 Hurricane Zeus is approaching plant site with sustained winds that will require plant S/D in the next 10 hours.

Event No.	Malf. No.	Event Type*	Event Description
1	RC-10A @ 100%	I – OATC I-SS TS-SS	Loop 1 RCS NR Cold leg temperature instrument fails high LCOs 3.3.1 (OTΔT, OPΔT trips) , 3.3.2 (FWI)
2	EL02 EL01A 25 sec TD	C-UO C-SS TS-SS	Loss of power to 1AA02, DG-1A trips during UV sequence LCOs 3.8.9, 3.8.1 Remote Functions Used: EL22-1NYR EL-24-1NYRS EL33-1ND1 Battery Charger EL35-1ND3A Battery Charger ***Note SOP 13432-1 will direct UO to reset MFP B which will be locked up. This requires use of remote function FW24/25 to reset the alarm.*** ***Note: Use Remote Function SF02 to swap Spent Fuel Pool Cooling to Train B.***
3	RD07 TU07	I-ALL	Inadvertent turbine runback & rods fail to move in automatic
4	N/A	R-ALL	Crew lowers power 10% for plant S/D per 18013-C. ***Hurricane Zeus has changed track unit must be S/D in 1 hour.***
5	N/A	N-OATC N-SS	RCS Boration

6	FW14 Ramp 75-0% In 120 sec	I-UO I-SS	PT-508 drifts high resulting underfeed of all Steam Generators
7	PR05 @ 100% ES01	M-ALL	PRZR PORV fails open, resulting in RCS LOCA. PORV block valve is de-energized due to loss of power to 1AA02.
8	GE12A	C-UO C-SS	Main generator output breaker fails to automatically open
9	ES22B	C-OATC C-SS	BIT isolation valve (HV-8801B) fails to open on SI
10		ALL	Report received that DG-1A ready to start. Faulty over speed sensor has been replaced. ***NOTES:*** ***Clear Malfunction EL01A*** ***Remote Functions:*** ***DG12 – local control*** ***DG05 – maintenance mode*** ***DG03 – reset all DG trip relays***
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor			

Event 1: RCS Narrow Range Cold Leg Temperature Instrument fails high (18001-C Section B)

Verifiable actions:

OATC – Places rods in manual control, restores Tave to program value, bypasses failed channel from control circuits.

Consequences:

Rods will continuously insert resulting in Tave going below minimum temperature for critical operation or an automatic reactor trip on low PRZR pressure.

Technical specifications:

LCO 3.3.1 OTΔT, OPΔT
LCO 3.3.2 FWI

Event 2: Loss of power to 1E electrical bus, DG-1A trips due to faulty relay (18031-C Section A).

Verifiable actions:

UO – Reduce TDAFW pump speed to keep reactor power less than license limits, place train B equipment in service.

Consequences:

Positive reactivity transient on reactor with corresponding power increase.

Technical specifications:

LCO 3.8.1 – AC Sources – RAT, DG-1A
LCO 3.8.9 – AC Power Distribution

Event 3: Turbine Runback and Rod Control System failure (18012-C)

Verifiable actions:

OATC – Manually drives rods to maintain Tave on program and lower steam dump demand if steam dumps arm

UO – Stabilize turbine load with standby load control circuits, unarm steam dumps if necessary.

Consequences:

Tave not maintained on program value, continuous turbine load reduction.

Technical specifications:

N/A

Event 4: Rapid power reduction due to Hurricane Zeus (18013-C)

Verifiable actions:

OATC - Drive rods in to lower Tave, and keep AFD on target

UO – Lower turbine load on schedule to be in mode 3 in 1 hour.

Consequences:

Unit is not shutdown prior to losing off-site power from high winds from Hurricane.

Technical specifications:

N/A

Event 5: RCS Boration (SOP 13009-1 section 4.8)

Verifiable actions:

OATC – Borate RCS using blender controls

Consequences:

RIL/AFD limits exceeded

Technical specifications:

N/A

Event 6: MFP discharge pressure PT-508 slowly fails high (18016-C Section E)

Verifiable actions:

UO – Take manual control of MFPs speed and MFRVs as necessary to stabilize all SG levels at 65%. Continue manual control of MFPs speed.

Consequences:

Reactor trip on SG Lo-Lo- levels if main feed pump speed not properly maintained.

Technical specifications:

N/A

Event 7: RCS LOCA through PRZR PORV-455, PORV block valve failed open due to loss of power.

Verifiable actions:

OATC – manually control charging to maintain PZR level, isolate letdown, starts a second charging pump Manually trip reactor when PRZR pressure cannot be maintained (Auto reactor trip failure).

Consequences:

Exceed DNBR protective limits if reactor is not manually tripped

Event 8: Main generator output breaker fails to open on turbine trip

Verifiable actions:

UO – Manually open output breaker

Consequences:

Main generator is motorized from grid causing turbine/generator damage. (OE Fermi)

Technical specifications:

N/A

Event 9: BIT Discharge valve fails to open on SI

Verifiable actions:

OATC – manually opens BIT valve

Consequences:

No HHSI flow, exacerbating loss of reactor coolant accident

Technical specifications:

N/A

Event 10: Power restored to bus 1AA02 from DG-1A

Verifiable actions:

UO – Manually starts DG-1A.

Consequences:

RCS LOCA continues if 1AA02 is not re-energized.

CRITICAL STEPS:

1. **Open Main Generator output breaker to prevent damage to main generator.**
2. **Open BIT valves to establish HHSI flow during RCS LOCA**

Op-Test No.: 2010-301 **Scenario No.:** 1 **Page 1 of 4**

Event No.: 1

Event Description: RCS NR Temperature Instrument Fails High (Tcold) on loop # 1. This will require the OATC to perform IOAs to stop inward control rod motion 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-cold fails high) Symptoms / alarms: • RC LOOP DELTA T / AUCT DELTA T HI-LO DEV • RC LOOP TAVG / AUCT TAVG HI-LO DEV • OVERPOWER ΔT ROD BLOCK AND RUNBACK ALERT • OVERTEMP ΔT ROD BLOCK AND RUNBACK ALERT • OT ΔT Runback bistable lit on TSLB board • OP ΔT Runback bistable lit on TSLB board Indications: • Rapid inward control rod motion. • Loop 1 Tavg / Delta T indications deviating from other loops.
	OATC	**18001-C SECTION B IMMEDIATE ACTION** B1. Place ROD BANK SELECTOR SWITCH in MAN position.
	SS	Enters AOP 18001-C, Section B. (Crew Update) Verifies immediate action step B1 with OATC
	OATC	**18001-C Section B Subsequent Actions** B2. Restore TAVG to program band.

Op-Test No.: 2010-301 **Scenario No.:** 1 **Page 2 of 4**

Event No.: 1

Event Description: RCS NR Temperature Instrument Fails High (Tcold) on loop # 1. This will require the OATC to perform IOAs to stop inward control rod motion 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	B3. Select affected loop on TS-412T TAVG DEFEAT SEL ***412***
		B4. Select affected loop on TS-411F DELTA T DEFEAT SEL. ***411***
	OATC	B5. Place ROD BANK SELECTOR SWITCH in AUTO position, if desired. ***NOTE: Crew will probably return rods to 228 steps***
	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.***

Op-Test No.: 2010-301 **Scenario No.:** 1 **Page 3 of 4**

Event No.: 1

Event Description: RCS NR Temperature Instrument Fails High (Tcold) on loop # 1. This will require the OATC to perform IOAs to stop inward control rod motion 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 B1

CAUTIONS

- ALL test switches for the loop with RTD failure should be tripped. Only one loop 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.

Loop 1 RTD Failure (Channel 1)					
SSPS INPUT	CAB	FRAME /CARD	B/S	SWITCH	Initial
Overpower Delta T Trip	1	8/22	1	TS-411G	(____)
Overpower Delta T Runback	1	8/22	2	TS-411H	(____)
Overtemp Delta T Trip	1	8/22	3	TS-411C	(____)
Overtemp Delta T Runback	1	8/22	4	TS-411D	(____)
MASTER TEST SWITCH		8/72		1	(____)
MASTER TEST SWITCH		8/72		2	(____)
MASTER TEST SWITCH		8/72		3	(____)
MASTER TEST SWITCH		8/72		4	(____)
Lo-Lo TAVG Stm Dump Block	1	8/21	1	TS-412D	(____)
Low TAVG FW Isolation	1	8/21	2	TS-412G	(____)
MASTER TEST SWITCH		4/55		1	(____)
MASTER TEST SWITCH		4/55		2	(____)

Op-Test No.: 2010-301 **Scenario No.:** 1 **Page 4 of 4**

Event No.: 1

Event Description: RCS NR Temperature Instrument Fails High (Tcold) on loop # 1. This will require the OATC to perform IOAs to stop inward control rod motion 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
	SS	B9. Initiate the applicable actions of: • TS 3.3.1 ***Function 6*** ***OTΔT Trip*** ***Condition E*** • TS 3.3.1 ***Function 7*** ***OPΔT Trip*** ***Condition E*** • TS 3.3.2 ***Function 5b*** ***FWI*** ***Condition I***
	OATC/UO	B10. Initiate the Continuous Actions Page.
	SS	*B11 **Check repairs and surveillances - COMPLETE.** RNO *B11. **Perform the following:** a. WHEN repairs and surveillances are complete, THEN perform Step B12. b. Return to procedure and step in effect.

Op-Test No.: 2010-301 **Scenario No.:** 1 **Page 1 of 14**

Event No.: 2

Event Description: The RAT supply breaker to 1AA02 will trip due to a fault with the RAT. DG-1A will start, close its output breaker, and begin sequencing UV loads. During the load sequence, the DG will emergency trip on a faulty over speed sensor. 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 < 100%, and shift electrical loads to the B train 1E bus, as well as implementing tech specs for loss of AC power.

Time	Position	Applicant's Action or Behavior
	UO OATC SS	Diagnose loss of power to 1AA02: Alarms: RESV AUX XFMR 1NXRA HI SIDE PHOC LOR TRIP DG1A TRIP OVERSPEED DG1A DISABLED NONRESET OF EMERGENCY TRIP DG1A EMERGENCY START DG1A LOW PRESS STARTING AIR 4160V SWGR 1AA02 TROUBLE Indications: Control room lighting dims due to loss of ½ of the lights 1AA02 white bus potential lights go out DG-1A starts and its output breaker shuts DG-1A trips and its output breaker opens
	SS	Enters AOP 18031-C, "Loss of Class 1E Electrical Systems" (Crew Update)
	OATC	**18031-C** *1. **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%.

Op-Test No.: 2010-301 **Scenario No.:** 1 **Page 2 of 14**

Event No.: 2

Event Description: The RAT supply breaker to 1AA02 will trip due to a fault with the RAT. DG-1A will start, close its output breaker, and begin sequencing UV loads. During the load sequence, the DG will emergency trip on a faulty over speed sensor. 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 < 100%, and shift electrical loads to the B train 1E bus, as well as implementing tech specs for loss of AC power.

Time	Position	Applicant's Action or Behavior
	UO	RNO *1. **Perform the following:** a. Reduce TDAFW pump speed to not less than 1535 rpm. b. Throttle affected MDAFW pump discharge valves. ***NOTE: These valves will not have any power*** 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	2. Check affected train Diesel Generator - RUNNING.
	SS	RNO 2. Go to Section A LOSS OF POWER WITH DG FAILING TO TIE TO BUS
	UO	**18031-C, SECTION A** A1. Verify NSCW pumps on unaffected train (B) - TWO RUNNING.

Op-Test No.: 2010-301 **Scenario No.:** 1 **Page 3 of 14**

Event No.: 2

Event Description: The RAT supply breaker to 1AA02 will trip due to a fault with the RAT. DG-1A will start, close its output breaker, and begin sequencing UV loads. During the load sequence, the DG will emergency trip on a faulty over speed sensor. 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 < 100%, and shift electrical loads to the B train 1E bus, as well as implementing tech specs for loss of AC power.

Time	Position	Applicant's Action or Behavior
	OATC	A2. Verify charging pump - RUNNING: ***NCP.*** -OR- Unaffected train CCP.
	UO	A3. Verify CCW pumps on unaffected train - TWO RUNNING. ***NOTE: Will start 2 train B CCW pumps***
	SS	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.

Event No.: 2

Event Description: The RAT supply breaker to 1AA02 will trip due to a fault with the RAT. DG-1A will start, close its output breaker, and begin sequencing UV loads. During the load sequence, the DG will emergency trip on a faulty over speed sensor. 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 < 100%, and shift electrical loads to the B train 1E bus, as well as implementing tech specs for loss of AC power.

Time	Position	Applicant's Action or Behavior
		RNO a. **Perform the following:**
	UO	1) Reduce TDAFW pump speed to not less than 1535 rpm.
	SS	2) Go to Step A7.
	UO	A7. Verify ACCW pump on unaffected train - RUNNING. ***NOTE: #2 ACCW pump will automatically start on low discharge pressure***
	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***
	UO	A9. Verify CRDM fans on unaffected train - TWO RUNNING. ***Starts CRDM Fan #4***
	UO	A10. Verify reactor cavity cooling unit on unaffected train - ONE RUNNING. ***Starts cooling unit #2***

Event No.: 2

Event Description: The RAT supply breaker to 1AA02 will trip due to a fault with the RAT. DG-1A will start, close its output breaker, and begin sequencing UV loads. During the load sequence, the DG will emergency trip on a faulty over speed sensor. 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 < 100%, and shift electrical loads to the B train 1E bus, as well as implementing 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 ***Will dispatch Auxiliary Building Operator to shift Spent Fuel Pool Cooling to Train B.***
	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. ***Train B***
	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

Event No.: 2

Event Description: The RAT supply breaker to 1AA02 will trip due to a fault with the RAT. DG-1A will start, close its output breaker, and begin sequencing UV loads. During the load sequence, the DG will emergency trip on a faulty over speed sensor. 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 < 100%, and shift electrical loads to the B train 1E bus, as well as implementing 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 C, STANDBY AUXILIARY TRANSFORMER.
	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 ***80 amps*** • DD1B 80 AMPS - expect 0 amps b. Monitor all 1E battery bus voltages - REMAIN GREATER THAN 105V DC.

Event No.: 2

Event Description: The RAT supply breaker to 1AA02 will trip due to a fault with the RAT. DG-1A will start, close its output breaker, and begin sequencing UV loads. During the load sequence, the DG will emergency trip on a faulty over speed sensor. 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 < 100%, and shift electrical loads to the B train 1E bus, as well as implementing tech specs for loss of AC power.

Time	Position	Applicant's Action or Behavior
	UO/OATC	A18. Check Reactor Makeup System: a. Unaffected boric acid transfer pump - RUNNING OR SELECTED TO AUTO. RNO a. Perform the following: • Manually start unaffected boric acid transfer pump, as necessary. -OR- Place unaffected pump handswitch in AUTO. • IF boric acid transfer pump is NOT available AND boration is required, THEN open RWST To Charging Pump Suction Valve: LV-112D -OR- LV-112E

Event No.: 2

Event Description: The RAT supply breaker to 1AA02 will trip due to a fault with the RAT. DG-1A will start, close its output breaker, and begin sequencing UV loads. During the load sequence, the DG will emergency trip on a faulty over speed sensor. 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 < 100%, and shift electrical loads to the B train 1E bus, as well as implementing tech specs for loss of AC power.

Time	Position	Applicant's Action or Behavior
		A18 b. Unaffected reactor makeup water pump - RUNNING OR SELECTED TO AUTO. RNO a. Perform the following: • Manually start unaffected reactor make-up water pump, as necessary. -OR- Place unaffected pump handswitch in AUTO. • IF reactor makeup water pump is NOT available, THEN transfer charging pump suction to RWST if VCT level lowers to less than 20%.
	UO	*A19. **Verify battery charger in service for non-1E batteries:** • ***ND1*** • ND2 • ***ND3A*** • 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***

Event No.: 2

Event Description: The RAT supply breaker to 1AA02 will trip due to a fault with the RAT. DG-1A will start, close its output breaker, and begin sequencing UV loads. During the load sequence, the DG will emergency trip on a faulty over speed sensor. 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 < 100%, and shift electrical loads to the B train 1E bus, as well as implementing tech specs for loss of AC power.

Time	Position	Applicant's Action or Behavior
	UO	A20. Transfer any de-energized NYS, ***NYRS***, and ***NYR*** busses to alternate sources by initiating 13432, 120V AC NON 1E INSTRUMENT DISTRIBUTION SYSTEM ***1NYRS and 1NYR will need to be transferred to alternate power sources*** ***NOTE: Main Feed Pump B speed control will be locked due to the loss of power to the control system relay. The UO sill use ARP 17015-1 Window C05 to restore normal speed control after power is restored.***
	UO	**ARP 17015-1 WINDOW C05** **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

Event No.: 2

Event Description: The RAT supply breaker to 1AA02 will trip due to a fault with the RAT. DG-1A will start, close its output breaker, and begin sequencing UV loads. During the load sequence, the DG will emergency trip on a faulty over speed sensor. 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 < 100%, and shift electrical loads to the B train 1E bus, as well as implementing tech specs for loss of AC power.

		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. 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.

Event No.: 2

Event Description: The RAT supply breaker to 1AA02 will trip due to a fault with the RAT. DG-1A will start, close its output breaker, and begin sequencing UV loads. During the load sequence, the DG will emergency trip on a faulty over speed sensor. 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 < 100%, and shift electrical loads to the B train 1E bus, as well as implementing tech specs for loss of AC power.

Time	Position	Applicant's Action or Behavior
	SS	A21. Check Control Room Emergency Lighting: a. Check bus loss of power expected duration - GREATER THAN 90 MINUTES. b. Transfer emergency lighting to the unaffected unit by placing MAIN CONTROL ROOM LIGHTING LOSP TRANSFER SWITCH on AFFECTED unit to LOSP position: UNIT 1 (CB-149 LOCKED SWITCHES) 1-TRS-9616A or B in UNIT 1 LOSP POSITION
	SS	A22. Initiate applicable Technical Specification requirements listed in

Event No.: 2

Event Description: The RAT supply breaker to 1AA02 will trip due to a fault with the RAT. DG-1A will start, close its output breaker, and begin sequencing UV loads. During the load sequence, the DG will emergency trip on a faulty over speed sensor. 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 < 100%, and shift electrical loads to the B train 1E bus, as well as implementing 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
3.8.9 3.8.10	1-4 5,6	Loss of safety function due to loss of power	**Immediately** enter TS 3.0.3 **Immediately** declare supported systems inop, or stop fuel movement/reactivity addition
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	1 hr: Restore loop or open RTBs

Event No.: 2

Event Description: The RAT supply breaker to 1AA02 will trip due to a fault with the RAT. DG-1A will start, close its output breaker, and begin sequencing UV loads. During the load sequence, the DG will emergency trip on a faulty over speed sensor. 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 < 100%, and shift electrical loads to the B train 1E bus, as well as implementing tech specs for loss of AC power.

		closed		
3.8.4	1-4	Loss of DC source due to other than inop battery	2 hrs:	Restore all 4 DC sources to operable

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		
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.: 2010-301 **Scenario No.:** 1 **Page 14 of 14**

Event No.: 2

Event Description: The RAT supply breaker to 1AA02 will trip due to a fault with the RAT. DG-1A will start, close its output breaker, and begin sequencing UV loads. During the load sequence, the DG will emergency trip on a faulty over speed sensor. 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 < 100%, and shift electrical loads to the B train 1E bus, as well as implementing 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.

Op-Test No.: 2010-301 **Scenario No.:** 1 **Page 1 of 5**

Event No.: 3

Event Description: An inadvertent Turbine runback will occur. The operating crew should check to see if the runback is required and determine per their IOAs that the runback is NOT required. The Unit Operator will then take Standby Control of the main turbine to stabilize load. During the event auto rod motion will not work and the OATC will be required to manually insert rods.

Time	Position	Applicant's Action or Behavior
	UO	Diagnose Main Turbine Runback in progress: Alarms: • TAVE / TREF DEVIATION Indications: • Generator MWe lowering. • Tavg rising.
	UO	**18012-C IMMEDIATE ACTIONS** 1. Check Turbine Runback – REQUIRED. 2 of 4 OT DELTA-T runback bistable status lights lit. - OR - 2 of 4 OP DELTA-T runback bistable status lights lit.
	UO	RNO 1. Perform the following: a. Stabilize Turbine load: 1) Approximately match CV SIGNAL using STANDBY LOAD SET potentiometer. 2) Simultaneously depress ON and BYPASS pushbuttons on STANDBY SIGNAL MATCH. b. Go to Step 16.

Op-Test No.: 2010-301 **Scenario No.:** 1 **Page 2 of 5**

Event No.: 3

Event Description: An inadvertent Turbine runback will occur. The operating crew should check to see if the runback is required and determine per their IOAs that the runback is NOT required. The Unit Operator will then take Standby Control of the main turbine to stabilize load. During the event auto rod motion will not work and the OATC will be required to manually insert rods.

Time	Position	Applicant's Action or Behavior
	SS	Enters AOP 18012-C (Crew Update) and verifies completion of immediate actions
	UO	16. Check Turbine load – STABLE.
	OATC/UO	17. Initiate the Continuous Actions Page.
	UO	*18. **Control Turbine load using the STANDBY LOAD SET potentiometer.**
	OATC	19. Check Tavg - TRENDING TO TREF.
	OATC UO	RNO 19. Match Tavg and Tref by performing the following as necessary: Use rods. ***NOTE: Manual rod control is required due to failure of the rod control system.*** Adjust turbine load. Borate by using 13009, CVCS REACTOR MAKEUP CONTROL SYSTEM.

Op-Test No.: 2010-301 **Scenario No.:** 1 **Page 3 of 5**

Event No.: 3

Event Description: An inadvertent Turbine runback will occur. The operating crew should check to see if the runback is required and determine per their IOAs that the runback is NOT required. The Unit Operator will then take Standby Control of the main turbine to stabilize load. During the event auto rod motion will not work and the OATC will be required to manually insert rods.

Time	Position	Applicant's Action or Behavior
	UO	20. Check Steam Dump System: a. ARMED RNO Go to step 21 b. RESPONDING TO TAVE/TREF DEVIATION.
	OATC	*21. **Control PRZR level - IN PROGRAM BAND.**
	OATC	*22. **Maintain Seal Injection flow to all RCPs - 8 TO 13 GPM.**
	OATC	23. Check PRZR Pressure - TRENDING TO 2235 PSIG.
	UO	24. Check SG NR level - TRENDING TO 65%.
	UO	RNO 24. Take manual control of MFP speed and FRVs to restore SG level, as necessary.

