Facility: **Oconee** Scenario No.: **1 fnl** Op-Test No.: **1**

Examiners: _____ Operators: _____

_____ _____

_____ _____

Initial Conditions:
- 100% Reactor Power EOL

Turnover:
- AMSAC/DSS bypassed for I&E testing
- SASS in Manual for I&E testing
- 1B GWD Tank release in progress

Event No.	Malfunction No.	Event Type*	Event Description
0a	Pre-Insert Updater		AMSAC/DSS bypassed
0b	Pre-Insert Updater		1HP-24 and 1HP-25 fail closed
0c	Pre-Insert Updater		SASS in Manual
0d	MPI300		Reactor fails to trip automatically Will trip from CR
1	Override	N, BOP, SRO, TS	Pump RBNS, 1LWD-2 fails to close (TS)
2	MSS460	C, BOP, SRO	Seismic event 1A CBP Trip and 1B CBP fails to AUTO Start
3	MNI031 MNI081	I, OATC, SRO	Controlling NI Fails High
4	Override	C, BOP, SRO, TS	1A HPIP sheared shaft, STBY pump fails to auto start (TS)
5	MPS010	SRO, TS	1A SGTL 1 - 50 gpm over 10 minutes, (TS)
6		R, OATC, SRO	Manual Plant Shutdown
7	MSS190	C, OATC, SRO	Spurious Turbine Trip, Reactor fails to trip
8	Override MEL180	M, ALL	Blackout CT-1 Lockout KHU 2 Emergency Lockout TD EFDW Pump Fails to Start Regain power from Keowee Unit 1

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

Op-Test No.: _____ Scenario No.: **1** Event No.: **1** Page 1 of 1

Event Description: **Pump RBNS, 1LWD-2 fails to close: (N, BOP/SRO) (TS)**

Time	Position	Applicant's Actions or Behavior

	BOP/SRO	**Crew response:**
		BOP uses OP/1/A/1104/007 Encl 4.1 to pump the Reactor Building Normal Sump (RBNS).
		
		OP/1/A/1104/007 Encl 4.1
		
		• Verify MWHUT level adequate to receive waste volume.
		• Position the following:
		  • Open 1LWD-1 (RB NORMAL SUMP ISOLATION)
		  • Open 1LWD-2 (RB NORMAL SUMP ISOLATION).
		• Start one or both of the following:
		  • 1A RB NORM SUMP PUMP
		  • 1B RB NORM SUMP PUMP.
		
		NOTE:
		Changes in LAWT levels may occur during pumping.
		RIA Alarms may be indicative of gas leakage.
		If RBNS level was above 14" when pumps were started a level increase following securing the RBNS pumps may occur.
		
		• **WHEN** RBNS level is at desired level or ≈ 6" (low level alarm), ensure pump(s) stopped.
		• Position the following:
		  • Close 1LWD-1 (RB NORMAL SUMP ISOLATION)
		  • Close 1LWD-2 (RB NORMAL SUMP ISOLATION).
		NOTE: 1LWD-2 will fail to close
		
		SRO will refer to TS 3.6.3 (Containment Isolation) Condition A within 4 hours.

		The event is complete when TS 3.6.3 is referred to or when determined by the Lead Examiner.

Op-Test No.: _____ Scenario No.: **1** Event No.: **2** Page 1 of 1

Event Description: **Seismic event**
1A CBP Trip and 1B CBP fails to AUTO Start: (C, BOP/SRO)

Time	Position	Applicant's Actions or Behavior
	BOP/SRO	**Plant Response:** • 1SA2/A11 • 1SA-8/A-1 FDW SUCTION PRESSURE LOW • Unit runback at 20%/min due to C/FDW Suction Pressure Runback (should clear ~ 85% power) • Powdex Bypasses at 360 psig FDWP Suction Pressure. • 1C-61 opens bypassing the hydrogen coolers @ 235 psig (on either FDWP/ 2 out of 3 logic) FDWP Suction Pressure

	SRO.BOP OATC	**Crew Response