Op-Test No.: 2010-301 Scenario No.: 1 Page 4 of 5

Event No.: 3

Event Description: An inadvertent Turbine runback will occur. The operating crew should check to see if the runback is required and determine per their IOAs that the runback is NOT required. The Unit Operator will then take Standby Control of the main turbine to stabilize load. During the event auto rod motion will not work and the OATC will be required to manually insert rods.

Time	Position	Applicant's Action or Behavior
	UO	*25. **Check Steam Dumps:** a. Check all Steam Dump valves – CLOSED.
	UO	RNO a. WHEN all Steam Dump valves are closed, THEN reset C-7, if present, by momentarily placing STM DUMP CONTROL MODE SELECT HS-500C in RESET.
	UO	b. Reset C-7, if present, by momentarily placing STM DUMP CONTROL MODE SELECT HS-500C in RESET.
	UO	26. Test the Backup and Mechanical Overspeed Trips by initiating 14286, TURBINE TRIP DEVICE OPERABILITY TEST.
	OATC	27. Check reactor power change - LESS THAN 15%. RNO Notify Chemistry to sample RCS activity per TS SR 3.4.16.2.
	UO	28. Check cause of runback – CORRECTED

Op-Test No.: 2010-301 **Scenario No.:** 1 **Page 5 of 5**

Event No.: 3

Event Description: An inadvertent Turbine runback will occur. The operating crew should check to see if the runback is required and determine per their IOAs that the runback is NOT required. The Unit Operator will then take Standby Control of the main turbine to stabilize load. During the event auto rod motion will not work and the OATC will be required to manually insert rods.

Time	Position	Applicant's Action or Behavior
	UO	RNO
		1. Perform the following:
		a. Restore turbine control to normal using 13800, MAIN TURBINE OPERATION when the cause is corrected.
	SS	b. Return to procedure and step in effect.

Op-Test No.: 2010-301 **Scenario No.:** 1 **Page 1 of 6**

Event No.: 4

Event Description: A phone call will be received by the Shift Manager and report that Hurricane Zeus has changed direction and the track will be over Plant Vogtle. The SM will direct a plant shutdown within one hour per AOP-18013-C, Rapid Power Reduction.

Time	Position	Applicant's Action or Behavior
	SS	Initiating condition: SS receives call from Shift Manager reporting change in direction of Hurricane Zeus. SM directs crew to shutdown the plant within 1 hour per AOP-18013-C, Rapid Power Reduction.
	SS	Enters AOP-18013-C, "Rapid Power Reduction" SS sets an appropriate target to have the plant shutdown within 1 hour.
	SS	**18013-C** 1. Perform SHUTDOWN BRIEFING.

Event No.: 4

Event Description: A phone call will be received by the Shift Manager and report that Hurricane Zeus has changed direction and the track will be over Plant Vogtle. The SM will direct a plant shutdown within one hour per AOP-18013-C, Rapid Power Reduction.

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.

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).

Op-Test No.: 2010-301 **Scenario No.:** 1 **Page 3 of 6**

Event No.: 4

Event Description: A phone call will be received by the Shift Manager and report that Hurricane Zeus has changed direction and the track will be over Plant Vogtle. The SM will direct a plant shutdown within one hour per AOP-18013-C, Rapid Power Reduction.

Time	Position	Applicant's Action or Behavior
	OATC	2. Verify rods in AUTO. ***NOTE: Auto rod control NOT available***
	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. Expect OATC to select section 4.8 for frequent borations
	OATC	***Refer to Event 5 for performing the CVCS Boration per 13009-1***
	OATC/UO	5. Initiate the Continuous Actions Page.
	CREW	*6. **Check desired ramp rate - LESS THAN OR EQUAL TO 5%/MIN.**

Op-Test No.: 2010-301 **Scenario No.:** 1 **Page 4 of 6**

Event No.: 4

Event Description: A phone call will be received by the Shift Manager and report that Hurricane Zeus has changed direction and the track will be over Plant Vogtle. The SM will direct a plant shutdown within one hour per AOP-18013-C, Rapid Power Reduction.

Time	Position	Applicant's Action or Behavior
	OATC	*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.
	OATC	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 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.
	OATC	*9. **Maintain PRZR Pressure - AT 2235 PSIG.**

Op-Test No.: 2010-301 **Scenario No.:** 1 **Page 5 of 6**

Event No.: 4

Event Description: A phone call will be received by the Shift Manager and report that Hurricane Zeus has changed direction and the track will be over Plant Vogtle. The SM will direct a plant shutdown within one hour per AOP-18013-C, Rapid Power Reduction.

Time	Position	Applicant's Action or Behavior
	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 IMPLEMENTATION INSTRUCTIONS. 00152-C, 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.
	CREW	NOTE Attempts should be made to keep steam dumps closed if power reduction is required for Condenser problem.

Op-Test No.: 2010-301 **Scenario No.:** 1 **Page 6 of 6**

Event No.: 4

Event Description: A phone call will be received by the Shift Manager and report that Hurricane Zeus has changed direction and the track will be over Plant Vogtle. The SM will direct a plant shutdown within one hour per AOP-18013-C, Rapid Power Reduction.

Time	Position	Applicant's Action or Behavior
	UO	*14. **Check steam dumps – CLOSED.**
	SS	15. Check Turb/Gen to remain online. RNO Go to Step 18.
	OATC	18. Check reactor power level - LESS THAN OR EQUAL TO 20%. RNO Return to Step 3.
		PROCEED TO EVENT 6 AFTER ~ 10% POWER REDUCTION

Op-Test No.: 2010-301 **Scenario No.:** 1 **Page 1 of 3**

Event No.: 5

Event Description: The OATC will use SOP 13009-1, Section 4.8 to borate the RCS as power is reduced to maintain Rods above RIL and AFD on target.

Time	Position	Applicant's Action or Behavior
	OATC	**SOP 13009-1, "CVCS Reactor Makeup Control System" Section 4.8** NOTES • This section can be used during power changes when necessary to frequently borate the RCS for temperature or AFD control. The use of this section shall be authorized by the SS. • Frequent borations 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.
	OATC	4.8.1 **Determine** the amount of boric acid necessary for desired change in boron concentration using PTDB Tab 2.3 and **correct** the obtained value using PTDB Tab 2.1 or use instructions provided by Reactor Engineering. _____ gals Boric Acid
	OATC	4.8.2 **Verify** the Reactor Makeup System is aligned for automatic operation.
	OATC	4.8.3 **Place** VCT MAKEUP CONTROL 1-HS-40001B in STOP.
	OATC	4.8.4 **Place** VCT MAKEUP MODE SELECT 1-HS-40001A in BOR.
	OATC	4.8.5 IF desired, AND with SS concurrence, Boric Acid flow may be adjusted to desired flow using 1-FIC-0110. Initial Pot Setting:_____ New Pot Setting:_____
	OATC	4.8.6 IF desired, AND with SS concurrence, **lower** pot setting on 1-LIC-0185, to limit VCT pressure increase. Initial Pot Setting:_____ New Pot Setting:_____

Op-Test No.: 2010-301 **Scenario No.:** 1 **Page 2 of 3**

Event No.: 5

Event Description: The OATC will use SOP 13009-1, Section 4.8 to borate the RCS as power is reduced to maintain Rods above RIL and AFD on target.

Time	Position	Applicant's Action or Behavior
	OATC	**CAUTION** Digital counters and thumbwheel settings on BORIC ACID TO BLENDER Integrator 1-FQI-0110 read in tenth-gallon increments.
	OATC	4.8.7 **Set** BORIC ACID TO BLENDER integrator 1-FQI-0110 for the desired amount of boric acid. Boric Acid _____ gals
	OATC	4.8.8 **Place** VCT MAKEUP CONTROL 1-HS-40001B in START, and **verify** flow is indicated on 1-FI-0110A.
	OATC	4.8.9 WHEN BORIC ACID TO BLENDER integrator 1-FQI-0110 reaches its setpoint, **verify** boration stops and the following valves close: • 1-FV-0110A, BORIC ACID TO BLENDER • 1-FV-0110B, BLENDER OUTLET TO CHARGING PUMPS SUCT
	OATC	4.8.10 **Operate** the Pressurizer Back-up Heaters as necessary to equalize C_b between the RCS and the Pressurizer.
	OATC	4.8.11 **Monitor** RCS temperature, Control Bank position, or power levels as applicable.
	OATC	4.8.12 **Repeat** Steps 4.8.7 through 4.8.11 to borate as necessary to continue power change and/or compensate for Xenon.

Op-Test No.: 2010-301 **Scenario No.:** 1 **Page 3 of 3**

Event No.: 5

Event Description: The OATC will use SOP 13009-1, Section 4.8 to borate the RCS as power is reduced to maintain Rods above RIL and AFD on target.

Time	Position	Applicant's Action or Behavior
	OATC	4.8.13 WHEN frequent borations are no longer required, **flush** approximately 15 gallons of Reactor Makeup Water through 1-FV-0110B by performing the following: 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-0111 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
	OATC	4.8.14 IF Boric Acid flow controller 1-FIC-0110 was adjusted in Step 4.8.5, **reset** to Initial Pot Setting. Final Pot Setting:_____
	OATC	4.8.15 **Align** RX M/U CONTROL System for automatic makeup per Section 4.1.
	OATC	4.8.16 IF VCT level controller 1-LIC-0185 pot setting was lowered, **restore** to initial setting recorded in Step 4.8.6 and **record** in Unit Control Log.

Op-Test No.: 2010-301 **Scenario No.:** 1 **Page 1 of 3**

Event No.: 6

Event Description: Main Feed Water Header Pressure (PT-508) will slowly fail high resulting in underfeed to all SGs due MFPs speed decreasing. The UO will immediately take manual control of the MFPT speed controls and MFRVs as necessary to stabilize SG levels. The crew will then use AOP 1816-C Section E to take additional corrective actions.

Time	Position	Applicant's Action or Behavior
	UO	Alarms: • STEAM GEN 1, 2, 3, 4 FLOW MISMATCH alarms. • STEAM GEN 1, 2, 3, 4 HI/LO LVL DEVIATION alarms. Indications: • Feed water flows lowering on all Steam Generators. • All Steam Generator levels lowering. • Main Feed Pump speeds decreasing. • Main Feed Pump speed deviation meters lowering.
	UO	**18016-C SECTION E IMMEDIATE ACTIONS** E1 Check steam and feed flows - MATCHED ON ALL SGs. RNO 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 AOP 18016-C Section E (Crew Update) Verifies immediate actions taken
	SS	**18016-C SECTION E SUBSEQUENT ACTIONS** E2. Initiate the Continuous Actions Page.

Op-Test No.: 2010-301 **Scenario No.:** 1 **Page 2 of 3**

Event No.: 6

Event Description: Main Feed Water Header Pressure (PT-508) will slowly fail high resulting in underfeed to all SGs due MFPs speed decreasing. The UO will immediately take manual control of the MFPT speed controls and MFRVs as necessary to stabilize SG levels. The crew will then use AOP 1816-C Section E to take additional corrective actions.

Time	Position	Applicant's Action or Behavior
	UO	*E3. **Maintain SG NR levels - GREATER THAN 40%.**
	UO	E4. Check SIC-509A, B, and C MFPT SPEED CONTROL – OPERATING PROPERLY: • ALB15-C05 MFPT LOSS OF FW SIGNAL – EXTINGUISHED • Controller(s) maintaining stable MFPT speed. • Controller(s) maintaining MFP discharge pressure/SG pressure differential - BETWEEN 100 AND 225 PSI.
		RNO 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 psi.

Op-Test No.: 2010-301 **Scenario No.:** 1 **Page 3 of 3**

Event No.: 6

Event Description: Main Feed Water Header Pressure (PT-508) will slowly fail high resulting in underfeed to all SGs due MFPs speed decreasing. The UO will immediately take manual control of the MFPT speed controls and MFRVs as necessary to stabilize SG levels. The crew will then use AOP 1816-C Section E to take additional corrective actions.

Time	Position	Applicant's Action or Behavior
	UO	E5. Check PT-507 - OPERATING PROPERLY.
	SS	E6. Notify I&C to initiate repairs. ***NOTE: The operating crew should have discovered that PT-508 is failed and requests I & C support to repair.***
	UO	E7 Return feed flow controls to AUTO as necessary.
	SS	*E8 **Check repairs and surveillances - COMPLETE.** RNO E8 Perform the following: a. WHEN repairs and surveillances are complete, THEN perform Step E9. b. Return to procedure and step in effect.

Op-Test No.: 2010-301 Scenario No.: 1 Page 1 of 14

Event No.: 7-10

Event Description: Reactor trip and Safety Injection due to stuck open PORV and de-energized block valve. BIT isolation valve HV-8801A will fail to auto open requiring manual action by the OATC. A main generator output breaker will fail to open requiring a manual action by the UO. Crew will transition to 19010-C due to the stuck open PORV and perform actions of 19010-C. The RCS LOCA will be terminated when 1E bus 1AA02 is re-energized from DG-1A.

Time	Position	Applicant's Action or Behavior
	OATC UO SS	Alarms: • PV-455A OPEN SIGNAL alarm. • PRZR RELIEF TANK HI PRESS alarm. • PRZR PRESS LO PORV BLOCK alarm. • PRZR RELIEF DISCH HI TEMP alarm. • PRZR CONTROL LO PRESS AND HTRS ON alarm. Indications: • PRZR pressure rapidly lowering on all indicators. • PRZR PORV 455A red light LIT. • PRZR PORV 455A failure to close with hand switch in close.
	OATC	**18000-C IMMEDIATE ACTIONS** 1. Verify PRZR Spray Valves - CLOSED.
	OATC	2. Operate PRZR Heaters as necessary.

Event No.: 7-10

Event Description: Reactor trip and Safety Injection due to stuck open PORV and de-energized block valve. BIT isolation valve HV-8801A will fail to auto open requiring manual action by the OATC. A main generator output breaker will fail to open requiring a manual action by the UO. Crew will transition to 19010-C due to the stuck open PORV and perform actions of 19010-C. The RCS LOCA will be terminated when 1E bus 1AA02 is re-energized from DG-1A.

Time	Position	Applicant's Action or Behavior
	OATC	3. Verify PRZR PORVs - CLOSED. 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-455A) IF PRZR pressure continues to lower, THEN go to 18004-C, REACTOR COOLANT SYSTEM LEAKAGE.
	OATC	Manually trips the reactor when PRZR pressure approaches 1960 psig.
	CREW	**19000-C, E-0 IMMEDIATE ACTIONS** 1. Verify Reactor Trip • Rod Bottom Lights lit • Reactor Trip and Bypass Breakers - Open • Neutron Flux Lowering 2. Verify Turbine Trip • All Turbine Stop Valves – Closed 3. Check Power to AC Emergency Buses • 3a, at least 1 4160 1E bus energized • 3b, all AC Emergency buses energized -4160 and 480V 4. Check if SI is Actuated • Any SI annunciator lit • SI BPLP status light lit Go to step 6.

Event No.: 7-10

Event Description: Reactor trip and Safety Injection due to stuck open PORV and de-energized block valve. BIT isolation valve HV-8801A will fail to auto open requiring manual action by the OATC. A main generator output breaker will fail to open requiring a manual action by the UO. Crew will transition to 19010-C due to the stuck open PORV and perform actions of 19010-C. The RCS LOCA will be terminated when 1E bus 1AA02 is re-energized from DG-1A.

Time	Position	Applicant's Action or Behavior
	OATC/UO	6. Initiate Foldout Page ***NOTE: Expect RCP trip criteria (<1375 psig RCS pressure) to be met*** 7. Initiate OATC Initial Actions page and UO Initial Actions Page.
	OATC	**Initial Operator Actions of E-0.** 1 Checks both Trains of ECCS aligning per MLBs. 2 Checks Containment Isolation Phase A – actuated per MLBs 3 Checks ECCS pumps and NCP status. a. CCPs – running b. SI Pumps – running c. RHR pumps – running d. NCP – tripped 4 CCW pumps – only two running per train 5a NSCW pumps – only two running per train 5b NSCW tower return / bypass valves – in auto 6a Containment coolers running in LOW speed per MLBs 6b NSCW cooler isolation valves open per MLBs 7 CVI dampers and valves shut per MLBs 8 Containment pressure remained < 21.5 9 Checks ECCS flows: a. BIT Flow – 0 GPM ***(Notifies SS of no BIT flow, aligns valves using Attachment B)***

Event No.: 7-10

Event Description: Reactor trip and Safety Injection due to stuck open PORV and de-energized block valve. BIT isolation valve HV-8801A will fail to auto open requiring manual action by the OATC. A main generator output breaker will fail to open requiring a manual action by the UO. Crew will transition to 19010-C due to the stuck open PORV and perform actions of 19010-C. The RCS LOCA will be terminated when 1E bus 1AA02 is re-energized from DG-1A.

ATTACHMENT B

VALVE LINEUP FOR CCP COLD LEG INJECTION THROUGH THE BIT

VALVE NUMBER	FUNCTION	POSITION	POSITION INDICATION
1204-U4-207	RWST SUPPLY TO ECCS	OPEN	LOCAL (RWST)
LV-112D	RWST TO CCP A&B SUCTION	OPEN	MLB09
LV-112E	RWST TO CCP A&B SUCTION	OPEN	MLB10
LV-112B	VCT OUTLET ISOLATION	CLOSED	MLB05
HV-8471A	CCP-A SUCTION	OPEN	MLB01
HV-8509B	CCP-A RV TO RWST ISOLATION	OPEN	MLB04
HV-8509A	CCP-B RV TO RWST ISOLATION	OPEN	MLB03
HV-8471B	CCP-B SUCTION	OPEN	MLB02
LV-112C	VCT OUTLET ISOLATION	CLOSED	MLB06
HV-8508A	CCP-A RV TO RWST ISOLATION	ENABLED	MLB09
HV-8508B	CCP-B RV TO RWST ISOLATION	ENABLED	MLB10
HV-8485A	CCP-A DISCHARGE ISOLATION	OPEN	MLB01
HV-8111A	CCP-A MINIFLOW	CLOSED	MLB06
HV-8111B	CCP-B MINIFLOW	CLOSED	MLB06
HV-8485B	CCP-B DISCHARGE ISOLATION	OPEN	MLB02
HV-8438	CCP DISCHARGE HEADER CROSSCONNECT	OPEN	MLB02
HV-8105	CHARGING TO RCS ISOLATION	CLOSED	MLB06
HV-8801A	BIT DISCH ISOLATION	OPEN	MLB05
HV-8116	SAFETY GRADE CHARGING TO REGEN HX	CLOSED	MLB01
HV-8110	CCP-A&B COMMON MINIFLOW	CLOSED	MLB05
HV-8801B	***BIT DISCH ISOLATION***	***OPEN***	***MLB06***
HV-8106	CHARGING TO RCS ISOLATION	CLOSED	MLB05
HV-8924	SI PMP-A SUCTION XCONN TO CCP	OPEN	MLB01

	OATC	b. RCS pressure < 1625 psig (If NOT go to step 10) c. SI pump flow d. RCS pressure < 300 psig e. RHR pump flow 10 Checks ECCS valve alignment proper on MLBs 11 Checks at least one ACCW pump running 12 Adjusts seal injection flow to RCPs 8 to 13 gpm.

Event No.: 7-10

Event Description: Reactor trip and Safety Injection due to stuck open PORV and de-energized block valve. BIT isolation valve HV-8801A will fail to auto open requiring manual action by the OATC. A main generator output breaker will fail to open requiring a manual action by the UO. Crew will transition to 19010-C due to the stuck open PORV and perform actions of 19010-C. The RCS LOCA will be terminated when 1E bus 1AA02 is re-energized from DG-1A.

Time	Position	Applicant's Action or Behavior
	UO	**Initial Operator Actions of E-0** 1. Checks MDAFW pumps running and TDAFW pump, if required. 2. Checks NR SG levels - one > 10%, If not ensures at least 570 GPM flow 3. Checks if SLI is required • Any SL Pressure < 585 psig • CNMT Pressure > 14.5 psig • High rate bistables lit with low pressure SI/SLI blocked • If any above met then verify MSIVs & BSIVs closed 4. Verifies FWI: • MFRV, BFRV, MFIV, BFIVs all shut 5. Verifies SGBD isolated • places hand switches for SGBD isolation valves to close • verifies SGBD sample isolations closed. 6. Verify Diesel Generators running. 7. Throttle AFW flow to control SG levels 10 – 65% NR 8. Verify both MFPs tripped. 9. Check Main Generator Output breakers open. RNO Open Generator Output Breaker on affected Unit: UNIT 1:
	CRITICAL	• ***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.

Event No.: 7-10

Event Description: Reactor trip and Safety Injection due to stuck open PORV and de-energized block valve. BIT isolation valve HV-8801A will fail to auto open requiring manual action by the OATC. A main generator output breaker will fail to open requiring a manual action by the UO. Crew will transition to 19010-C due to the stuck open PORV and perform actions of 19010-C. The RCS LOCA will be terminated when 1E bus 1AA02 is re-energized from DG-1A.

Time	Position	Applicant's Action or Behavior
	CREW	**19000-C** 8. Initiate the continuous actions page.
	OATC	*9. **Check RCS temperature stable at or trending to 557 F:** With RCP(s) running - RCS AVERAGE TEMPERATURE. Without RCP(s) running - RCS WR COLD LEG TEMPERATURES.
	UO	RNO *9. **IF temperature is less than 557 F and lowering, THEN perform the following as necessary:** a. Stop dumping steam. b. Perform the following as appropriate: IF at least one SG NR level greater than 10% [32% ADVERSE], THEN lower total feed flow. - OR - IF all SG NR levels less than 10% [32% ADVERSE], THEN lower total feed flow to NOT less than 570 gpm. c. IF cooldown continues, THEN close MSIVs and BSIVs. d. IF temperature greater than 557 F and rising, THEN dump steam.

Op-Test No.: 2010-301 Scenario No.: 1 Page 7 of 14

Event No.: 7-10

Event Description: Reactor trip and Safety Injection due to stuck open PORV and de-energized block valve. BIT isolation valve HV-8801A will fail to auto open requiring manual action by the OATC. A main generator output breaker will fail to open requiring a manual action by the UO. Crew will transition to 19010-C due to the stuck open PORV and perform actions of 19010-C. The RCS LOCA will be terminated when 1E bus 1AA02 is re-energized from DG-1A.

Time	Position	Applicant's Action or Behavior
	OATC	10. Check PORVs, Block Valves, & Spray Valves: a. PORVs – CLOSED AND IN AUTO RNO a. IF PRZR pressure less than 2315 psig, THEN verify closed affected PRZR PORV(s). IF a PRZR PORV can NOT be closed, THEN close its Block Valve. IF Block Valve can NOT be closed, THEN go to 19010 C, E 1 LOSS OF REACTOR OR SECONDARY COOLANT.
	SS	Enters 19010-C, E-1 Loss of Reactor or Secondary Coolant. (Crew Update)
	OATC/UO OATC	**19010-C** 1. Initiate the following: • Continuous Actions and Foldout Page. • Critical Safety Function Status Trees per 19200-C, F-O CRITICAL SAFETY FUNCTION STATUS TREE.

Event No.: 7-10

Event Description: Reactor trip and Safety Injection due to stuck open PORV and de-energized block valve. BIT isolation valve HV-8801A will fail to auto open requiring manual action by the OATC. A main generator output breaker will fail to open requiring a manual action by the UO. Crew will transition to 19010-C due to the stuck open PORV and perform actions of 19010-C. The RCS LOCA will be terminated when 1E bus 1AA02 is re-energized from DG-1A.

Time	Position	Applicant's Action or Behavior
	SS	2. Initiate 91001-C, EMERGENCY CLASSIFICATION AND IMPLEMENTING INSTRUCTIONS.
	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: • CCP or SI Pump b. RCS pressure - LESS THAN 1375 PSIG. RNO b. Go to Step 5.
	OATC	5. Check ACCW Pumps - AT LEAST ONE RUNNING.
	UO	6. Place Containment Hydrogen Monitors in service by initiating 13130, POST -ACCIDENT HYDROGEN CONTROL. ***NOTE: Expect request for extra operator to perform this action***
	UO	7. Check SGs secondary pressure boundaries: a. Identify faulted SG(s): ANY SG PRESSURE LOWERING IN AN UNCONTROLLED MANNER. OR ANY SG COMPLETELY DEPRESSURIZED. RNO Go to Step 8

Event No.: 7-10

Event Description: Reactor trip and Safety Injection due to stuck open PORV and de-energized block valve. BIT isolation valve HV-8801A will fail to auto open requiring manual action by the OATC. A main generator output breaker will fail to open requiring a manual action by the UO. Crew will transition to 19010-C due to the stuck open PORV and perform actions of 19010-C. The RCS LOCA will be terminated when 1E bus 1AA02 is re-energized from DG-1A.

Time	Position	Applicant's Action or Behavior

	UO	7. b. Faulted SG(s) - ISOLATED:
		• Steamlines
		  • MSIVs
		  • BSIVs
		  • TDAFW supplies
		  • SG ARVs
		• Feedlines
		  • MFIVs
		  • BFIVs
		  • MFRVs
		  • BFRVs
		  • AFW valves
		  • SG blow down valves
		  • SG sample valves

	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. RNO c. Go to step 9.

Event No.: 7-10

Event Description: Reactor trip and Safety Injection due to stuck open PORV and de-energized block valve. BIT isolation valve HV-8801A will fail to auto open requiring manual action by the OATC. A main generator output breaker will fail to open requiring a manual action by the UO. Crew will transition to 19010-C due to the stuck open PORV and perform actions of 19010-C. The RCS LOCA will be terminated when 1E bus 1AA02 is re-energized from DG-1A.

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: • 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. RNO c. Go to Step 10.

Event No.: 7-10

Event Description: Reactor trip and Safety Injection due to stuck open PORV and de-energized block valve. BIT isolation valve HV-8801A will fail to auto open requiring manual action by the OATC. A main generator output breaker will fail to open requiring a manual action by the UO. Crew will transition to 19010-C due to the stuck open PORV and perform actions of 19010-C. The RCS LOCA will be terminated when 1E bus 1AA02 is re-energized from DG-1A.

Time	Position	Applicant's Action or Behavior
	OATC	*10. **Check PRZR PORVs and Block Valves:** a. Power to PRZR PORV Block Valves - AVAILABLE. RNO a. Restore power to Block Valves. b. PRZR PORVs - CLOSED. RNO b. IF PRZR pressure less than 2315 psig, THEN verify closed affected PRZR PORV(s). IF any PRZR PORV can NOT be closed, THEN close its Block Valve. c. PRZR PORV Block Valves - AT LEAST ONE OPEN. d. Any RCS WR CL temperature - LESS THAN 220°F. RNO d. WHEN any RCS CL temperature lowers to less than 220°F, THEN arm COPS. Go to step 11.
	OATC	*11. **Check if ECCS flow should be reduced:** a. RCS Subcooling - GREATER THAN 24°F [38°F ADVERSE]. RNO a. Go to step 12.

Event No.: 7-10

Event Description: Reactor trip and Safety Injection due to stuck open PORV and de-energized block valve. BIT isolation valve HV-8801A will fail to auto open requiring manual action by the OATC. A main generator output breaker will fail to open requiring a manual action by the UO. Crew will transition to 19010-C due to the stuck open PORV and perform actions of 19010-C. The RCS LOCA will be terminated when 1E bus 1AA02 is re-energized from DG-1A.

Time	Position	Applicant's Action or Behavior
	OATC	*12. **Check if Containment Spray should be stopped:** a. CS Pumps - RUNNING. RNO Go to Step 13 b. Containment pressure - LESS THAN 15 PSIG. c. Any Containment radiation levels - INDICATE HIGH DUE TO PRIMARY LOCA: RE-002 RE-003 RE-005 RE-006 d. Operate CS pumps. • Minimum of 2 hours. • At least 1.5 hours in recirculation mode. RNO d. WHEN CS Pumps have operated for at least 2 hours AND in the recirculation mode for at least 1.5 hours, THEN perform Step 12.c RNO.
	OATC UO	**CAUTION** 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).

Event No.: 7-10

Event Description: Reactor trip and Safety Injection due to stuck open PORV and de-energized block valve. BIT isolation valve HV-8801A will fail to auto open requiring manual action by the OATC. A main generator output breaker will fail to open requiring a manual action by the UO. Crew will transition to 19010-C due to the stuck open PORV and perform actions of 19010-C. The RCS LOCA will be terminated when 1E bus 1AA02 is re-energized from DG-1A.

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. b. RCS pressure: 1) Greater than 300 psig. 2) Stable or rising. c. Reset SI. d. Stop RHR Pumps.
	OATC	*14. **IF RCS pressure lowers in an uncontrolled manner to less than 300 psig, THEN restart RHR Pumps.**
	OATC	15. Check RCS and SG pressures: • Pressure in all SGs STABLE OR RISING. • RCS pressure STABLE OR LOWERING.

Op-Test No.: 2010-301 Scenario No.: 1

Event No.: 7-10

Event Description: Reactor trip and Safety Injection due to stuck open PORV and de-energized block valve. BIT isolation valve HV-8801A will fail to auto open requiring manual action by the OATC. A main generator output breaker will fail to open requiring a manual action by the UO. Crew will transition to 19010-C due to the stuck open PORV and perform actions of 19010-C. The RCS LOCA will be terminated when 1E bus 1AA02 is re-energized from DG-1A.

Time	Position	Applicant's Action or Behavior
	UO	16. Check if DGs should be stopped: a. AC Emergency Busses ENERGIZED BY OFFSITE POWER. RNO a. Try to restore offsite power to AC Emergency Busses by initiating 13427A/B, 4160V AC AA02/BA03 ELECTRICAL DISTRIBUTION SYSTEM. ***NOTE: Crew will receive report that faulty over speed sensor on DG-1A has been replaced and that the DG is ready to be started.***
	SS	***Directs DG-1A be started*** ***NOTE: When DG-1A is started, PORV block valve HV-8000A will re-energize and close due to the low RCS pressure. This will stop the LOCA.***
		END OF THE SCENARIO.

DRAFT

Facility: Vogtle Scenario No.: 2 Op-Test No.: 2010-301

Examiners: Lea Operators:

NEW

Initial Conditions: 100% power, Blender is OOS due to electrical control problems. Manual make up using section 4.6 of 13009-1 will be required when VCT < 30%.

Turnover: Both EDG's have been declared INOP due to water in both FOSTs. Efforts to remove the water have failed. LCOs 3.8.3 Condition G, and 3.8.1 Conditions F & H are applicable. 3.8.1 condition H was entered 3 hours ago. Be in mode 3 in 3 hours to comply with Technical Specifications.

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	R-ALL	Lower power 10% for unit shutdown
2	CV07	C-OATC C-SS TS-SS	NCP trip TR 13.1.5 (Charging pumps) INFO ONLY
3	N/A	N-OATC N-SS	Restore CVCS Charging and Letdown
4	SG02F @ 100%	I-UO I-SS TS-SS	Loop 2 SG controlling NR level channel fails high LCO 3.3.1 (lo-lo level trip) LCO 3.3.2 (P-14)
5	PR02A @ 100% PR05 @ 20%	I-OATC I-SS TS-SS	PRZR Pressure channel fails high & PORV valve sticks partially open LCOs 3.3.1 (lo pressure, hi pressure, OTΔT) & 3.3.2 (lo pressure SI), P-11 (1 hour action), LCO 3.4.11 PRZR PORV ***NOTE: Use Remote Function PR03 to de-energize PORV Block Valve HV-8000A when Control Building Operator is directed to take this action.***
6	TU12 OR: HS-6539 PTL ALB20C05 OFF	C-UO C-SS	Turbine EHC pump 1 trips with failure of pump 2 to auto start

7	MS06A-D @ 50% TU01 TU12 ES01 OR HS-40007 to neutral	M-ALL	All SGs faulted due to code safeties lifting following turbine spurious trip. SG code safeties reseat after crew completes step 13 of 19121-C.Failure of Automatic Reactor Trip. Failure of first trip Rx Trip handswitch.
8	ES08 ES16	I-OATC I-SS	Automatic SI failure
9	AF05B	C-UO C-SS	MDAFW pump B fails to automatically start on the SI
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor			

Event 1: Power reduction for Tech Spec Required Shut Down (12004-C)

Verifiable actions:

OATC - Drive rods to lower Tave, and keep AFD on target, borate RCS

UO – Lower turbine load on schedule to be in mode 3 in 3 hours.

Consequences:

Unit is not shutdown prior Technical Specification action time limit.

Technical specifications:

N/A

Event 2: NCP trip with 120 GPM letdown in service (18007-C Section B)

Verifiable actions:

OATC – isolate letdown

Consequences:

Flashing will occur in the letdown line with possible mechanical damage to piping and restraints. Longer term consequences include gradual loss of RCS inventory out of the RCP seals.

Technical specifications:

TR 13.1.5 charging pumps – INFO ONLY

Event 3: Restore CVCS Charging and Letdown (SOP 13006-1 Sections 4.4.2, 4.4.13 and 4.2.4)

Verifiable actions:

OATC – Restores normal charging (using CCP-1A or B) & letdown to service

Consequences:

Flashing in the letdown line if charging flow not controlled properly.

Technical specifications:

N/A

Event 4: Controlling SG loop 2 NR level channel fails high (18001-C Section E)

Verifiable actions:

UO – Place loop 2 MFRV in manual & match feed flow to steam flow. Unselect failed channel from control circuits, place MFRV back in automatic control

Consequences:

Reactor trip on Lo-Lo SG NR level due to incorrect operation of MFRV.

Technical specifications:

LCO 3.3.1 reactor trip on lo-lo SG level
LCO 3.3.2 P-14 on hi-hi SG level

Event 5: Controlling PRZR pressure channel fails high & PORV sticks open (18000-C & 18001-C Section C)

Verifiable actions:

OATC – immediately close both PRZR spray valves, the affected PORV, and energize PRZR backup heaters. Select an operable pressure channel and restore the pressure control system to automatic operation. Close associated block valve for affected PORV.

Consequences:

Reactor trip and SI on low PRZR pressure if the correct immediate actions not taken promptly

Technical specifications:

LCO 3.3.1 (lo pressure, hi pressure, OTΔT)
LCO 3.3.2 (lo pressure SI and P-11)
LCO 3.4.11 PRZR PORV condition B

Event 6: Turbine EHC pump 1 trips with failure of pump 2 to auto start (17020-1 Window C06)

Verifiable actions:

UO – manually start standby EHC pump to prevent trip of the main turbine on low EHC pressure.

Consequences:

Main Turbine trip due to low EHC pressure at 1100 psig.

Technical specifications:

N/A

Event 7: Turbine trip/ATWT results in lifting SG code safeties on all 4 loops.

Verifiable actions:

OATC – Manually trip reactor due to failure of automatic reactor trip on turbine trip > P-9 power level

UO – Throttle AFW flow to < 30 gpm/SG to limit cooldown and prevent SG dryout

Consequences:

OATC – reactor continues to operate at power while exceeding a trip setpoint

UO – excessive RCS cooldown due to continued feeding of faulted SGs

Event 8: Automatic SI actuation failure

Verifiable actions:

OATC – Manually actuates SI

Consequences:

PRZR level goes off scale low and RCS depressurizes to saturation conditions if ECCS flow is not initiated.

Event 9: MDAFW Pump B fails to automatically start on the SI signal

Verifiable actions:

UO – controls flow from the TDAFW pump to all four SGs. Isolates steam to the TDAFWP in 19121-C, and uses MDAFWP's to feed SGs.

Consequences:

Continues to use TDAFW pump to feed SGs when a MDAFW pump is available causing additional steam removal from SGs 1 & 2.

CRITICAL STEPS:

1. **Transitions to 19121-C when no intact SG identified.**
2. **Throttles AFW flow to prevent PTS and SG dry out during 19121-C use.**

Op-Test No.: 2010-301 **Scenario No.:** 2 **Page 1 of 2**

Event No.: 1

Event Description: The crew will start with step 4.2.3 of UOP 12004-C, "Power Operations" to begin a shutdown of the unit. After the crew completes a significant power change then event 2 will occur.

Time	Position	Applicant's Action or Behavior
	OATC	**UOP 12004-C** 4.2.3 **Control** Tavg within 2°F of Tref during the power reduction by performing the following. a. **Place** the Rod Control System in MANUAL. b. WHILE reducing turbine load, **adjust** control rods/boron as necessary to **maintain** AFD within limits per the AFD control strategy and guidelines of Section 4.3.2. c. IF it is intended to continue power operation at a reduced power plateau, THEN AFD should be **trended** and **maintained** at or near the AFD target value.
	SS	NOTE Aux. Steam should not be placed in service from the other unit if that unit's power is below 25%.
	UO	4.2.4 IF the auxiliary steam will be required following unit shutdown, initiate the following: a. **Pressurize** the Auxiliary Steam Header from the opposite unit per 13761, "Auxiliary Steam System." b. **Start** the second Steam Jet Air Ejector on auxiliary steam per 13620, "Condenser Air Ejection System." c. **Transfer** Turbine Steam Seal supply to the Auxiliary Steam Supply per 13825, "Turbine Steam Seal System.
	SS	4.2.5 **Notify** System Operator of upcoming power decrease.

Op-Test No.: 2010-301 **Scenario No.:** 2 **Page 2 of 2**

Event No.: 1

Event Description: The crew will start with step 4.2.3 of UOP 12004-C, "Power Operations" to begin a shutdown of the unit. After the crew completes a significant power change then event 2 will occur.

Time	Position	Applicant's Action or Behavior
	UO	4.2.6 **Reduce** turbine load as desired per 13800, "Main Turbine Operation." a. Each time reactor power change exceeds 15% in a one hour period, **notify** Chemistry to **perform** the following samples: (1) RCS iodine sample per TS SR 3.4.16.2. (Required between 2 and 6 hours after reactor power changes greater than or equal to 15% in a one hour period) (2) Gaseous release path samples per ODCM Table 3-3. (3) **Record** the time of the change and the person contacted in the Control Room Log. b. **Maintain** Tavg within 2°F of Tref.
		PROCEED TO EVENT 2 AFTER POWER LOWERED ~ 10%

Op-Test No.: 2010-301 **Scenario No.:** 2 **Page 1 of 7**

Event No.: 2

Event Description: The NCP will trip resulting in a loss of charging flow, RCP seal injection flow, and cooling for the CVCS letdown regenerative heat exchanger. The OATC should immediately isolate CVCS letdown to prevent damage due to flashing. The crew will then take corrective actions using AOP 18007-C, "Chemical and Volume Control System Malfunction", Section B for a total loss of charging flow.

Time	Position	Applicant's Action or Behavior
	OATC	Diagnose NCP trip: Indications: NCP breaker trips: Red – OFF Green – ON Amber – ON Charging line flow (FI-121) drops to 0 GPM RCP seal injection flows drop to 0 GPM Alarms: CHARGING PUMP OVERLOAD TRIP CHARGING LINE HI/LO FLOW RCP SEAL WATER INJ LO FLOW REGEN HX LTDN HI TEMP 4160V SWGR 1NA05 TROUBLE
	OATC	**18007-C IMMEDIATE ACTIONS** B1. Isolate letdown: a. Close letdown orifice isolation valves: • HV 8149A • HV 8149B • HV 8149C b. Close letdown isolation valves: • LV 459 • LV 460
	SS	Enters 18007-C, Section B (Crew update) Verifies immediate action B1 with OATC

Op-Test No.: 2010-301 **Scenario No.:** 2 **Page 2 of 7**

Event No.: 2

Event Description: The NCP will trip resulting in a loss of charging flow, RCP seal injection flow, and cooling for the CVCS letdown regenerative heat exchanger. The OATC should immediately isolate CVCS letdown to prevent damage due to flashing. The crew will then take corrective actions using AOP 18007-C, "Chemical and Volume Control System Malfunction", Section B for a total loss of charging flow.

Time	Position	Applicant's Action or Behavior
	OATC/UO	B2. Initiate the Continuous Actions Page.
	OATC	*B3 **Trend RCP Seal Parameters listed in ATTACHMENT A.**

Event No.: 2

Event Description: The NCP will trip resulting in a loss of charging flow, RCP seal injection flow, and cooling for the CVCS letdown regenerative heat exchanger. The OATC should immediately isolate CVCS letdown to prevent damage due to flashing. The crew will then take corrective actions using AOP 18007-C, "Chemical and Volume Control System Malfunction", Section B for a total loss of charging flow.

ATTACHMENT A
RCP SEAL PARAMETER INDICATION

NOTE

The following points are accessible under IPC Group 62.

PARAMETER	IPC POINT
RCP Seal Injection Flow:	
RCP 1	F0131
RCP 2	F0129
RCP 3	F0127
RCP 4	F0125
RCP Seal Injection Temperature: (Measured at VCT Outlet)	T0140
Number 1 Seal Leakoff High Flow:	
RCP 1	F0161
RCP 2	F0160
RCP 3	F0159
RCP 4	F0158
Number 1 Seal Inlet Temperature:	
RCP 1	T0181 T0417
RCP 2	T0182 T0437
RCP 3	T0183 T0457
RCP 4	T0184 T0477

Op-Test No.: 2010-301 **Scenario No.:** 2 **Page 4 of 7**

Event No.: 2

Event Description: The NCP will trip resulting in a loss of charging flow, RCP seal injection flow, and cooling for the CVCS letdown regenerative heat exchanger. The OATC should immediately isolate CVCS letdown to prevent damage due to flashing. The crew will then take corrective actions using AOP 18007-C, "Chemical and Volume Control System Malfunction", Section B for a total loss of charging flow.

Time	Position	Applicant's Action or Behavior
	OATC	B4. Check charging pump(s) - OPERATING NORMALLY: • Discharge flow trend – STABLE. • Discharge pressure trend – STABLE. • VCT level - IN NORMAL BAND. • Bus current – STABLE. • Suction pressure - STABLE
	OATC	***NOT expected for the crew to perform this RNO*** RNO B4. Perform the following: a. Stop charging pumps. b. Determine and correct cause of charging pump abnormal operations. c. IF loss of suction to charging pumps has occurred, THEN do NOT start charging pumps until the cause of the loss of suction is understood and all affected piping and components are vented. d. IF gas binding of charging pumps occurred, THEN do NOT start charging pumps until the cause of the gas binding is understood and all affected piping and components are vented.
	OATC	B5. Locate and isolate any charging system leakage.

Op-Test No.: 2010-301 **Scenario No.:** 2 **Page 5 of 7**

Event No.: 2

Event Description: The NCP will trip resulting in a loss of charging flow, RCP seal injection flow, and cooling for the CVCS letdown regenerative heat exchanger. The OATC should immediately isolate CVCS letdown to prevent damage due to flashing. The crew will then take corrective actions using AOP 18007-C, "Chemical and Volume Control System Malfunction", Section B for a total loss of charging flow.

Time	Position	Applicant's Action or Behavior
	OATC	B6. Check ACCW system - IN SERVICE.
	OATC	B7. Check normal charging valves - OPEN: • HV 8105 • HV 8106 • HV 8146 or HV 8147 • HV 8485A and B • FV 121
	OATC	*B8. **Check normal charging flow – ESTABLISHED.**
	OATC	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. b) Go to Step B10.

Op-Test No.: 2010-301 Scenario No.: 2 Page 6 of 7

Event No.: 2

Event Description: The NCP will trip resulting in a loss of charging flow, RCP seal injection flow, and cooling for the CVCS letdown regenerative heat exchanger. The OATC should immediately isolate CVCS letdown to prevent damage due to flashing. The crew will then take corrective actions using AOP 18007-C, "Chemical and Volume Control System Malfunction", Section B for a total loss of charging flow.

Time	Position	Applicant's Action or Behavior
	OATC	***Refer to Event 3 for placing normal CVCS charging and letdown in service per SOP 13006-1.***
	OATC	**AOP 18007-C Section B** B10. Establish Seal Injection flow to all RCPs - 8 TO 13 GPM.
	OATC	B11. Check RCP seal injection flow – ESTABLISHED.
	SS	NOTE Operation of the excess letdown flowpath will bypass the CVCS demineralizers. This may impact RCS chemistry control.
	OATC	*B12. **Control PRZR level - IN PROGRAM BAND.**
	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 ONLY

Op-Test No.: 2010-301 **Scenario No.:** 2 **Page 7 of 7**

Event No.: 2

Event Description: The NCP will trip resulting in a loss of charging flow, RCP seal injection flow, and cooling for the CVCS letdown regenerative heat exchanger. The OATC should immediately isolate CVCS letdown to prevent damage due to flashing. The crew will then take corrective actions using AOP 18007-C, "Chemical and Volume Control System Malfunction", Section B for a total loss of charging flow.

Time	Position	Applicant's Action or Behavior
	OATC	B14. Check normal charging flow – ESTABLISHED.
	SS	B15. Return to procedure and step in effect.

Op-Test No.: 2010-301 **Scenario No.:** 2 **Page 1 of 14**

Event No.: 3

Event Description: The OATC will use SOP 13006-1 to restore CVCS charging and letdown to service. After charging and letdown are restored the crew may opt to raise letdown flow to 120 GPM. Section 4.2.4 of SOP 13006-1 will be used to complete this task.

Time	Position	Applicant's Action or Behavior
	OATC	***Selects section 4.4.2 of procedure 13006-1.***
	OATC	**13006-C Section 4.4.2** 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.
	OATC	**13006-C Section 4.4.13** **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.
	OATC	**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.

Op-Test No.: 2010-301 **Scenario No.:** 2 **Page 2 of 14**

Event No.: 3

Event Description: The OATC will use SOP 13006-1 to restore CVCS charging and letdown to service. After charging and letdown are restored the crew may opt to raise letdown flow to 120 GPM. Section 4.2.4 of SOP 13006-1 will be used to complete this task.

Time	Position	Applicant's Action or Behavior
	OATC	4.4.13.2 **Dispatch** an Operator to perform pump pre-start checks. ***NOTE: Expect system operators dispatched to check on NCP and NCP breaker for cause of trip.***
	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	NOTE CCP-1A is only capable of flows up to 102 gpm at NOPT. It may not be used with 120 gpm letdown. At higher than normal RCS pressure, the flow will be reduced even more.

Op-Test No.: 2010-301 **Scenario No.:** 2 **Page 3 of 14**

Event No.: 3

Event Description: The OATC will use SOP 13006-1 to restore CVCS charging and letdown to service. After charging and letdown are restored the crew may opt to raise letdown flow to 120 GPM. Section 4.2.4 of SOP 13006-1 will be used to complete this task.

Time	Position	Applicant's Action or Behavior
	OATC	4.4.13.6 IF starting a CCP perform the following: IF starting CCP-A: a. **Open** CCP-A SUCTION 1-HV-8471A. b. **Open** CCP-A MINIFLOW 1-HV-8111A. c. **Verify** OPEN CCP-A & B COMMON MINIFLOW 1-HV-8110. d. **Close** CCP-A SAFETY GRADE CHG 1-HV-0190A. e. **Open** CCP-A DISCHARGE ISOLATION 1-HV-8485A. IF starting CCP-B: ***(Expect this option)*** 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.
	OATC	NOTE The desired position of NCP MINIFLOW 1-HV-8109 prior to a pump start is closed. The NCP Miniflow valve will open after a pump start and will remain open until the pump is shut down.

Op-Test No.: 2010-301 **Scenario No.:** 2 **Page 4 of 14**

Event No.: 3

Event Description: The OATC will use SOP 13006-1 to restore CVCS charging and letdown to service. After charging and letdown are restored the crew may opt to raise letdown flow to 120 GPM. Section 4.2.4 of SOP 13006-1 will be used to complete this task.

Time	Position	Applicant's Action or Behavior	
	OATC	4.4.13.7	IF starting the NCP, **verify** ACCW flow through the NCP Motor Cooler is established.
	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.
	OATC	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.	
	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 1-HV-8147
	OATC	4.4.13.11	**Verify** OPEN CHARGING TO RCS ISOLATION Valves: • 1-HV-8105 • 1-HV-8106

Event No.: 3

Event Description: The OATC will use SOP 13006-1 to restore CVCS charging and letdown to service. After charging and letdown are restored the crew may opt to raise letdown flow to 120 GPM. Section 4.2.4 of SOP 13006-1 will be used to complete this task.

Time	Position	Applicant's Action or Behavior	
	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 OR NCP 1HS-275
	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.
	OATC	4.4.13.15	IF the NCP was started, **verify** NCP MINIFLOW 1-HV-8109 opens.
	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.

Event No.: 3

Event Description: The OATC will use SOP 13006-1 to restore CVCS charging and letdown to service. After charging and letdown are restored the crew may opt to raise letdown flow to 120 GPM. Section 4.2.4 of SOP 13006-1 will be used to complete this task.

Time	Position	Applicant's Action or Behavior
	OATC	**13006-C Section 4.4.2** NOTES • This section also applies to returning normal charging and letdown to service following termination of safety injection. • Letdown is to be established as soon as possible after initiating flow through a Charging Nozzle.
	OATC	4.4.2.2 IF NCP is in service, **verify** NCP MINIFLOW 1-HV-8109 is open.
	OATC	4.4.2.3 Perform the following: a. **Close** LETDOWN ORIFICE Isolation Valves: • 1-HV-8149A • 1-HV-8149B • 1-HV-8149C
	OATC	b. **Close** LETDOWN ISOLATION VLV UPSTREAM AND DOWNSTREAM Valves: • 1-LV-460 • 1-LV-459
	OATC	c. **Close** PZR AUX SPRAY VALVE 1-HV-8145.
	OATC	d. **Open** CVCS LETDOWN PIPE BREAK PROT ISOLATION 1-HV-15214.

Event No.: 3

Event Description: The OATC will use SOP 13006-1 to restore CVCS charging and letdown to service. After charging and letdown are restored the crew may opt to raise letdown flow to 120 GPM. Section 4.2.4 of SOP 13006-1 will be used to complete this task.

Time	Position	Applicant's Action or Behavior
	OATC	e. **Open** RCS LETDOWN LINE ISO VLV IRC 1-HV-8160.
	OATC	f. **Open** RCS LETDOWN LINE ISO VLV ORC 1-HV-8152.
	OATC	g. **Place** Letdown Pressure Controller 1PIC-131 in MAN and **adjust** output to between 50% and 75%.
	OATC	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.
	OATC	i. **Verify** PRESSURIZER LEVEL 1LR-459 greater than 17%.
	OATC	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.
	OATC	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)

Event No.: 3

Event Description: The OATC will use SOP 13006-1 to restore CVCS charging and letdown to service. After charging and letdown are restored the crew may opt to raise letdown flow to 120 GPM. Section 4.2.4 of SOP 13006-1 will be used to complete this task.

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
	OATC	**CAUTION** Unless otherwise directed by Operations Management, until the letdown flow orifices are replaced the even/odd fuel cycle rotation of 75 gpm orifices does not apply and only the 75 gpm orifice associated with 1HV-8149C should be placed in service.

Event No.: 3

Event Description: The OATC will use SOP 13006-1 to restore CVCS charging and letdown to service. After charging and letdown are restored the crew may opt to raise letdown flow to 120 GPM. Section 4.2.4 of SOP 13006-1 will be used to complete this task.

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.
	OATC	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 and 380 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.

Op-Test No.: 2010-301 **Scenario No.:** 2 **Page 10 of 14**

Event No.: 3

Event Description: The OATC will use SOP 13006-1 to restore CVCS charging and letdown to service. After charging and letdown are restored the crew may opt to raise letdown flow to 120 GPM. Section 4.2.4 of SOP 13006-1 will be used to complete this task.

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.
	OATC		b. AFTER level has been stable within 1% of setpoint for approximately 3 minutes, **place** 1FIC-121 in AUTO.
	OATC	4.4.2.14	IF this section was performed to restore normal charging and letdown to service following termination of Safety Injection, **Return To** 19011-C, "ES-1.1 SI Termination".

Event No.: 3

Event Description: The OATC will use SOP 13006-1 to restore CVCS charging and letdown to service. After charging and letdown are restored the crew may opt to raise letdown flow to 120 GPM. Section 4.2.4 of SOP 13006-1 will be used to complete this task.

Time	Position	Applicant's Action or Behavior
	OATC	***NOTE: If the crew opts to raise letdown flow to 120 GPM then these additional steps will apply.*** **13006-1 Section 4.2.4** NOTE Table 1 may be reviewed for specific charging flow and letdown orifice combinations and conditions.

TABLE 1

Desired Letdown Flow	Initial Charging Flow	Required Charging Flow for Transfer: GPM	Manual 1TI-127 Temperature ° 1PIC-131 Pressure PSIG	Initial Orifice In service	Final Orifice(s) In service	Final Charging Flow	Final 1TI-127 Temperature ° 1PIC-131 Pressure PSIG
Swap 45 to 75 gpm	~58 gpm	~90 - 100	<290° 100 to 120	8149A	8149B or 8149C	~87 gpm	~290° AUTO ~370 AUTO
Raise 75 to 120	~87 gpm	~120 - 130	<290° 100 to 120	8149B or 8149C	(8149B or 8149C) and 8149A	~132 gpm	~290° AUTO ~370 AUTO
Swap 75 to 75	~87 gpm	~90 - 100	<290° 100 to 120	8149B or 8149C	8149C or 8149B	~87 gpm	~290° AUTO ~370 AUTO

Time	Position	Applicant's Action or Behavior
	OATC	**CAUTIONS** • CCP-1B or the NCP must be used for 120 gpm letdown. CCP-1A is only capable of flows up to 102 gpm at NOPT. It may not be used with 120 gpm letdown. At higher than normal RCS pressure, the flow will be reduced even more. • Letdown temperature and pressure should be continuously monitored during the transfer. The Operator should manually intervene to control these limits during the transfer.

Op-Test No.: 2010-301 **Scenario No.:** 2 **Page 12 of 14**

Event No.: 3

Event Description: The OATC will use SOP 13006-1 to restore CVCS charging and letdown to service. After charging and letdown are restored the crew may opt to raise letdown flow to 120 GPM. Section 4.2.4 of SOP 13006-1 will be used to complete this task.

Time	Position	Applicant's Action or Behavior
	OATC	4.2.4.1 IF CCP-A is in service, **swap** to the NCP or CCP-B per Section 4.2.1 or 4.2.3 as applicable.
	OATC	4.2.4.2 **Maintain** Seal Injection flows between 8 and 13 gpm per RCP.
	OATC	4.2.4.3 IF the NCP is in service, perform the following: a. Dispatch an operator to **obtain** NCP miniflow value as indicated on 1FI-10132 NCP MINIFLOW FLOW INDICATOR b. **Place** Charging Flow Control 1FIC-121 in MAN AND **adjust** charging until the sum of NCP miniflow AND normal charging flow is greater than 120 gpm. NOTE Reducing seal injection flow before closing miniflow will help keep seal flow from exceeding maximum limit when 1-HV-8109 goes closed. c. **Adjust** SEAL FLOW CONTROL 1HC-182 as necessary to maintain Seal Injection flows approximately 8 gpm. d. **Close** NCP MINIFLOW 1-HV-8109.
	OATC	4.2.4.4 WITH Charging Flow Control 1FIC-121 in MAN, simultaneously perform the following: • **Adjust** 1FIC-121 until charging flow is approximately 120 to 130 gpm. • **Adjust** SEAL FLOW CONTROL 1HC-182 as necessary to maintain Seal Injection flows between 8 and 13 gpm.
	OATC	4.2.4.5 **Verify** Regenerative Heat Exchanger Outlet 1TI-127 temperature remains less than 290°F.

Event No.: 3

Event Description: The OATC will use SOP 13006-1 to restore CVCS charging and letdown to service. After charging and letdown are restored the crew may opt to raise letdown flow to 120 GPM. Section 4.2.4 of SOP 13006-1 will be used to complete this task.

Time	Position	Applicant's Action or Behavior
	OATC	4.2.4.6 **Place** Letdown Pressure Controller 1PIC-131 pressure controller in MAN AND **adjust** LETDOWN PRESS 1PI-131A pressure to between 100 and 120 psig.
	OATC	ALB07-F03 LTDN HX OUT HI FLOW
	OATC	**CAUTION** Until the letdown flow orifices are replaced the even/odd fuel cycle rotation of 75 gpm orifices does not apply and only the 75 gpm orifice associated with 1HV-8149C should be placed in service, as required by Step 4.2.4.7, unless otherwise directed by Operations Management.
	OATC	4.2.4.7 **Open** the selected LETDOWN ORIFICE isolation valve: 1HS-8149A for 45 gpm orifice isolation 1-HV-8149A. OR 1HS-8149B for 75 gpm orifice isolation 1-HV-8149B (odd fuel cycles). OR 1HS-8149C for 75 gpm orifice isolation 1-HV-8149C (even fuel cycles).
	OATC	4.2.4.8 **Adjust** 1PIC-131 to maintain letdown pressure between 360 and 380 psig.
	OATC	4.2.4.9 WHEN LETDOWN PRESS 1PI-131A stabilizes between 360 and 380 psig, **place** 1PIC-131 in AUTO.
	OATC	4.2.4.10 **Monitor** 1LR-459 Pressurizer Actual Level and Level Setpoint.

Event No.: 3

Event Description: The OATC will use SOP 13006-1 to restore CVCS charging and letdown to service. After charging and letdown are restored the crew may opt to raise letdown flow to 120 GPM. Section 4.2.4 of SOP 13006-1 will be used to complete this task.

Time	Position	Applicant's Action or Behavior	
	OATC	4.2.4.11	**Adjust** 1FIC-121 to maintain Pressurizer Level within 1% of setpoint.
	OATC	4.2.4.12	**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	4.2.4.13	**Adjust** LETDOWN HEAT EXCH OUTLET 1TIC-130 to maintain LETDOWN HEAT EXCH OUTLET 1TI-130 below 115°F, and **place** in AUTO.
	OATC	4.2.4.14	**Record** the letdown orifice that was placed-in service or removed-from-service in the Unit Control Log.
	OATC	4.2.4.15	**Notify** Chemistry that Letdown Flow has been raised.
	OATC	4.2.4.16	**Notify** Reactor Engineering that Letdown Flow has been changed and to monitor for impacts.

Op-Test No.: 2010-301 **Scenario No.:** 2 **Page 1 of 4**

Event No.: 4

Event Description: Controlling SG Level transmitter for Loop # 2 fails HIGH. The MFRV for loop # 2 will close requiring the UO to perform IOAs and take manual control of the valve to prevent a reactor trip on Lo-Lo SG level. The crew will then enter AOP-18001 Section E, "Failure of SG NR Level Instrumentation" to complete the corrective actions for this failure.

Time	Position	Applicant's Action or Behavior
	UO	Diagnoses the high failure of SG # 2 NR level instrument LT-529. Symptoms / alarms / indications: • STM GEN 2 HI / LO LVL DEVIATION • STM GEN 2 HI-HI LEVEL ALERT • Steam generator # 2 controlling level channel reading off scale high. • MFRV for loop # 2 SG throttling closed. • MFW flow to SG # 2 decreasing. • Other 3 level channels on SG # 2 lowering.
	UO	**AOP-18001 Section E Immediate Actions** E1 Check steam and feed flows matched on all SGs RNO Take manual control of SG # 2 MFRV to restore SG # 2 level between 60% and 70%.
	SS	Enters AOP-18001-C, section E. (Crew Update) Verifies Immediate Actions with UO
	UO	**AOP-18001 Section E Subsequent Actions** E2 Selects an unaffected control channel (LT-552)
	UO	E3 Returns feed flow control to automatic on MFRV loop # 2.

Op-Test No.: 2010-301 **Scenario No.:** 2 **Page 2 of 4**

Event No.: 4

Event Description: Controlling SG Level transmitter for Loop # 2 fails HIGH. The MFRV for loop # 2 will close requiring the UO to perform IOAs and take manual control of the valve to prevent a reactor trip on Lo-Lo SG level. The crew will then enter AOP-18001 Section E, "Failure of SG NR Level Instrumentation" to complete the corrective actions for this failure.

Time	Position	Applicant's Action or Behavior
	OATC/UO	E4 Initiate the Continuous Actions Page.
	UO	*E5 **Check SG level control maintains NR level at 65%.** *RNO **Control NR level between 60 – 70%**
	SS	E6 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	E7 Bypass the affected instrument channel using 13509 C, BYPASS TEST INSTRUMENTATION (BTI) PANEL OPERATION, if desired. ***NOTE: The SS is not expected to BTI.***
	SS	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: SS expected to leave bistables untripped during allowed out of service time to facilitate troubleshooting by I&C.***

Op-Test No.: 2010-301 **Scenario No.:** 2 **Page 3 of 4**

Event No.: 4

Event Description: Controlling SG Level transmitter for Loop # 2 fails HIGH. The MFRV for loop # 2 will close requiring the UO to perform IOAs and take manual control of the valve to prevent a reactor trip on Lo-Lo SG level. The crew will then enter AOP-18001 Section E, "Failure of SG NR Level Instrumentation" to complete the corrective actions for this failure.

CAUTIONS

- ALL test switches for the failed level transmitter should be tripped. Only one channel for each steam generator 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.

TABLE E1

SSPS INPUT	CAB	FRAME /CARD	B/S	SWITCH	Initial
LT-529 Failure (Channel 1)					
SG2 Hi-Hi Lvl TT & FWI	1	8/31	1	LS-529A	(____)
SG2 Lo-Lo Lvl Rx Trip/AFW	1	8/31	2	LS-529B	(____)
MASTER TEST SWITCH		8/73		1	(____)

Time	Position	Applicant's Action or Behavior
	SS	E9. Initiate the applicable actions of: • TS 3.3.1 • TS 3.3.2 3.3.1 – Reactor Trip – Function 13 – Condition E 3.3.2 – ESFAS: - Function 5c – P14 – Condition I Function 6b – AFW – Condition D 3.3.3 – PAMS: - INFO ONLY

Op-Test No.: 2010-301 **Scenario No.:** 2 **Page 4 of 4**

Event No.: 4

Event Description: Controlling SG Level transmitter for Loop # 2 fails HIGH. The MFRV for loop # 2 will close requiring the UO to perform IOAs and take manual control of the valve to prevent a reactor trip on Lo-Lo SG level. The crew will then enter AOP-18001 Section E, "Failure of SG NR Level Instrumentation" to complete the corrective actions for this failure.

Time	Position	Applicant's Action or Behavior
	SS	*E10. **Check repairs and surveillances - COMPLETE.**
	SS	RNO *E10. **Perform the following:** a) WHEN repairs and surveillances are complete, THEN perform Step E11. b) Return to procedure and step in effect.

Op-Test No.: 2010-301 **Scenario No.:** 2 **Page 1 of 9**

Event No.: 5

Event Description: PRZR pressure channel PT-455 will fail high. The associated PORV will stick partially open. The OATC will have to perform immediate actions to prevent a reactor trip and a safety injection. The crew will then use AOP 18001-C, Section C for the failed instrument and AOP 18000-C for the failed PORV.

Time	Position	Applicant's Action or Behavior
	OATC	Diagnose the failure of PT-455 high: Alarms: PRZR HI PRESS PRZR HI PRESS CHANNEL ALERT PRZR RELIEF DISCH HI TEMP PRZR PRESS LO PORV BLOCK PV-0455A OPEN SIGNAL Indications: PI-455 off scale high Other 3 PRZR pressure channels lowering Both normal spray valves fully open PORV-455 open ***PORV-455 will NOT close with handswitch in close when block valve is open*** ***NOTE: This indication will not occur until PRZR pressure is restored above 2185 psig.***
	OATC	**AOP 18001-C, Section C IMMEDIATE ACTIONS** C1. Check RCS pressure - STABLE OR RISING. RNO: C1. Perform the following: • Close spray valves. • Close affected PRZR PORV. • Operate PRZR heaters as necessary.

Op-Test No.: 2010-301 Scenario No.: 2 Page 2 of 9

Event No.: 5

Event Description: PRZR pressure channel PT-455 will fail high. The associated PORV will stick partially open. The OATC will have to perform immediate actions to prevent a reactor trip and a safety injection. The crew will then use AOP 18001-C, Section C for the failed instrument and AOP 18000-C for the failed PORV.

Time	Position	Applicant's Action or Behavior
	OATC	**AOP 18000-C IMMEDIATE ACTIONS** 1. Verify PRZR Spray Valves - CLOSED.
	SS	Enters AOP 18000-C (Crew Update)
	OATC	**AOP 18000-C Subsequent Actions** 2. Operate PRZR Heaters as necessary.
	OATC	3. Verify PRZR PORVs - CLOSED
	OATC	RNO: 3. Perform the following to isolate affected PORV as necessary: Close affected PORV Block Valve. ***(HV-8000A)*** Open affected PORV power supply breaker: AD1M-04 (PV-455A) BD1M-04 (PV-456A) IF PRZR pressure continues to lower, THEN go to 18004 C, REACTOR COOLANT SYSTEM LEAKAGE.

Op-Test No.: 2010-301 **Scenario No.:** 2 **Page 3 of 9**

Event No.: 5

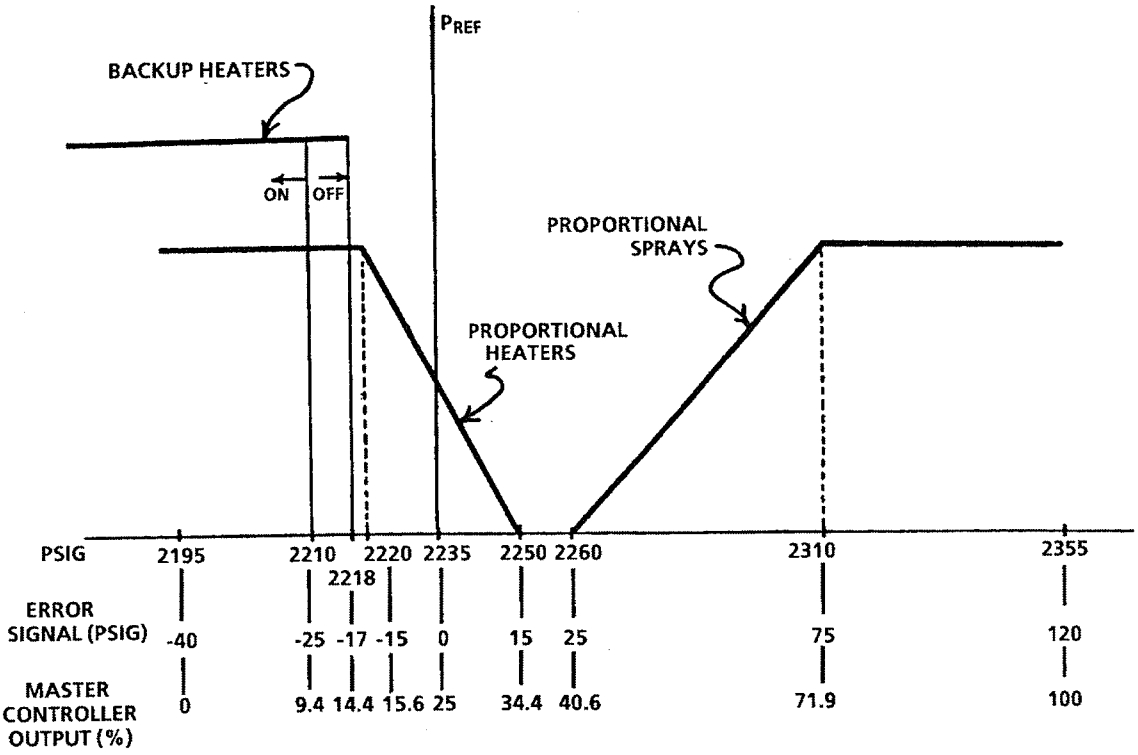
Event Description: PRZR pressure channel PT-455 will fail high. The associated PORV will stick partially open. The OATC will have to perform immediate actions to prevent a reactor trip and a safety injection. The crew will then use AOP 18001-C, Section C for the failed instrument and AOP 18000-C for the failed PORV.

Time	Position	Applicant's Action or Behavior
	OATC	4. Check PRZR Safety Valves - CLOSED
	OATC	5. Check PIC-455A Pressurizer Master Pressure Controller - OPERATING PROPERLY: • Reference FIGURE 1.
		RNO 5. Perform the following: a. Operate PRZR heaters and sprays in manual as necessary to restore RCS pressure between 2220 and 2250 psig. Adjust PIC-455A output AND return sprays and heaters to auto as necessary to restore RCS pressure between 2220 and 2250 psig. b. Notify I&C to initiate repairs. c. Restore controls to automatic when repairs are complete.

Event No.: 5

Event Description: PRZR pressure channel PT-455 will fail high. The associated PORV will stick partially open. The OATC will have to perform immediate actions to prevent a reactor trip and a safety injection. The crew will then use AOP 18001-C, Section C for the failed instrument and AOP 18000-C for the failed PORV.

FIGURE 1
PRESSURIZER PRESSURE CONTROLLER BAND



Time	Position	Applicant's Action or Behavior
	OATC	6. Check associated instrumentation - OPERATING PROPERLY.
	SS	RNO: 6. Initiate 18001-C, PRIMARY SYSTEMS INSTRUMENTATION MALFUNCTION.

Event No.: 5

Event Description: PRZR pressure channel PT-455 will fail high. The associated PORV will stick partially open. The OATC will have to perform immediate actions to prevent a reactor trip and a safety injection. The crew will then use AOP 18001-C, Section C for the failed instrument and AOP 18000-C for the failed PORV.

Time	Position	Applicant's Action or Behavior
	SS	7. Comply with applicable Technical Specifications: 3.4.1 DNB Condition A met when pressure ≥ 2199 psig 3.4.10 Safety Valves - N/A 3.4.11 PORV's Condition B B1. Close block valve in 1 hour AND B2. Remove power from block valve in 1 hour ***NOTE: Will dispatch Control Building Operator to locally open breaker for HV-8000A*** AND B3. Restore PORV in 72 hours 3.4.12 COPS – INFO ONLY 3.4.13 Operational Leakage – Met when block valve closed.
	SS	8. Return to procedure and step in effect.
	SS	Enters AOP 18001-C, Section C. (Crew Update)
	SS	**AOP 18001-C, Section C Subsequent Actions** **CAUTION** Failure of the controlling channel may saturate the Master Pressure Controller and cause inadvertent operation of the spray valves during recovery.

Event No.: 5

Event Description: PRZR pressure channel PT-455 will fail high. The associated PORV will stick partially open. The OATC will have to perform immediate actions to prevent a reactor trip and a safety injection. The crew will then use AOP 18001-C, Section C for the failed instrument and AOP 18000-C for the failed PORV.

Time	Position	Applicant's Action or Behavior
	OATC	C2. Check controlling channel – OPERATING PROPERLY. 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.**
		C5. Check PIC-455A Pressurizer Master Pressure Controller – IN AUTO WITH OUTPUT SIGNAL APPROXIMATELY 25%. 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.

Op-Test No.: 2010-301 **Scenario No.:** 2 **Page 7 of 9**

Event No.: 5

Event Description: PRZR pressure channel PT-455 will fail high. The associated PORV will stick partially open. The OATC will have to perform immediate actions to prevent a reactor trip and a safety injection. The crew will then use AOP 18001-C, Section C for the failed instrument and AOP 18000-C for the failed PORV.

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.
		C9. Place PORVs in AUTO and verify proper operation. ***NOTE: Unable to complete this step due to PORV being stuck open.***
	OATC	C10. Return PRZR pressure Master Controller to AUTO.
	OATC	C11. Select same channel on PS-455G PRZR PRESS REC SEL as selected on PS-455F. ***457***

Op-Test No.: 2010-301 Scenario No.: 2 Page 8 of 9

Event No.: 5

Event Description: PRZR pressure channel PT-455 will fail high. The associated PORV will stick partially open. The OATC will have to perform immediate actions to prevent a reactor trip and a safety injection. The crew will then use AOP 18001-C, Section C for the failed instrument and AOP 18000-C for the failed PORV.

Time	Position	Applicant's Action or Behavior
	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.***
	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.***

Op-Test No.: 2010-301 **Scenario No.:** 2 **Page 9 of 9**

Event No.: 5

Event Description: PRZR pressure channel PT-455 will fail high. The associated PORV will stick partially open. The OATC will have to perform immediate actions to prevent a reactor trip and a safety injection. The crew will then use AOP 18001-C, Section C for the failed instrument and AOP 18000-C for the failed PORV.

Time	Position	Applicant's Action or Behavior
	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 • TS 3.4.1 DNB RCS pressure < 2199 psig — B (Momentary)
	SS	*C17. **Check repairs and surveillances - COMPLETE.**
	SS	RNO: *C17. Perform the following: a. WHEN repairs and surveillances are complete, THEN perform step C18. b. Return to procedure and step in effect.

Op-Test No.: 2010-301 **Scenario No.:** 2 **Page 1 of 2**

Event No.: 6

Event Description: Main Turbine EHC pump 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: 480V SWGR 1NB02 TROUBLE (ALB33 window B07) After several minutes - HYD FLUID LO PRESS (ALB20 window D05) Indications: EHC pump A (HS-6539): Red – OFF Amber – ON Green – ON EHC pressure (PI-6338) <1600 psig and lowering EHC Pump A amps (II-40073) drop to 0 amps
	UO	Refers to ARP 17033-1 for Window B07 (480V SWGR 1NB02 TROUBLE)
	UO	**1.0 PROBABLE CAUSE** 1. One of the breakers on Switchgear 1NB02 tripped due to a fault. 2. Bus ground fault. 3. Potential transformer/fuse failure. 4. Loss of bus voltage from Switchgear 1NA04. 5. Transformer 1NB02X winding high temperature. 6. Loss of 125V DC control power from Panel 1ND21. 7. Loss of power to transformer temperature monitor. **2.0 AUTOMATIC ACTIONS** NONE

Op-Test No.: 2010-301 **Scenario No.:** 2 **Page 2 of 2**

Event No.: 6

Event Description: Main Turbine EHC pump 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. **NOTE: Student notices green and amber lights for EHC pump A and then starts EHC pump B.** **NOTE: After starting EHC pump B EHC pressure returns to 1600 psig.**
	UO SS	***Will call SSS to:*** ***Write condition report*** ***Notify Maintenance***

Op-Test No.: 2010-301 **Scenario No.:** 2 **Page 1 of 14**

Event No.: 7-9

Event Description: SG code safety valves fail open on all four loops following a turbine trip. The crew will enter EOP 19121-C, ECA-2.1 to take corrective actions. The code safety valves will reseat a lower than normal pressure. As soon as the crew realizes a SG is intact they should transition to 19020-C, Faulted SG isolation, based on 19121-C, Foldout page criteria.

Time	Position	Applicant's Action or Behavior
	OATC/UO	Diagnose turbine trip W/O Reactor Trip: • All Stop Valves shut • TURBINE TRIP/P9 REACTOR TRIP Alarm
	OATC	Manually actuates Reactor Trip using both manual trip handswitches: 1HS-40007 & 1HS-40002
	CREW	**IMMEDIATE ACTIONS of 19000-C, Reactor Trip or Safety Injection** 1 - Verifies Reactor Trip • Rod Bottom Lights - LIT • Reactor Trip and Bypass Breakers - OPEN • Neutron Flux - LOWERING 2 – Verifies Turbine Trip • All Turbine Stop Valves – CLOSED 3 – Checks Power to AC Emergency Buses 3a. at least 1 4160 1E bus energized - White lights - ON 3b. all AC Emergency buses energized - White lights - ON (4160V and 480V) 4 - Checks if SI / Actuated • Any SI annunciator - LIT • SI BPLP status light - LIT RNO - Check if SI is required: IF one or more of the following conditions has occurred: • PRZR pressure 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.

Op-Test No.: 2010-301 Scenario No.: 2 Page 2 of 14

Event No.: 7-9

Event Description: SG code safety valves fail open on all four loops following a turbine trip. The crew will enter EOP 19121-C, ECA-2.1 to take corrective actions. The code safety valves will reseat a lower than normal pressure. As soon as the crew realizes a SG is intact they should transition to 19020-C, Faulted SG isolation, based on 19121-C, Foldout page criteria.

Time	Position	Applicant's Action or Behavior
	SS	Plant page for Reactor Trip / Safety Injection
	OATC / UO	6. Initiate Foldout Page 7. Initiate OATC Initial Actions pages Initiate UO Initial Actions pages.

Op-Test No.: 2010-301 **Scenario No.:** 2 **Page 3 of 14**

Event No.: 7-9

Event Description: SG code safety valves fail open on all four loops following a turbine trip. The crew will enter EOP 19121-C, ECA-2.1 to take corrective actions. The code safety valves will reseat a lower than normal pressure. As soon as the crew realizes a SG is intact they should transition to 19020-C, Faulted SG isolation, based on 19121-C, Foldout page criteria.

Time	Position	Applicant's Action or Behavior
	OATC	**Initial Operator Actions of E-0.**
		1 Checks both Trains of ECCS aligning per MLBs.
		Manually actuates SI
		2 Checks Containment Isolation Phase A – actuated per MLBs
		3 Checks ECCS pumps and NCP status. a. CCPs – running b. SI Pumps – running c. RHR pumps – running d. NCP – tripped
		4 CCW pumps – only two running per train
		5a NSCW pumps – only two running per train
		5b NSCW tower return / bypass valves – in auto
		6a Containment coolers running in LOW speed per MLBs
		6b NSCW cooler isolation valves open per MLBs
		7 CVI dampers and valves shut per MLBs
		8 Containment pressure remained < 21.5
		9 Checks ECCS flows: a. BIT Flow – On scale b. RCS pressure < 1625 psig (If NOT go to step 10) c. SI pump flow d. RCS pressure < 300 psig e. RHR pump flow
		10 Checks ECCS valve alignment proper on MLBs
		11 Checks at least one ACCW pump running
		12 Adjusts seal injection flow to RCPs 8 to 13 gpm.

Event No.: 7-9

Event Description: SG code safety valves fail open on all four loops following a turbine trip. The crew will enter EOP 19121-C, ECA-2.1 to take corrective actions. The code safety valves will reseat a lower than normal pressure. As soon as the crew realizes a SG is intact they should transition to 19020-C, Faulted SG isolation, based on 19121-C, Foldout page criteria.

	UO	**Initial Operator Actions of E-0** 1. Checks MDAFW pumps running and TDAFW pump, if required. ***NOTE: MDAFW Pump B will have to be manually started.*** 2. Checks NR SG levels - one > 10%, If not ensures at least 570 GPM flow 3. Checks if SLI is required • Any SL Pressure < 585 psig • CNMT Pressure > 14.5 psig • High rate bistables lit with low pressure SI/SLI blocked • If any above met then verify MSIVs & BSIVs closed 4. Verifies FWI: MFRV, BFRV, MFIV, BFIVs all shut 5. Verifies SGBD isolated • places hand switches for SGBD isolation valves to close • verify SGBD sample isolations closed. 6. Verify Diesel Generators running. 7. Throttle AFW flow to control SG levels 10 – 65% NR 8. Verify both MFPs tripped. 9. Check Main Generator Output breakers open.

Op-Test No.: 2010-301 **Scenario No.:** 2 **Page 5 of 14**

Event No.: 7-9

Event Description: SG code safety valves fail open on all four loops following a turbine trip. The crew will enter EOP 19121-C, ECA-2.1 to take corrective actions. The code safety valves will reseat a lower than normal pressure. As soon as the crew realizes a SG is intact they should transition to 19020-C, Faulted SG isolation, based on 19121-C, Foldout page criteria.

Time	Position	Applicant's Action or Behavior
		19000-C
	OATC / UO	8. Initiate Continuous Actions pages.
	OATC	*9. Checks RCS temperature stable at or trending to 557 degrees F using RCS Tavg.
	UO	9 RNO. If necessary, takes actions to control RCS temperature. • Stop dumping steam. • Reduces AFW flow (not < 570 gpm if SG NR levels < 10% NR). • If cooldown continues shuts MSIVs and BSIVs • If temperature > 557 F & rising then dump steam
	OATC	10 - Checks PORVs, Block Valves, & Spray Valves • a, PORVs closed and in AUTO ***(456 ONLY)*** • b, Normal spray valves closed • c, Power available to at least one block valve ***(HV-8000B ONLY)*** • *d, At least one block valve open (NOT) • *d RNO, verify open at least one block valve when RCS pressure > 2185 psig.
	OATC	11 - Checks if RCPs should be stopped • a, CCP or SIP running • b, RCS pressure < 1375 psig • If yes then stop all RCPs if no then go to step # 12

Op-Test No.: 2010-301 **Scenario No.:** 2 **Page 6 of 14**

Event No.: 7-9

Event Description: SG code safety valves fail open on all four loops following a turbine trip. The crew will enter EOP 19121-C, ECA-2.1 to take corrective actions. The code safety valves will reseat a lower than normal pressure. As soon as the crew realizes a SG is intact they should transition to 19020-C, Faulted SG isolation, based on 19121-C, Foldout page criteria.

Time	Position	Applicant's Action or Behavior
	UO / SS	12 - Checks for faulted SG and transition to E-2 • SG pressures: • Any lowering in an uncontrolled manner, or • Completely depressurized • ***If yes then go to 19020-C, E-2*** • If no then go to step # 13
	SS	Enters 19020-C (Crew Update)
	OATC/UO	**19020-C, E-2 FAULTED SG ISOLATION** 1. Initiate critical safety function status trees per 19200-C, F-0 CRITICAL SAFETY FUNCTION STATUS TREES.
	SS	2. Initiate 91001-C, EMERGENCY CLASSIFICATION AND IMPLEMENTING INSTRUCTIONS. ***Contacts Shift Manager to implement EPIPs***
	SS	**CAUTION** At least one SG should be maintained available for RCS cooldown

Event No.: 7-9

Event Description: SG code safety valves fail open on all four loops following a turbine trip. The crew will enter EOP 19121-C, ECA-2.1 to take corrective actions. The code safety valves will reseat a lower than normal pressure. As soon as the crew realizes a SG is intact they should transition to 19020-C, Faulted SG isolation, based on 19121-C, Foldout page criteria.

Time	Position	Applicant's Action or Behavior
	UO	3. Verify Main Steamline Isolation and Bypass Valves - SHUT
	UO	4. Check SGs secondary pressure boundaries: a. Identify intact SG(s): • SG pressures – ANY STABLE OR RISING
	SS	RNO 4a: a. IF all SG pressures are lowering in an uncontrolled manner, THEN go to 19121-C, ECA-2.1 UNCONTROLLED DEPRESSURIZATION OF ALL STEAM GENERATORS.
	SS ***CRITICAL***	Enters 19121-C, ECA-2.1 (Crew Update)
	OATC/UO	**19121-C, ECA-2.1** 1. Initiate the Continuous Actions and Foldout Page.

Event No.: 7-9

Event Description: SG code safety valves fail open on all four loops following a turbine trip. The crew will enter EOP 19121-C, ECA-2.1 to take corrective actions. The code safety valves will reseat a lower than normal pressure. As soon as the crew realizes a SG is intact they should transition to 19020-C, Faulted SG isolation, based on 19121-C, Foldout page criteria.

Time	Position	Applicant's Action or Behavior
	UO	2. Check SGs secondary pressure boundaries: a. Verify the following valves - CLOSED: MSIVs MFIVs BFIVs MFRVs BFRVs b. Verify BSIVs - CLOSED. c. Verify SG Blowdown and Sampling Isolation Valves - CLOSED. d. Verify SG ARVs - CLOSED.
	UO	3. Isolate steam supply to TDAFW Pump by performing the following: a. Check at least one MDAFW Pump - RUNNING AND CAPABLE OF FEEDING SG(s) NEEDED FOR RCS COOLDOWN. b. Close TDAFW Pump Steam Supply Valves: • 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: Cross connecting MDAFW pump A discharge per SOP 13610-1, Section 4.4.2 is not expected due to the caution at the beginning of the section.***

Event No.: 7-9

Event Description: SG code safety valves fail open on all four loops following a turbine trip. The crew will enter EOP 19121-C, ECA-2.1 to take corrective actions. The code safety valves will reseat a lower than normal pressure. As soon as the crew realizes a SG is intact they should transition to 19020-C, Faulted SG isolation, based on 19121-C, Foldout page criteria.

Time	Position	Applicant's Action or Behavior
		*4 **Control feed flow to minimize RCS cooldown:**
	SS	a. Monitor shutdown margin by initiating 14005, SHUTDOWN MARGIN AND KEFF CALCULATIONS. ***SS will contact SSS to initiate 14005.***
	UO	b. Check cooldown rate in RCS Cold Legs - LESS THAN 100°F/HR.
		RNO:
	UO ***CRITICAL***	b. ***Lower feed flow to 30 gpm to each SG.***
	SS	Go to Step 4.d.
		NOTE: The heat sink CSFST will turn red when AFW flow is throttled to < 570 GPM if SG NR levels are < 10%.
		If the SS transitions to 19231-C, then the following are applicable:
	SS	**19231-C, FR-H.1, Loss of Secondary Heat Sink**
		1. Check total feed flow capability to SG(s): • Greater than 570 gpm available. -AND- • Less than 570 gpm due to Operator action.
		2. ***Do NOT perform this procedure and return to procedure and step in effect.***

Event No.: 7-9

Event Description: SG code safety valves fail open on all four loops following a turbine trip. The crew will enter EOP 19121-C, ECA-2.1 to take corrective actions. The code safety valves will reseat a lower than normal pressure. As soon as the crew realizes a SG is intact they should transition to 19020-C, Faulted SG isolation, based on 19121-C, Foldout page criteria.

Time	Position	Applicant's Action or Behavior
		19121-C Actions
	UO	*4. **Control feed flow to minimize RCS cooldown:**
	UO	d. Check NR level in all SGs - GREATER THAN 10% [32% ADVERSE].
		RNO:
		d. Maintain a minimum feed flow of 30 gpm to each SG with less than 10% [32% ADVERSE] NR level.
	UO	*4. **Control feed flow to minimize RCS cooldown:**
		e. Check RCS WR Hot Leg temperatures - STABLE OR LOWERING.
		RNO:
		e. Control feed flow or dump steam to stabilize RCS WR Hot Leg temperatures.
	OATC	*5. **Check if RCPs should be stopped:**
		a. ECCS Pumps - AT LEAST ONE RUNNING:
		CCP or SI Pump
		b. RCS pressure - LESS THAN 1375 PSIG.
		c. Stop all RCPs.

Op-Test No.: 2010-301 Scenario No.: 2 Page 11 of 14

Event No.: 7-9

Event Description: SG code safety valves fail open on all four loops following a turbine trip. The crew will enter EOP 19121-C, ECA-2.1 to take corrective actions. The code safety valves will reseat a lower than normal pressure. As soon as the crew realizes a SG is intact they should transition to 19020-C, Faulted SG isolation, based on 19121-C, Foldout page criteria.

Time	Position	Applicant's Action or Behavior
	OATC	*6. **Maintain Seal Injection flow to all RCPs - 8 TO 13 GPM**
	OATC	*7. **Check PRZR PORVS and Block Valves:** a. Power to PRZR PORV Block Valves - AVAILABLE. b. PRZR PORVs - CLOSED. c. PRZR PORV Block Valves - AT LEAST ONE OPEN. d. Any RCS WR CL temperature - LESS THAN 220°F.
	OATC SS	*7. **Check PRZR PORVS and Block Valves:** RNO: d. WHEN any RCS CL temperature lowers to less than 220°F, THEN arm COPS. Go to Step 8.

Op-Test No.: 2010-301 **Scenario No.:** 2 **Page 12 of 14**

Event No.: 7-9

Event Description: SG code safety valves fail open on all four loops following a turbine trip. The crew will enter EOP 19121-C, ECA-2.1 to take corrective actions. The code safety valves will reseat a lower than normal pressure. As soon as the crew realizes a SG is intact they should transition to 19020-C, Faulted SG isolation, based on 19121-C, Foldout page criteria.

Time	Position	Applicant's Action or Behavior
	UO	8. Check secondary radiation - NORMAL: • Direct Chemistry to take periodic activity samples of all SGs one at a time. • Secondary radiation - NORMAL. • 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.
	SS	**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).

Event No.: 7-9

Event Description: SG code safety valves fail open on all four loops following a turbine trip. The crew will enter EOP 19121-C, ECA-2.1 to take corrective actions. The code safety valves will reseat a lower than normal pressure. As soon as the crew realizes a SG is intact they should transition to 19020-C, Faulted SG isolation, based on 19121-C, Foldout page criteria.

Time	Position	Applicant's Action or Behavior
	OATC	*9. **Check if RHR Pumps should be stopped:** a. RHR Pumps - ANY RUNNING WITH SUCTION ALIGNED TO RWST. b. RCS pressure: 1) Greater than 300 psig. 2) Stable or rising. c. Reset SI if necessary. d. Stop RHR Pumps.
	OATC	*10. **<u>IF</u> RCS pressure lowers in an uncontrolled manner to less than 300 psig, <u>THEN</u> restart RHR Pumps.**
	OATC	*11. Check if Containment Spray should be stopped: a. CS Pumps - RUNNING. RNO: SS a. Go to Step 12.
	OATC	12. Check if SI Accumulators should be isolated: a. At least two RCS WR Hot Leg temperatures - LESS THAN 380°F. RNO: SS a. Go to Step 14.

Op-Test No.: 2010-301 **Scenario No.:** 2 **Page 14 of 14**

Event No.: 7-9

Event Description: SG code safety valves fail open on all four loops following a turbine trip. The crew will enter EOP 19121-C, ECA-2.1 to take corrective actions. The code safety valves will reseat a lower than normal pressure. As soon as the crew realizes a SG is intact they should transition to 19020-C, Faulted SG isolation, based on 19121-C, Foldout page criteria.

Time	Position	Applicant's Action or Behavior
	OATC/UO	*14. **Check if ECCS flow should be reduced:** a. RCS subcooling - GREATER THAN 24°F [38°F ADVERSE]. b. RCS pressure - STABLE OR RISING. c. PRZR level - GREATER THAN 9% [37% ADVERSE]. RNO: c. Try to stabilize RCS pressure with Normal PRZR Spray. SS Return to Step 14.a.
		END OF SCENARIO

DRAFT

Facility: Vogtle Scenario No.: 3 Op-Test No: 2010-301

Examiners: Lea Operators:

NEW

Initial Conditions: Plant is at 0% power preparing for a mid-cycle critical approach.

Turnover: The previous crew has pulled control rods for the reactor startup. You will continue the start up after turnover. Hurricane Zeus has been down graded to a tropical depression. Highest sustained winds are now 35 mph. Heavy rain and widespread flooding is expected in the area. PT-455 is out of service for repairs, all required Technical Specification actions have been completed.

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	R-ALL	Pull control rods to establish critical reactor
2	NS02A NSO7E	C-UO C-SS TS-SS	Train 'A' NSCW Pump #1 trips and standby pump #5 fails to start LCO 3.7.8
3	PR03A @ 100% Ramp 120 sec	I-OATC I-SS TS-SS	Controlling channel Pressurizer Level Transmitter (LT-459) fails high LCO 3.3.1
4	N/A	N-OATC N-SS	Restore CVCS Letdown to service
5	CV02 @ 25%	C-OATC C-SS TS-SS	Letdown line break inside containment (isolable) LCO 3.4.13
6	N/A	N-OATC N-SS	Place Excess Letdown in service
7	MS03D @ 100%	I-UO I-SS TS-SS	Steam Generator # 4 ARV pressure Transmitter fails high LCO 3.3.4 & 3.7.4 N/A - ARV still operable (manual)
8	ALB08 E4, and F4 ON	C-OATC C-SS TS-SS	RCP #2 High Vibration LCO 3.4.4

9	SG01B @ 45%	M-ALL	Loop 2 Steam Generator Tube Rupture
10	SI06B SI03A	C-OATC C-SS	SIP-1B fails to automatically start when safety injection is actuated SIP-1A trips on automatic start and cannot be restarted
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor			

Event 1: Continue Reactor Startup (12003-C)

Verifiable Action:

OATC - Withdraw control rods to establish critical conditions and raise power to 2E-3%

UO - Maintain SG NR levels 60-70%.

Consequences:

Enter power range too fast to control or loss of SG level control either resulting in the need for a reactor trip.

Technical Specifications:

N/A

Event 2: NSCW pump 1 trips, pump 5 fails to automatically start (18021-C)

Verifiable Action:

UO - Start standby NSCW pump.

Consequences:

NSCW pump 3 damage due to run out conditions

Technical Specifications:

INFO LCO 3.7.8

Event 3: Controlling PRZR level channel fails high (18001-C Section D)

Verifiable Actions:

OATC - Manual control of pressurizer level and RCP seal injection flow. Select operable channel for control.

Consequences:

Loss of PRZR level control or RCP seal damage if flows are not properly controlled.

Technical Specifications:

LCO 3.3.1 – reactor trip on hi PRZR level

Event 4: Restore CVCS letdown to service (SOP 13006-1 Section 4.4.2)

Verifiable Actions:

OATC – Places normal CVCS letdown in service

Consequences:

Flashing/water hammer in letdown line if charging flow not adequate

Technical Specifications:

N/A

Event 5: Letdown leak inside containment (18004-C)

Verifiable Action:

OATC - Isolate letdown to stop RCS leak

Consequence:

If letdown is not isolated, RCS leak will inside containment will continue.

Technical Specifications:

LCO 3.4.13 Operational Leakage (Unidentified Leakage) not met until letdown isolated

Event 6: Place Excess Letdown in Service (SOP 13008-1 Section 4.1)

Verifiable Action:

OATC – Places Excess letdown in service to the RCP Seal Return Header per 13008-1.

Consequences:

Exceeding Excess letdown HX outlet temperature or RCP seal return pressure limits.

Technical Specifications:

N/A

Event 7: Steam Generator 4 ARV pressure transmitter fails high (18008-C)

Verifiable Actions:

UO - Close SG 4 ARV.

Consequence:

Uncontrolled entry into mode 1.

Technical Specifications:

3.3.4 & 3.7.4 N/A – ARV still operable (manual operation)

Event 8: RCP 2 high vibration (17008-1 Windows E04 & F04, 13003-1 Section 4.3.1)

Verifiable Action:

OATC - Trip RCP 2.

Consequence:

If RCP is running 10 minutes after trip, then a seal failure occurs.

Technical Specifications:

LCO 3.4.4 RCS Loops – Modes 1 & 2: Condition A – be in mode 3 in 6 hours.

Event 9: SG 2 SGTR

Verifiable Action:

UO – Isolate the ruptured SG, complete rapid RCS cool down to target temperature, maintain Tave at target temperature.

OATC – Depressurize RCS to stop break flow, secure ECCS pumps, establish normal charging.

Consequences:

Prolonged off site radioactivity release through ruptured SG ARVs / code safety valves.

Event 10: SIP 1B must be manually started & SIP 1A trips

Verifiable Actions:

OATC - Manual start of SIP-1B

Consequences:

RCS inventory is not maintained.

CRITICAL STEPS:

1. **Manually start SIP-1B to maintain RCS inventory during SGTR.**
2. **Isolate SG 2 to allow RCS rapid cool down to target temperature.**
3. **Maintain RCS Tavg ≤ target temperature.**

PT-455 (PRZR Pressure) Out of Service turnover information:

LCO	Function	Condition	Actions
3.3.1	OTΔT	E	Trip bistables in 72 hours
3.3.1	Low PRZR Pressure	M	INFO ONLY [applicable > P7 (10% power)]
3.3.1	High PRZR Pressure	E	Trip bistables in 72 hours
3.3.2	SI Low PRZR Pressure	D	Trip bistables in 72 hours
3.3.2	P11 Interlock	L	Verify P11 in correct condition in 1 hour

Op-Test No.: 2010-301 **Scenario No.:** 3

Event No.: 1

Event Description: Crew will perform actions necessary to continue the in-progress reactor startup until criticality is achieved using procedure 12,003-C. The OATC will need to withdraw control rods, and both the OATC and SS will need to identify when the reactor is critical.

Time	Position	Applicant's Action or Behavior
	OATC	4.2.20 When Control Bank C reaches 115 steps, VERIFY Control Bank D begins withdrawing. (TS SR 3.1.6.3)
	OATC	4.2.21 IF this startup is a dilution to criticality for LPPT, **perform** the following: a. **Withdraw** Control Bank D to the ARO position in 50 step increments or less as recommended by reactor engineering and approved by the SS. b. **Commence** dilution to criticality at ARO, per LPPT-GAE/GBE-01. c. **Log** Mode 2 entry time and **update** IPC per Step 4.2.14. ***This step is N/A***
	OATC	4.2.22 **Verify** IR indication comes on scale as source range count rate rises. (SR indication ≈ 3 X 10^2 cps)
	OATC SS	4.2.23 WHEN criticality is reached, **Log** "the reactor is critical" in the Control Room Log.
	SS	**CAUTION** Source Range high flux reactor trip will occur at 10^5 cps.

Op-Test No.: 2010-301 **Scenario No.:** 3 **Page 2 of 5**

Event No.: 1

Event Description: Crew will perform actions necessary to continue the in-progress reactor startup until criticality is achieved using procedure 12,003-C. The OATC will need to withdraw control rods, and both the OATC and SS will need to identify when the reactor is critical.

Time	Position	Applicant's Action or Behavior
	OATC	4.2.24 At an IR indication of approximately 2 X 10^{-5}%, **perform** the following: a. **Observe** the following status lights illuminated: (1) IR P6 NC35D (TSLB-4, 3.1), or (2) IR P6 NC36D (TSLB-4, 3.2) (3) SOURCE RANGE BLOCK PERMISSIVE P6 b. **Block** the source range hi flux reactor trip by placing both SR BLOCK RESET A/B switches HS-40030/HS-40031 to the BLOCK position, c. **Observe** the following BPLP status lights illuminated: (1) SR TRAIN A TRIP BLK'D (2-1) (2) SR TRAIN B TRIP BLK'D (2-2)
	SS	**CAUTION** If the startup is stopped after blocking the SR Hi flux trip and power level is allowed to decrease, the SR trip may become unblocked. There is no audible indication to alert the operator if this occurs. The SR Hi Flux trip should be verified blocked and, if necessary, the above steps repeated to re-block the trip prior to reaching 1E+5 cps.

Op-Test No.: 2010-301 **Scenario No.:** 3 **Page 3 of 5**

Event No.: 1

Event Description: Crew will perform actions necessary to continue the in-progress reactor startup until criticality is achieved using procedure 12,003-C. The OATC will need to withdraw control rods, and both the OATC and SS will need to identify when the reactor is critical.

Time	Position	Applicant's Action or Behavior
	OATC	d. **Configure** Nuclear Instrumentation for continuing power increase: (1) **Verify** both channels of Intermediate Range NIs indicating properly on recorder NR-45. (2) **Remove** Audible Count Rate monitor from service per 13501, "Nuclear Instrumentation System."
	OATC	4.2.25 **Raise** power to 2 X 10^{-3}% in the Intermediate Range by adjusting control rods as necessary
	OATC	4.2.26 **Stabilize** power at an Intermediate Range indication of approximately 2 X 10^{-3}% and **complete**: a. OSP 14940, "Estimated Critical Condition Calculation" Data Sheet 1, Actual Critical Data, OR b. 88010-C, "Computer Calculation Of Estimated Critical Conditions" Data Sheet 3. c. **Place** a copy of the above Data Sheet(s) in the Start-up Log tab of the Reactor Trip Log. d. IF this reactor startup IS NOT a dilution to criticality for LPPT, Tavg recording per Data Sheet 2 can be terminated if ALB12A05 is NOT illuminated.

Op-Test No.: 2010-301 Scenario No.: 3 Page 4 of 5

Event No.: 1

Event Description: Crew will perform actions necessary to continue the in-progress reactor startup until criticality is achieved using procedure 12,003-C. The OATC will need to withdraw control rods, and both the OATC and SS will need to identify when the reactor is critical.

Time	Position	Applicant's Action or Behavior
	SS	NOTE The Avg/Tref Deviation alarm, ALB12A05, provides actions to maintain Tavg above 551°F, the minimum temperature for criticality.
	OATC SS	4.2.27 **Monitor** "Tavg/Tref Deviation" alarm, ALB12A05, 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
	SS	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.

Op-Test No.: 2010-301 **Scenario No.:** 3 **Page 5 of 5**

Event No.: 1

Event Description: Crew will perform actions necessary to continue the in-progress reactor startup until criticality is achieved using procedure 12,003-C. The OATC will need to withdraw control rods, and both the OATC and SS will need to identify when the reactor is critical.

Time	Position	Applicant's Action or Behavior
	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.
	OATC	4.2.31 **Raise** power to approximately 1% to 3%.
	UO	4.2.32 **Verify** steam dumps or, if applicable, SG atmospheric relief valves, maintain Tavg at 557°F ±2°F.
	SS	4.2.33 **Continue** to power operation per 12004-C, "Power Operation (Mode 1)" OR **Commence** reactor shutdown per 12005-C, "Reactor Shutdown to Hot Standby".

Op-Test No.: 2010-301 **Scenario No.:** 3 **Page 1 of 4**

Event No.: 2

Event Description: Trip of 'A' train NSCW pump #1. The standby NSCW pump #5 will fail to automatically start. The crew will enter AOP 18021-C, "Loss of Nuclear Service Cooling Water System" to take the corrective actions to restore the train 'A' NSCW system to normal 2 pump operation.

Time	Position	Applicant's Action or Behavior
	UO	Diagnose degraded NSCW conditions: **Trip of NSCW pump #1**(1HS-1602A) Green – ON Amber – ON Red – OFF **Alarms:** • NSCW TRAIN A LO HDR PRESS • NSCW TRAIN A DG CLR LO FLOW • NSCW TRAIN A RHR PMP & MTR CLR LO FLOW • NSCW TRAIN A CNMT CLR 1 & 2 LO FLOW • NSCW TRAIN A CNMT CLR 5 & 6 LO FLOW • NSCW TRN A RX CVTY CLG COIL LOW FLOW • TRAIN A SYS STATUS MON PNL ALERT • 4160V SWGR 1AA02 TROUBLE **Indications:** NSCW HDR PRESS 1PI-1636 drops to 50 psig NSCW Train A flow: SUPPLY 1FI1640B drops to 12,000 GPM RETURN 1FI1640A drops to 12,000 GPM
	SS	Enters AOP 18021, "Loss of Nuclear Service Cooling Water System" (Crew Update)
	UO SS	1. Check if catastrophic leakage from NSCW system – EXISTS. RNO Go to Step 6.

Op-Test No.: 2010-301 **Scenario No.:** 3 **Page 2 of 4**

Event No.: 2

Event Description: Trip of 'A' train NSCW pump #1. The standby NSCW pump #5 will fail to automatically start. The crew will enter AOP 18021-C, "Loss of Nuclear Service Cooling Water System" to take the corrective actions to restore the train 'A' NSCW system to normal 2 pump operation.

Time	Position	Applicant's Action or Behavior
	UO	6. Verify NSCW pumps in affected train TWO OR MORE OPERATING: ***NOTE: UO should start NSCW pump 5 here*** • Supply header pressure greater than 70 psig. Train A:PI 1636 Train B:PI 1637 • Supply header flow approximately 17,000 gpm. Train A:FI 1640B Train B:FI 1641B
	UO SS	7. Check the following on the affected train: • NSCW pumps – THREE RUNNING. -AND- • Low header pressure annunciator – EXTINGUISHED. RNO Go to Step 9.
	UO	9. Verify the following on the affected NSCW train: • Supply header pressure GREATER THAN 70 PSIG: Train A:PI 1636 Train B:PI 1637 • Supply header temperature computer indication LESS THAN 90°F: Train A:TE 1642 Train B:TE 1643 • Supply header flow APPROXIMATELY 17,000 GPM: Train A:FI 1640B Train B:FI 1641B

Op-Test No.: 2010-301 Scenario No.: 3 Page 3 of 4

Event No.: 2

Event Description: Trip of 'A' train NSCW pump #1. The standby NSCW pump #5 will fail to automatically start. The crew will enter AOP 18021-C, "Loss of Nuclear Service Cooling Water System" to take the corrective actions to restore the train 'A' NSCW system to normal 2 pump operation.

Time	Position	Applicant's Action or Behavior
	UO	10. Check NSCW cooling tower basin levels on affected NSCW train GREATER THAN 73%: Train A:LI 1606 Train B:LI 1607
	UO	11. Check proper operation of affected NSCW train: • Two pumps running. • Supply header pressure GREATER THAN 70 PSIG: Train A:PI 1636 Train B:PI 1637 • Supply header temperature computer indication LESS THAN 90°F: Train A:TE 1642 Train B:TE 1643 • Supply header flow APPROXIMATELY 17,000 GPM: Train A:FI 1640B Train B:FI 1641B
	SS	12. Go to Step 21.
	UO	21. Check NSCW return temperature on affected train – LESS THAN 95°F: Train A:TI 1676A Train B:TI 1677A

Op-Test No.: 2010-301 Scenario No.: 3 Page 4 of 4

Event No.: 2

Event Description: Trip of 'A' train NSCW pump #1. The standby NSCW pump #5 will fail to automatically start. The crew will enter AOP 18021-C, "Loss of Nuclear Service Cooling Water System" to take the corrective actions to restore the train 'A' NSCW system to normal 2 pump operation.

Time	Position	Applicant's Action or Behavior
	SS	22. Return to procedure and step in effect.

Op-Test No.: 2010-301 **Scenario No.:** 3 **Page 1 of 5**

Event No.: 3

Event Description: Controlling Pressurizer level channel fails high. The OATC will have to manually control charging & seal injection flow until the failed channel is removed from service. The OATC may opt to isolate letdown if letdown line starts flashing.

Time	Position	Applicant's Action or Behavior
	OATC	Diagnose controlling Pressurizer level channel failure: Indications: • LI-459 indication rising • Charging line flow lowering (FI-121A & FI-121C) • Possible erratic letdown flow due to flashing (FI-132C) Alarms: • PRZR CONTROL HI LEVEL DEV AND HEATERS ON • PRZR HI LEVEL CHANNEL ALERT
	SS	Initiates AOP 18001-C, Section D for the failed PRZR level channel. (Crew Update)
	OATC/UO	D1. Initiate the Continuous Actions Page.
	OATC	*D2. **Check PRZR level - TRENDING TO PROGRAM LEVEL.**
	OATC	*D2 RNO: **IF PRZR level instrument fails high, THEN perform the following as necessary:** Adjust charging to prevent letdown from flashing. -OR- Isolate letdown.

Op-Test No.: 2010-301 Scenario No.: 3 Page 2 of 5

Event No.: 3

Event Description: Controlling Pressurizer level channel fails high. The OATC will have to manually control charging & seal injection flow until the failed channel is removed from service. The OATC may opt to isolate letdown if letdown line starts flashing.

Time	Position	Applicant's Action or Behavior
	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. ***461/460 selected***
	OATC	D5. Select same channel on LS-459E PRZR LVL REC SEL as selected on LS-459D. ***461 selected***
	UO	*D6 **Restore letdown flow by initiating 13006, CHEMICAL AND VOLUME CONTROL SYSTEM, if required.** ***NOTE: If letdown was isolated, then refer to event 3A for this task.***
	OATC	D7. Check if PRZR heaters should be restored to service: PRZR level controlling channel - FAILED LOW.
	SS	D7 RNO: Go to Step D9
	OATC	D9 Return PRZR level control to AUTO.

Op-Test No.: 2010-301 Scenario No.: 3 Page 3 of 5

Event No.: 3

Event Description: Controlling Pressurizer level channel fails high. The OATC will have to manually control charging & seal injection flow until the failed channel is removed from service. The OATC may opt to isolate letdown if letdown line starts flashing.

Time	Position	Applicant's Action or Behavior
	OATC	*D10 **Check PRZR level is maintained at program by auto control.**
	SS	D11. Notify I&C to initiate repairs. ***Contacts SSS to:*** • ***Write a Condition Report*** • ***Contact OPS Duty Manager of AOP entry*** • ***Contact Maintenance***
	SS	D12. Bypass the affected instrument channel using 13509-C, BYPASS TEST INSTRUMENTATION (BTI) PANEL OPERATION, if desired. ***Use of BTI is NOT expected.***
	SS	D13. Trip affected channel bistable and place associated MASTER TEST switch in TEST position per TABLE D1 72 hours. (TS 3.3.1) ***Expect channels to remain as is to facilitate I&C repair activities.***

Op-Test No.: 2010-301 Scenario No.: 3 Page 4 of 5

Event No.: 3

Event Description: Controlling Pressurizer level channel fails high. The OATC will have to manually control charging & seal injection flow until the failed channel is removed from service. The OATC may opt to isolate letdown if letdown line starts flashing.

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.

TABLE D1

SSPS INPUT	CAB	FRAME /CARD	B/S	SWITCH	Initial
LT-459 Failure (Channel 1)					
High Level Reactor Trip	1	8/47	1	LS-459A	(____)
MASTER TEST SWITCH		8/73		7	(____)

Op-Test No.: 2010-301 Scenario No.: 3 Page 5 of 5

Event No.: 3

Event Description: Controlling Pressurizer level channel fails high. The OATC will have to manually control charging & seal injection flow until the failed channel is removed from service. The OATC may opt to isolate letdown if letdown line starts flashing.

Time	Position	Applicant's Action or Behavior
	SS	D14. Initiate applicable actions of Technical Specification 3.3.1 INFO ONLY LCO 3.3.1 FU 9 – applicable > P-7 (10% power)
	SS	*D15. **Check repairs and surveillances - COMPLETE.**
	SS	*D15 RNO. **Perform the following:** a) WHEN repairs and surveillances are complete, THEN perform step D16. b) Return to procedure and step in effect.

Op-Test No.: 2010-301 Scenario No.: 3 Page 1 of 7

Event No.: 4

Event Description: If letdown was isolated in response to the PRZR level instrument failure, then it will be returned to service using SOP 13006-1. This task will likely be performed by the UO while the OATC remains in front of the reactor controls.

Time	Position	Applicant's Action or Behavior
	UO	Selects section 4.4.2 of procedure 13006-1. ***NOTE: With letdown isolated and charging still in service, an Auto-makeup will occur to ensure VCT level is maintained. The OATC and/or UO should verify proper makeup flow rates per the Reactivity Briefing Sheet.***
	UO	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.
	UO	NOTES • This section also applies to returning normal charging and letdown to service following termination of safety injection. • Letdown is to be established as soon as possible after initiating flow through a Charging Nozzle.
	UP	4.4.2.2 IF NCP is in service, **verify** NCP MINIFLOW 1-HV-8109 is open.

Op-Test No.: 2010-301 **Scenario No.:** 3 **Page 2 of 7**

Event No.: 4

Event Description: If letdown was isolated in response to the PRZR level instrument failure, then it will be returned to service using SOP 13006-1. This task will likely be performed by the UO while the OATC remains in front of the reactor controls.

Time	Position	Applicant's Action or Behavior
	UO	4.4.2.3 Perform the following: a. **Close** LETDOWN ORIFICE Isolation Valves: • 1-HV-8149A • 1-HV-8149B • 1-HV-8149C
	UO	b. **Close** LETDOWN ISOLATION VLV UPSTREAM AND DOWNSTREAM Valves: • 1-LV-460 • 1-LV-459
	UO	c. **Close** PZR AUX SPRAY VALVE 1-HV-8145.
	UO	d. **Open** CVCS LETDOWN PIPE BREAK PROT ISOLATION 1-HV-15214.
	UO	e. **Open** RCS LETDOWN LINE ISO VLV IRC 1-HV-8160.

Op-Test No.: 2010-301 Scenario No.: 3 Page 3 of 7

Event No.: 4

Event Description: If letdown was isolated in response to the PRZR level instrument failure, then it will be returned to service using SOP 13006-1. This task will likely be performed by the UO while the OATC remains in front of the reactor controls.

Time	Position	Applicant's Action or Behavior
	UO	f. **Open** RCS LETDOWN LINE ISO VLV ORC 1-HV-8152.
	UO	g. **Place** Letdown Pressure Controller 1PIC-131 in MAN and **adjust** output to between 50% and 75%.
	UO	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. ***NOTE: UO will use value posted on board at back of control room***
	UO	i. **Verify** PRESSURIZER LEVEL 1LR-459 greater than 17%.
	UO	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.
	UO	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)

Op-Test No.: 2010-301 Scenario No.: 3 Page 4 of 7

Event No.: 4

Event Description: If letdown was isolated in response to the PRZR level instrument failure, then it will be returned to service using SOP 13006-1. This task will likely be performed by the UO while the OATC remains in front of the reactor controls.

Time	Position	Applicant's Action or Behavior
	UO	4.4.2.4 **Verify** CHARGING TO RCS ISOLATION Valves are OPEN: • 1-HV-8106 • 1-HV-8105
	UO	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.
	UO	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
	UO	**CAUTION** Unless otherwise directed by Operations Management, until the letdown flow orifices are replaced the even/odd fuel cycle rotation of 75 gpm orifices does not apply and only the 75 gpm orifice associated with 1HV-8149C should be placed in service.

Op-Test No.: 2010-301 **Scenario No.:** 3 **Page 5 of 7**

Event No.: 4

Event Description: If letdown was isolated in response to the PRZR level instrument failure, then it will be returned to service using SOP 13006-1. This task will likely be performed by the UO while the OATC remains in front of the reactor controls.

Time	Position	Applicant's Action or Behavior
	UO	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.
	UO	b. **Record** the letdown orifice that was placed in service in the Unit Control Log.
	UO	4.4.2.8 WHEN LETDOWN PRESS 1PI-131A stabilizes between 360 and 380 psig, **place** 1PIC-131 in AUTO.

Op-Test No.: 2010-301 Scenario No.: 3 Page 6 of 7

Event No.: 4

Event Description: If letdown was isolated in response to the PRZR level instrument failure, then it will be returned to service using SOP 13006-1. This task will likely be performed by the UO while the OATC remains in front of the reactor controls.

Time	Position	Applicant's Action or Behavior
	UO	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.
	UO	4.4.2.10 **Verify** LETDOWN REGEN HX OUT 1TI-127 indicates less than 380°F.
	UO	4.4.2.11 **Monitor** 1LR-459 Pressurizer Level and Pressurizer Level Setpoint.
	UO	4.4.2.12 **Maintain** Pressurizer Level within 1% of Level Setpoint using 1FIC-121.
	UO	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.
	UO	b. AFTER level has been stable within 1% of setpoint for approximately 3 minutes, **place** 1FIC-121 in AUTO.

Op-Test No.: 2010-301 Scenario No.: 3 Page 7 of 7

Event No.: 4

Event Description: If letdown was isolated in response to the PRZR level instrument failure, then it will be returned to service using SOP 13006-1. This task will likely be performed by the UO while the OATC remains in front of the reactor controls.

Time	Position	Applicant's Action or Behavior	
	UO	4.4.2.14	IF this section was performed to restore normal charging and letdown to service following termination of Safety Injection, **Return To** 19011-C, "ES-1.1 SI Termination".

Op-Test No.: 2010-301 **Scenario No.:** 3 **Page 1 of 11**

Event No.: 5

Event Description: Letdown line break inside containment will result in loss of RCS inventory and increasing radiation levels inside containment. The crew will enter AOP 18004-C, "Reactor Coolant System Leakage", to take corrective actions for the loss of inventory.

Time	Position	Applicant's Action or Behavior
	OATC	Diagnoses loss of RCS/CVCS inventory: **Alarms:** • INTMD RADIATION ALARM • HIGH RADIATION ALARM **Indications:** Charging flow (FI-121C) increases to ~ 137 GPM PRZR levels 24% & slowly lowering (LI-459/460/461) Charging flow controller (FIC-0121) @ 100% (red up arrow lit) **Safety Related Display Console & IPC:** RE-002 CNMT area low range ALERT (Amber) RE-003 CNMT area low range ALERT (Amber) RE-2562C CNMT ATM RADIOGAS HIGH (Red)
	SS/UO	Refers to Annunciator Response Procedure 17102-1 guidance for RE-2562, 002, and 003 alarms: **Initial Operator Actions** 1. **Initiate** evacuation of Containment IF the alarm is due to unexpected or unexplained radiation increases, OR IF appropriate HP controls are NOT in place for the radiological conditions indicated. 2. IF the alarm is due to expected radiation increases from preplanned evolutions AND appropriate HP controls are in place, THEN **request** HP and Chemistry to investigate the cause of alarm and sample Containment atmosphere. If required, **initiate** evacuation of Containment.

Event No.: 5

Event Description: Letdown line break inside containment will result in loss of RCS inventory and increasing radiation levels inside containment. The crew will enter AOP 18004-C, "Reactor Coolant System Leakage", to take corrective actions for the loss of inventory.

Time	Position	Applicant's Action or Behavior
	SS/UO	**Subsequent Operator Actions** 1. If required, **verify** that the Containment has been evacuated and all personnel are accounted for. 2. **Perform** the following: (1) IF RCS leakage IS apparent by observable conditions, **initiate** 18004-C, "RCS Leakage."
	SS	Enters AOP 18004-C, "Reactor Coolant System Leakage" Section A. (Crew Update)
	SS	A1. Check plant conditions: In Mode 1 or 2. -OR- In Mode 3 with RCS pressure greater than 1000 psig.
	OATC/UO	A2. Initiate the Continuous Actions Page.
		***A3. Maintain PRZR level:** a) Adjust charging flow as necessary to maintain program level. b) Check PRZR level – STABLE OR RISING.

Op-Test No.: 2010-301 Scenario No.: 3 Page 3 of 11

Event No.: 5

Event Description: Letdown line break inside containment will result in loss of RCS inventory and increasing radiation levels inside containment. The crew will enter AOP 18004-C, "Reactor Coolant System Leakage", to take corrective actions for the loss of inventory.

Time	Position	Applicant's Action or Behavior
	OATC	***A3b RNO:** ***NOTE: Isolating letdown will isolate the leak.*** 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.
	SS	**CAUTION** The NCP will NOT have miniflow when the CCP normal miniflow valves are closed.

Event No.: 5

Event Description: Letdown line break inside containment will result in loss of RCS inventory and increasing radiation levels inside containment. The crew will enter AOP 18004-C, "Reactor Coolant System Leakage", to take corrective actions for the loss of inventory.

Time	Position	Applicant's Action or Behavior
	OATC	A4. Check charging flow less than or equal to 100 gpm. ***NOTE: Charging flow is expected to drop below 100 gpm due to isolating letdown***
	OATC	RNO ***(This is not expected to be performed)*** A4. Shift charging suction to the RWST: a. Open RWST TO CCP A&B SUCTION valves: • LV 0112D • LV 0112E b. Close VCT OUTLET ISOLATION valves: • LV 0112B • LV 0112C a. Place CCP alternate mini flow valves in ENABLE PTL: • HV 8508A • HV 8508B b. Close CCP normal miniflow valves: • HV 8110 CCP A & B COMMON MINIFLOW • HV 8111A CCP A MINIFLOW • HV 8111B CCP B MINIFLOW c. Trip the reactor. d. Initiate19000-C, E 0 REACTOR TRIP OR SAFETY INJECTION.
	OATC	*A5. **Maintain VCT level using automatic or manual makeup control.**

Op-Test No.: 2010-301 Scenario No.: 3 Page 5 of 11

Event No.: 5

Event Description: Letdown line break inside containment will result in loss of RCS inventory and increasing radiation levels inside containment. The crew will enter AOP 18004-C, "Reactor Coolant System Leakage", to take corrective actions for the loss of inventory.

Time	Position	Applicant's Action or Behavior
	SS	A6. Initiate 91001-C, EMERGENCY CLASSIFICATION AND IMPLEMENTING INSTRUCTIONS
	OATC	A7. Verify PRZR PORVs - CLOSED.
	OATC	A8. Check PRZR Safety Valves - CLOSED.
	UO	A9. Stop any load changes in progress.
	OATC	A10. Check PRZR pressure - TRENDING TO PROGRAM.
	OATC/UO	*A11 **Monitor CNMT pressure:** • Less than 3.8 psig. • Stable.
	SS	A12 Initiate 14905, RCS LEAKAGE CALCULATION (INVENTORY BALANCE) to verify TS 3.4.13 compliance.

Event No.: 5

Event Description: Letdown line break inside containment will result in loss of RCS inventory and increasing radiation levels inside containment. The crew will enter AOP 18004-C, "Reactor Coolant System Leakage", to take corrective actions for the loss of inventory.

Time	Position	Applicant's Action or Behavior
	SS	**CAUTION** Non essential personnel should be evacuated from containment if conditions warrant. However, a containment entry may be necessary to identify the source of the leakage, if conditions permit.
	SS/OATC	A13 Locate the source of leakage using ATTACHMENT A.

Event No.: 5

Event Description: Letdown line break inside containment will result in loss of RCS inventory and increasing radiation levels inside containment. The crew will enter AOP 18004-C, "Reactor Coolant System Leakage", to take corrective actions for the loss of inventory.

ATTACHMENT A
LEAK IDENTIFICATION SYMPTOMS

1. Leak from pressurizer steam space:

   - System pressure degraded with pressurizer level normal and relatively stable.
   - Rising temperature, pressure or level in PRT.
   - ALB12-E01 PRZR RELIEF DISCH HI TEMP.
   - ALB12-F01 PRZR SAFETY RELIEF DISCH HI TEMP.
   - ALB12-E02 PRZR REL TANK HI PRESS.
   - ALB12-F02 PRZR REL TANK HI/LO LEVEL.
   - ALB12-E03 PRZR REL TANK HI TEMP.
   - A pressurizer level/pressure instrument reference leg leak will display the following symptoms:
     - Affected pressure channel failing low and affected level channel failing high.
     - Unaffected pressure channels lowering and unaffected level channels normal and relatively stable.
     - ALB11-C01 PRZR CONTROL HI LEVEL DEV AND HEATERS ON.
     - ALB11-E01 PRZR HI LEVEL ALARM.
     - ALB11-F01 PRZR HI LEVEL CHANNEL ALERT.

2. Leak past reactor vessel head flange:

   - ALB12-F03 RV FLG LKOF HI TEMP.

Event No.: 5

Event Description: Letdown line break inside containment will result in loss of RCS inventory and increasing radiation levels inside containment. The crew will enter AOP 18004-C, "Reactor Coolant System Leakage", to take corrective actions for the loss of inventory.

3. Leak into auxiliary component cooling water:

   - ALB-04-A05 (B05, C05, D05) ACCW RCP 1(2,3, 4) THERM BARRIER HX HI FLOW.
   - ALB04-B06 ACCW RCP THRM BARRIER HI PRESS.
   - ALB04-A01 ACCW SURGE TK HI/LO LVL.
   - RE-1950 Auxiliary component cooling water process monitor rising or alarm.
   - ACCW outlet from seal water heat exchanger local ti-2075.
   - ALB04-C02 ACCW EXCESS LTDN HX LO FLOW extinguished.
   - Low or no letdown flow indicated on FI-0132A/C with normal charging temperature indicated on TI-0126 (Letdown heat exchanger tube leak).

4. Reactor coolant pump seal package:

   - ALB08-A03(B03,C03,D03) RCP1 (2,3,4) STANDPIPE HI LEVEL.
   - ALB08-A05(B05,C05,D05) RCP1 (2,3,4) CONTROLLED LKG HI/LO FLOW.
   - ALB08-A04(B04,C04,D04) RCP1 (2,3,4) NO.2 SEAL LKOF HI FLOW.
   - Abnormally high seal return flow indicated on FI-0160 or FI-0158..
   - Low differential pressure across No. 1 seal for any reactor coolant pump/

5. Safety injection system accumulators:

   - ALB06-A03(B03,C03,D03) ACCUM TANK 1 (2,3,4) HI/LO LEVEL.
   - Rising water level indication for any accumulator.
   - Rising pressure indication for any accumulator.

Event No.: 5

Event Description: Letdown line break inside containment will result in loss of RCS inventory and increasing radiation levels inside containment. The crew will enter AOP 18004-C, "Reactor Coolant System Leakage", to take corrective actions for the loss of inventory.

6. Chemical and volume control system:

   - Abnormal temperatures in letdown or charging flow.
   - Abnormal pressure in letdown or charging flow.
   - Abnormal flows in letdown or charging flow.
   - ALB51-B04 (ALB52-B01) CVCS TRAIN A(B) PMP RM HI TEMP.
   - Pressurizer relief tank level, temperature or pressure rising from CVCS letdown line relief valve PSV-8117.
   - Seal return line relief valve PSV-8121 lifting.
   - ALB63-E01 CVCS PIPE BREAK RM PROT ACTUATION.

7. Excess letdown line:

   - Rising temperature at Excess Letdown Heat Exchanger Outlet TI-0122.
   - Rising pressure at Excess Letdown Heat Exchanger Outlet PI-0124.

8. Reactor vessel head vent line:

   - Rising temperature on Head Vent Line TI-0400.
   - Rising flow on Head Vent Line FI-0406A or FI-0407A.
   - Rising level, temperature, or pressure in the pressurizer relief tank.

9. RHR system:

   - Lifting of relief valves PSV-8708A or 8708B as indicated by rising PRT level, pressure or temperature.
   - ALB02(03)-B05 CCW TRAIN A(B) SURGE TK HI/LO LVL

Event No.: 5

Event Description: Letdown line break inside containment will result in loss of RCS inventory and increasing radiation levels inside containment. The crew will enter AOP 18004-C, "Reactor Coolant System Leakage", to take corrective actions for the loss of inventory.

- CCW process RAD RE-0017A(B) rising or alarm.

10. Safety injection system, RHR subsystem:

    - Lifting of relief valves PSV-8842, 8856A or 8856B as indicated by rising boron recycle holdup tank levels.

11. Safety injection system, SI pumps:

    - Lifting of relief valves PSV-8851, 8853A or 8853B as indicated by rising boron recycle holdup tank levels.

12. Intersystem LOCA:

    - RWST level rising.

    - Any abnormal rise in inventory of a system connected to the RCS.

13. Steam Generator Tube Leakage:

    - SG sample results indicate greater than minimum detectable activity.

    - Secondary radiation monitors indicate increasing leakage based on historical data.

Event No.: 5

Event Description: Letdown line break inside containment will result in loss of RCS inventory and increasing radiation levels inside containment. The crew will enter AOP 18004-C, "Reactor Coolant System Leakage", to take corrective actions for the loss of inventory.

Time	Position	Applicant's Action or Behavior
	OATC	A14. Isolate the leak.
	OATC	A15. Restore normal charging and letdown, if possible by initiating 13006, CHEMICAL AND VOLUME CONTROL SYSTEM ***NOTE: The SS may opt to place excess letdown in service to keep PRZR level stable.*** ***Refer to Event 6 for placing Excess Letdown in service.***
	SS	A16. Check continued operation allowed per Operations Management.
	SS	RNO A16. Perform a unit shutdown by initiating 12004-C, POWER OPERATION (MODE 1).
	SS	A17. Return to procedure and step in effect.

Op-Test No.: 2010-301 Scenario No.: 3 Page 1 of 5

Event No.: 6

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

Time	Position	Applicant's Action or Behavior
	UO	Section 4.1 of 13008-1 is selected.
	UO	NOTE Independent Verifications performed within Section 4.1 are documented on Checklist 1.
	UO	4.1.1 **Verify** that a CVCS Charging Pump is running.
	UO	4.1.2 **Verify** CLOSED RX HEAD VENT TO EXCESS LETDOWN ISOLATION 1-HV-8098.
	UO	4.1.3 **Verify** flow controller EXCESS LETDOWN, 1HC-123 is set to closed (0% demand).
	UO	4.1.4 **Verify** OPEN RCPs Seal Leakoff Isolation valves: • 1-HV-8100 RCPS SEAL LEAKOFF ORC ISOLATION • 1-HV-8112 RCPS SEAL LEAKOFF IRC ISOLATION

Op-Test No.: 2010-301 Scenario No.: 3 Page 2 of 5

Event No.: 6

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

Time	Position	Applicant's Action or Behavior
	UO	4.1.5 **Verify** EXCESS LETDOWN TO VCT, 1HS-8143 is in the OPEN VCT position.
	UO	4.1.6 **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.
	UO	4.1.7 **Open** EXCESS LETDOWN LINE Isolation Valves: • 1-HV-8153 EXCESS LETDOWN LINE ISO VLV • 1-HV-8154 EXCESS LETDOWN LINE ISO VLV
	UO	4.1.8 **Record** the following: • Pressure on indicator EXCESS LETDOWN HX OUTLET, 1PI-124. • Temperature on indicator EXCESS LETDOWN HX OUTLET, 1TI-122.

Event No.: 6

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

Time	Position	Applicant's Action or Behavior
	UO	4.1.9 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.
	UO	4.1.10 Slowly **adjust** output flow controller EXCESS LETDOWN 1HC-123 to establish maximum allowable flow (estimated to be approximately 30 gpm).
	UO	4.1.11 **Perform** the following as required to maintain desired pressurizer level: • **Adjust** charging using CHARGING LINE CONTROL, 1FIC-121. • **Adjust** seal injection using SEAL FLOW CONTROL, 1HC-182.

Op-Test No.: 2010-301 **Scenario No.:** 3 **Page 4 of 5**

Event No.: 6

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

Time	Position	Applicant's Action or Behavior
	UO	4.1.12 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)
	UO	4.1.13 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.

Op-Test No.: 2010-301 Scenario No.: 3 Page 5 of 5

Event No.: 6

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

Time	Position	Applicant's Action or Behavior
	UO	4.1.14 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)

Op-Test No.: 2010-301 **Scenario No.:** 3 **Page 1 of 3**

Event No.: 7

Event Description: SG #4 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 by the following indications: • MN STM SFTY VLVS LLEAKING • TAVG/TREF DEVIATION • TAVG LO-LO ALERT • TERR (TAVG-TREF) LO • High ARV tailpipe temperature (back panel indication) • SG 4 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" (Crew Update)
	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.

Op-Test No.: 2010-301 **Scenario No.:** 3 **Page 2 of 3**

Event No.: 7

Event Description: SG #4 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
	OATC/UO	2. Initiate the Continuous Actions Page.
	UO	***3. Monitor steam leakage characteristics:** • **Small in magnitude such that no significant hazard to personnel or equipment exists.** • **Leakage rate is relatively stable and is not rapidly worsening.**
	OATC UO	4. Check the following: a. Tavg - MATCHED WITH TREF b. PRZR level - IN PROGRAM BAND c. PRZR pressure - BETWEEN 2220 AND 2250 PSIG d. SG levels - IN PROGRAM BAND
	UO	5. Check containment conditions - NORMAL: • Pressure • Temperature • Moisture • Sump level
	UO	6. Close SG blowdown isolation valves if the source of leakage is unknown.

Op-Test No.: 2010-301 **Scenario No.:** 3

Event No.: 7

Event Description: SG #4 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	***7. Check CSTs level - GREATER THAN 80%.**
	UO	***8. Monitor hotwell makeup rate - SUFFICIENT TO MAINTAIN LEVEL.**
	SS	9. Review applicable Technical Specification requirements. LCO 3.3.4 Remote Shutdown System – INFO ONLY LCO 3.7.4 ARV's – INFO ONLY
	SS	10. Perform one of the following: Continue plant operation. -OR- Commence a unit shutdown by initiating 12004 C, POWER OPERATION (MODE 1). ***Should select unit shutdown due to RCS/CVCS leakage***

Op-Test No.: 2010-301 **Scenario No.:** 3 **Page 1 of 6**

Event No.: 8

Event Description: High shaft vibration on RCP #2. The crew will dispatch a Systems Operator to obtain local panel readings and to determine which RCP has the high vibrations. The Annunciator Response procedure for the RCP hi shaft vibration will direct the crew the shut down the RCP using procedure 13003-1, "Reactor Coolant Pump Operation". If RCP #2 is not stopped within 10 minutes of the alarm, RCP seal leakage into CNMT will result.

Time	Position	Applicant's Action or Behavior
	OATC	Alarms: RCP SHAFT VIBRATION ALERT RCP SHAFT HI VIBRATION ***Refers to procedure 17008-1, windows E04 and F04.***
	OATC	NOTES • Prompt action is required to confirm alarm validity and shut down affected RCP if required. • The Vibration Monitoring Panel displays auctioneered high vibration levels.
	OATC SS	**INITIAL OPERATOR ACTIONS** 1. Attempt to **confirm** validity of annunciator through related plant parameters. ***Possible parameters to look at are:*** • ***seal D/P*** • ***seal injection flow*** • ***seal leak off flow*** • ***bearing temperatures*** • ***lube oil alarms***

Op-Test No.: 2010-301 **Scenario No.:** 3 **Page 2 of 6**

Event No.: 8

Event Description: High shaft vibration on RCP #2. The crew will dispatch a Systems Operator to obtain local panel readings and to determine which RCP has the high vibrations. The Annunciator Response procedure for the RCP hi shaft vibration will direct the crew the shut down the RCP using procedure 13003-1, "Reactor Coolant Pump Operation". If RCP #2 is not stopped within 10 minutes of the alarm, RCP seal leakage into CNMT will result.

Time	Position	Applicant's Action or Behavior
	SS	2. **Dispatch** an operator to the Vibration Monitoring Panel 1-1201-P5-VMP to: a. **Identify** the Reactor Coolant Pump (RCP) causing the alarm. b. **Check** both vibration channels and alarm setpoints for shaft and frame of each RCP (32 points in all) to verify no obvious vibration monitoring equipment problems exist. c. Attempt to **reset** alarm using COMMON RESET toggle switch. 3. Refer to 13003-1, "Reactor Coolant Pump Operation" and **shut down** the affected RCP. ***NOTE: The SO reports that RCP #2 shaft vibration channels are reading 21 mils, and the frame vibration channels are reading 2.5 mils. All other RCP channels indicate ~ 7 mils shaft and 1 mil frame. The common reset switch has been placed to reset to attempt to clear the alarm.***
	SS	Determines section 4.3.1 of procedure 13003-1, is the correct section to use for RCP shutdown.
	SS	**CAUTIONS** • If RHR is in the Shutdown Cooling Mode, RCS Pressure shall be less than 365 psig prior to stopping a Reactor Coolant Pump (This is to preclude lifting a RHR Suction Relief). • If RCP #1 or #4 is to be stopped, the associated Spray Valve is placed in manual and closed to prevent spray short cycling. ***Determines these cautions are N/A***

Op-Test No.: 2010-301 **Scenario No.:** 3 **Page 3 of 6**

Event No.: 8

Event Description: High shaft vibration on RCP #2. The crew will dispatch a Systems Operator to obtain local panel readings and to determine which RCP has the high vibrations. The Annunciator Response procedure for the RCP hi shaft vibration will direct the crew the shut down the RCP using procedure 13003-1, "Reactor Coolant Pump Operation". If RCP #2 is not stopped within 10 minutes of the alarm, RCP seal leakage into CNMT will result.

Time	Position	Applicant's Action or Behavior
	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 • RCP 4: 1-PIC-0455B ***Determines this step is N/A.***
	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. Red – ON Green – OFF Blue - ON
	OATC	b. IF Reactor Power is Greater than 15% Rated Thermal Power: (1) **Trip** the Reactor and **initiate** 19000-C, "E-0 Reactor Trip Or Safety Injection". (2) WHEN the immediate operator actions of 19000-C are complete, **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 Loop 2 / 1-HS-0496B / 1-HS-0496A Loop 3 / 1-HS-0497B / 1-HS-0497A Loop 4 / 1-HS-0498B / 1-HS-0498A ***Determines this step is N/A.***

Event No.: 8

Event Description: High shaft vibration on RCP #2. The crew will dispatch a Systems Operator to obtain local panel readings and to determine which RCP has the high vibrations. The Annunciator Response procedure for the RCP hi shaft vibration will direct the crew the shut down the RCP using procedure 13003-1, "Reactor Coolant Pump Operation". If RCP #2 is not stopped within 10 minutes of the alarm, RCP seal leakage into CNMT will result.

Time	Position	Applicant's Action or Behavior
	OATC	c. IF Reactor Power is less than 15% Rated Thermal Power: **(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 2 — 1-HS-0496B — 1-HS-0496A** (2) **Initiate** 18005-C, "Partial Loss Of Flow". ***Notifies SS to initiate 18005-C.***
	OATC	4.3.1.3 IF in Mode 3 or below, **perform** an RCP shutdown as follows: a. **Start** the RCP Oil Lift Pump for affected RCP, if available. b. **Stop** the RCP by placing its Non-1E Control Switch in STOP and then **place** its 1E Control Switch in STOP: RCP — Non-1E Control Switch — 1E Control Switch Loop 1 — 1-HS-0495B — 1-HS-0495A Loop 2 — 1-HS-0496B — 1-HS-0496A ***Determines this step is N/A.***

Event No.: 8

Event Description: High shaft vibration on RCP #2. The crew will dispatch a Systems Operator to obtain local panel readings and to determine which RCP has the high vibrations. The Annunciator Response procedure for the RCP hi shaft vibration will direct the crew the shut down the RCP using procedure 13003-1, "Reactor Coolant Pump Operation". If RCP #2 is not stopped within 10 minutes of the alarm, RCP seal leakage into CNMT will result.

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.
	OATC	4.3.1.4 WHEN the RCP has coasted to a stop (as indicated by reverse flow), **stop** the RCP Oil Lift Pump. ***HS-0556 placed in stop***
	SS	Initiates AOP 18005-C, "Partial Loss of Flow" (Crew Update).
	OATC	**18008-C** 1. Check reactor power - LESS THAN OR EQUAL TO 15%
	UO	2. Stop any power changes in progress.
	OATC/UO	3. Initiate the Continuous Actions Page.
	UO	* 4. **Check affected loop SG NR Level - TRENDING TO 65%** RNO: Control feed flow to maintain affected loop SG NR level between 60% and 70%.

Op-Test No.: 2010-301 Scenario No.: 3 Page 6 of 6

Event No.: 8

Event Description: High shaft vibration on RCP #2. The crew will dispatch a Systems Operator to obtain local panel readings and to determine which RCP has the high vibrations. The Annunciator Response procedure for the RCP hi shaft vibration will direct the crew the shut down the RCP using procedure 13003-1, "Reactor Coolant Pump Operation". If RCP #2 is not stopped within 10 minutes of the alarm, RCP seal leakage into CNMT will result.

Time	Position	Applicant's Action or Behavior
	OATC/UO	5. Check Tavg - TRENDING TO PROGRAM
	OATC	6. Verify PRZR level - TRENDING TO PROGRAM
	OATC	7. Verify PRZR pressure - TRENDING TO 2235 PSIG
	OATC	8. Check RCP 1 and RCP 4 - RUNNING
	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.
	SS	11. Check shutdown to Mode 3 – COMPLETE RNO: Return to Step 9.

Op-Test No.: 2010-301 **Scenario No.:** 3 **Page 1 of 16**

Event No.: 9 and 10

Event Description: A SGTR suddenly develops in the loop with the RCP high vibration immediately after the RCP is stopped. The OATC will not be able to maintain PRZR level and will manually actuate Safety Injection. The crew will enter the EOP network and transition to 19030-C, SGTR. The OATC will have to manually start SIP-1B.

Time	Position	Applicant's Action or Behavior
	OATC	Tries to maintain PRZR level: (Continuous action from AOP 18009-C) 2 Maintain PRZR Level a. Adjust charging flow as necessary to maintain program level. b. Check PRZR level – STABLE OR RISING. RNO 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 **Report to SS unable to maintain PRZR level through the normal charging path.**
	SS	Directs OATC action per AOP 18009-C step 2 RNO actions listed above
	SS	Directs OATC / UO actions using EOP 19000-C, Reactor Trip or Safety Injection

Op-Test No.: 2010-301 **Scenario No.:** 3 **Page 2 of 16**

Event No.: 9 and 10

Event Description: A SGTR suddenly develops in the loop with the RCP high vibration immediately after the RCP is stopped. The OATC will not be able to maintain PRZR level and will manually actuate Safety Injection. The crew will enter the EOP network and transition to 19030-C, SGTR. The OATC will have to manually start SIP-1B.

Time	Position	Applicant's Action or Behavior
	CREW	**IMMEDIATE ACTIONS of 19000-C, Reactor Trip or Safety Injection** 1 - Verifies Reactor Trip • Rod Bottom Lights - LIT • Reactor Trip and Bypass Breakers - OPEN • Neutron Flux - LOWERING 2 – Verifies Turbine Trip • All Turbine Stop Valves – CLOSED 3 – Checks Power to AC Emergency Buses 3a. at least 1 4160 1E bus energized - White lights - ON 3b. all AC Emergency buses energized - White lights - ON (4160V and 480V) 4 - Checks if SI / Actuated • Any SI annunciator - LIT • SI BPLP status light - LIT
	SS	Plant page for Reactor Trip / Safety Injection
	OATC / UO	6. Initiates Foldout Page 7. Initiate OATC Initial Actions pages Initiate UO Initial Actions pages.

Op-Test No.: 2010-301 **Scenario No.:** 3 **Page 3 of 16**

Event No.: 9 and 10

Event Description: A SGTR suddenly develops in the loop with the RCP high vibration immediately after the RCP is stopped. The OATC will not be able to maintain PRZR level and will manually actuate Safety Injection. The crew will enter the EOP network and transition to 19030-C, SGTR. The OATC will have to manually start SIP-1B.

Time	Position	Applicant's Action or Behavior
	OATC	**Initial Operator Actions of E-0.**
		1 Checks both Trains of ECCS aligning per MLBs.
		2 Checks Containment Isolation Phase A – actuated per MLBs
	CRITICAL	3 Checks ECCS pumps and NCP status. a. CCPs – running b. SI Pumps – running ***(manually starts SIP-1B)*** c. RHR pumps – running d. NCP – tripped
		4 CCW pumps – only two running per train
		5a NSCW pumps – only two running per train
		5b NSCW tower return / bypass valves – in auto
		6a Containment coolers running in LOW speed per MLBs
		6b NSCW cooler isolation valves open per MLBs
		7 CVI dampers and valves shut per MLBs
		8 Containment pressure remained < 21.5
	OATC	9 Checks ECCS flows: a. BIT Flow – On scale b. RCS pressure < 1625 psig (If NOT go to step 10) c. SI pump flow d. RCS pressure < 300 psig e. RHR pump flow
	OATC	10 Checks ECCS valve alignment proper on MLBs
		11 Checks at least one ACCW pump running
		12 Adjusts seal injection flow to RCPs 8 to 13 gpm.

Op-Test No.: 2010-301 **Scenario No.:** 3 **Page 4 of 16**

Event No.: 9 and 10

Event Description: A SGTR suddenly develops in the loop with the RCP high vibration immediately after the RCP is stopped. The OATC will not be able to maintain PRZR level and will manually actuate Safety Injection. The crew will enter the EOP network and transition to 19030-C, SGTR. The OATC will have to manually start SIP-1B.

Time	Position	Applicant's Action or Behavior
	UO	**Initial Operator Actions of E-0** 1. Checks MDAFW pumps running and TDAFW pump, if required. 2. Checks NR SG levels - one > 10%, If not ensures at least 570 GPM flow 3. Checks if SLI is required • Any SL Pressure < 585 psig • CNMT Pressure > 14.5 psig • High rate bistables lit with low pressure SI/SLI blocked • If any above met then verify MSIVs & BSIVs closed 4. Verifies FWI: MFRV, BFRV, MFIV, BFIVs all shut 5. Verifies SGBD isolated • places hand switches for SGBD isolation valves to close • verify SGBD sample isolations closed. 6. Verify Diesel Generators running. 7. Throttle AFW flow to control SG levels 10 – 65% NR 8. Verify both MFPs tripped. 9. Check Main Generator Output breakers open.
	OATC / UO	**19000-C** 8. Initiate Continuous Actions pages.
	OATC	9. Checks RCS temperature stable at or trending to 557 degrees F using RCS Tavg.

Event No.: 9 and 10

Event Description: A SGTR suddenly develops in the loop with the RCP high vibration immediately after the RCP is stopped. The OATC will not be able to maintain PRZR level and will manually actuate Safety Injection. The crew will enter the EOP network and transition to 19030-C, SGTR. The OATC will have to manually start SIP-1B.

Time	Position	Applicant's Action or Behavior
	UO	9RNO. If necessary, takes actions to control RCS temperature. • Stop dumping steam. • Reduces AFW flow (not < 570 gpm if SG NR levels < 10% NR). • If cooldown continues shuts MSIVs and BSIVs • If temperature > 557 F & rising then dump steam
	OATC	10 - Checks PORVs, Block Valves, & Spray Valves • a, PORVs closed and in AUTO • b, Normal spray valves closed • c, Power available to at least one block valve • d, At least one block valve open (NOT) • d RNO, verify open at least one block valve when RCS pressure > 2185 psig.
	OATC	11 - Checks if RCPs should be stopped • a, CCP or SIP running • b, RCS pressure < 1375 psig • If yes then stop all RCPs if no then go to step # 12
	UO / SS	12 - Checks for faulted SG and transition to E-2 • SG pressures: o Any lowering in an uncontrolled manner, or o Completely depressurized • If yes then go to 19020-C, E-2 • ***If no then go to step # 13***

Event No.: 9 and 10

Event Description: A SGTR suddenly develops in the loop with the RCP high vibration immediately after the RCP is stopped. The OATC will not be able to maintain PRZR level and will manually actuate Safety Injection. The crew will enter the EOP network and transition to 19030-C, SGTR. The OATC will have to manually start SIP-1B.

Time	Position	Applicant's Action or Behavior
	SS / UO	13 - Checks for SG tubes intact. a. Directs chemistry to periodically sample all SG one at a time for activity. b. Checks secondary radiation normal: o Main Steam Line Rad Monitors ▪ RE-13120 ▪ RE-13121 ▪ RE-13122 ▪ RE-13119 o Condenser Air Ejector Rad Monitors ▪ RE-12839C ▪ RE-12839D (if on scale) ▪ RE-12839E (if on scale) o Steam Generator Liquid Process Rad Monitors ▪ RE-0019 (Sample) ▪ RE-0021 (Blowdown) o SG sample radiation c. ***Any SG level rising in an uncontrolled manner (EXPECTED)*** d. If rad monitors abnormal or SG level rising uncontrollably, then go to 19030-C, E-3
	SS	**EOP 19030-C, Steam Generator Tube Rupture** Directs actions of OATC / UO using 19030-C. (Crew Update)
	OATC / UO	1. Initiate the following: • Continuous Actions and Foldout Page • Critical Safety Function Status Trees per 19200-C

Event No.: 9 and 10

Event Description: A SGTR suddenly develops in the loop with the RCP high vibration immediately after the RCP is stopped. The OATC will not be able to maintain PRZR level and will manually actuate Safety Injection. The crew will enter the EOP network and transition to 19030-C, SGTR. The OATC will have to manually start SIP-1B.

Time	Position	Applicant's Action or Behavior
	SS	2. Directs SM to implement EPIPs (91001-C)
	OATC	*3. **Maintain RCP seal injection flow 8 to 13 GPM**
	OATC	*4. **Checks if RCPs should be stopped:** • At least one CCP or SI pump running • RCS pressure < 1375 psig ***(EXPECT > 1375)*** • If pressure lowers < 1375 psig prior to initiation of RCS cooldown then stop all RCPs
	UO	*5. **Identifies Ruptured SG by any of the following:** • ***Unexpected rise in SG # 2 narrow range level***, or • Report for chemistry • High radiation from any SG steamline • High radiation from any SG blowdown line
	UO ***CRITICAL***	6. **Isolate Ruptured SG ARV:** • **Adjusts SG 2 ARV controller to 1160 psig (7.7.3 pot setting)** • **Check SG 2 ARV -CLOSED**
	UO	7. Checks at least one MDAFW pump running & capable of feeding SG(s) needed for RCS cooldown

Event No.: 9 and 10

Event Description: A SGTR suddenly develops in the loop with the RCP high vibration immediately after the RCP is stopped. The OATC will not be able to maintain PRZR level and will manually actuate Safety Injection. The crew will enter the EOP network and transition to 19030-C, SGTR. The OATC will have to manually start SIP-1B.

Time	Position	Applicant's Action or Behavior
	UO CRITICAL	**8. Closes SG 2 supply to TDAFW pump HV-3019**
	UO	9. Verifies SGBD isolation valves & handswitches in close
	UO CRITICAL	**10. Closes loop 2 MSIVs & BSIV's to isolate ruptured SG from intact SGs**
	SS	CAUTION Procedure should be performed in a timely manner to assure break flow in the ruptured SG is terminated before water enters the SGs main steam piping.
	UO	11. Maintains ruptured SG that is also faulted isolated unless needed for RCS cooldown or SG activity sample
	UO	12. Checks SG 2 isolated from intact SGs: • MSIVs & BSIVs on loop 2 shut • Steam supply to TDAFW pump (HV-3019) shut
	UO **CRITICAL**	***13. Controls ruptured SG level:** • **Maintains feed flow until NR level > 10%, then isolates feed flow**
	UO	14. Checks ruptured SG pressure > 290 psig

Event No.: 9 and 10

Event Description: A SGTR suddenly develops in the loop with the RCP high vibration immediately after the RCP is stopped. The OATC will not be able to maintain PRZR level and will manually actuate Safety Injection. The crew will enter the EOP network and transition to 19030-C, SGTR. The OATC will have to manually start SIP-1B.

Time	Position	Applicant's Action or Behavior
	OATC / UO	15. Checks if low steamline pressure SI / SLI should be blocked: a. Steam dumps available b. PRZR pressure < 2000 psig RNOb. Blocks low steamline pressure SI/SLI when RCS pressure < 2000 psig and SG high steam pressure rate alarms are clear. (HS-40068 & HS 40069)
	UO	16. Checks if automatic steam dump isolation should be bypassed: a. RCS temperature > 550 F b. As RCS cooldown initiated hold HS-500A and HS-500B in BYPASS INTERLOCK position until RCS temperature is < 550 F
	UO	17. Raises intact SG levels prior to maximum rate cooldown
	OATC	18. Checks at least one RCP running

Event No.: 9 and 10

Event Description: A SGTR suddenly develops in the loop with the RCP high vibration immediately after the RCP is stopped. The OATC will not be able to maintain PRZR level and will manually actuate Safety Injection. The crew will enter the EOP network and transition to 19030-C, SGTR. The OATC will have to manually start SIP-1B.

<table>
<tr><th>Time</th><th>Position</th><th>Applicant's Action or Behavior</th></tr>
<tr><td></td><td>CREW</td><td>19. Determines required core exit temperature for cooldown:
<table>
<tr><th>Ruptured SG Pressure (psig)</th><th>Core Exit Temperature (°F)</th></tr>
<tr><td>≥ 1200</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>
</table></td></tr>
<tr><td></td><td>UO</td><td>20. Initiates RCS cooldown at maximum rate using steam Dumps

If in Tave mode:

1) Match demand on SG header pressure controller PIC-507 and SD demand meter UI-500

2) Transfer steam dumps to STM PRESS mode using HS-500C

3) Open all available steam dumps by slowly raising demand on PIC-507

If in steam pressure mode:

1) Open all available steam dumps by slowly raising demand on PIC-507</td></tr>
</table>

Event No.: 9 and 10

Event Description: A SGTR suddenly develops in the loop with the RCP high vibration immediately after the RCP is stopped. The OATC will not be able to maintain PRZR level and will manually actuate Safety Injection. The crew will enter the EOP network and transition to 19030-C, SGTR. The OATC will have to manually start SIP-1B.

Time	Position	Applicant's Action or Behavior
	UO	*21. **Checks if RCS Cooldown should be stopped:** a. Core Exit TCs < required temperature – if not, perform 21b & 21c when < required temperature otherwise go to step 22 b. Stop RCS cooldown ***CRITICAL*** **c. Maintain core exit TCs < required temperature**
	UO	*22. **Checks intact SG levels:** a. NR level - at least one > 10% if not maintain > 570 gpm total feed flow b. Maintain NR levels between 10% and 65% c. NR level – any rising in an uncontrolled manner: if yes stop cooldown and return to step 3 If no go to step 23
	OATC	*23. **Checks PRZR PORVs and Block valves** a. Power to PRZR PORV Block Valves - AVAILABLE. b. PRZR PORVs - CLOSED. c. PRZR PORV Block Valves - AT LEAST ONE OPEN. 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.

Event No.: 9 and 10

Event Description: A SGTR suddenly develops in the loop with the RCP high vibration immediately after the RCP is stopped. The OATC will not be able to maintain PRZR level and will manually actuate Safety Injection. The crew will enter the EOP network and transition to 19030-C, SGTR. The OATC will have to manually start SIP-1B.

Time	Position	Applicant's Action or Behavior
	SS	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	24. Reset SI
	SS	CAUTION Repositioning Phase A Isolation Valves may cause radiation problems throughout plant
	OATC	25. Reset Containment Isolation Phase A
	UO OATC	26. Establish Instrument Air to Containment: a. Instrument air pressure > 100 psig b. Open INSTR AIR CNMT ISO VLV HV-9378 c. Verify PRZR Spray Valves operating as required

Event No.: 9 and 10

Event Description: A SGTR suddenly develops in the loop with the RCP high vibration immediately after the RCP is stopped. The OATC will not be able to maintain PRZR level and will manually actuate Safety Injection. The crew will enter the EOP network and transition to 19030-C, SGTR. The OATC will have to manually start SIP-1B.

Time	Position	Applicant's Action or Behavior
	OATC	27. Check if RHR pumps should be stopped: a. RHR pumps – any running with suction aligned to RWST b. RCS pressure > 300 psig c. Stop RHR pumps
	OATC	*28. **IF RCS pressure lowers in an uncontrolled manner to less than 300 psig, THEN restart RHR Pumps.**
	OATC	*29. **Check if RCS cooldown should be stopped:** a. Core Exit TCs - LESS THAN REQUIRED TEMPERATURE. RNO a. Do NOT proceed until core exit TCs less than required temperature.
	UO	b. Stop RCS cooldown.
	UO	c. Maintain Core Exit TCs - LESS THAN REQUIRED TEMPERATURE.
	SS	CAUTION Ruptured SG pressure and RCS subcooling should begin to rise as RCS pressure recovers after the cooldown is stopped.

Event No.: 9 and 10

Event Description: A SGTR suddenly develops in the loop with the RCP high vibration immediately after the RCP is stopped. The OATC will not be able to maintain PRZR level and will manually actuate Safety Injection. The crew will enter the EOP network and transition to 19030-C, SGTR. The OATC will have to manually start SIP-1B.

Time	Position	Applicant's Action or Behavior
	UO	30. Check ruptured SG(s) pressure - STABLE OR RISING.
	OATC	31. Check RCS Subcooling - GREATER THAN 44°F [58°F ADVERSE].
	OATC	32. Check if RCS depressurization termination criteria is currently met: 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 24 F [38 F ADVERSE]. -OR- PRZR level - GREATER THAN 75% [52% ADVERSE]. ***If NOT met go to step 34 (expected action)***
	OATC	34. Check Normal PRZR Spray - AVAILABLE.

Event No.: 9 and 10

Event Description: A SGTR suddenly develops in the loop with the RCP high vibration immediately after the RCP is stopped. The OATC will not be able to maintain PRZR level and will manually actuate Safety Injection. The crew will enter the EOP network and transition to 19030-C, SGTR. The OATC will have to manually start SIP-1B.

Time	Position	Applicant's Action or Behavior
	OATC	35. Depressurize RCS using Normal PRZR Spray to refill PRZR: a. Spray PRZR with maximum available spray. b. Normal PRZR Spray – EFFECTIVE AT REDUCING RCS PRESSURE c. Go to step 41.
	OATC	41. Check if any of the following conditions are satisfied: Both of the following: 1) RCS pressure < ruptured SG pressure 2) PRZR level > 9% -- OR -- RCS subcooling < 24 F -- OR – PRZR level > 75% ***RNO Do NOT continue until termination criteria met.***
	OATC	42. Terminates RCS depressurization: a. Verify normal spray valves closed b. Verify PRZR PORV(s) closed c. Block COPS d. Check auxiliary spray in service RNO d. go to step 43

Event No.: 9 and 10

Event Description: A SGTR suddenly develops in the loop with the RCP high vibration immediately after the RCP is stopped. The OATC will not be able to maintain PRZR level and will manually actuate Safety Injection. The crew will enter the EOP network and transition to 19030-C, SGTR. The OATC will have to manually start SIP-1B.

Time	Position	Applicant's Action or Behavior
	OATC	43. Check RCS pressure rising
	SS	CAUTION ECCS FLOW SHOULD BE TERMINATED when termination criteria are satisfied to prevent overfilling of the ruptured SGs.
	OATC / UO	44. Check if ECCS flow should be terminated: **(SHOULD BE MET)** • RCS subcooling > 24 F, and • SG NR level in one intact SG > 10%, or • > 570 GPM flow to SGs, and • RCS pressure stable or rising, and • PRZR level > 9%
	OATC	45. Stops both SI pumps and one CCP
		END OF SCENARIO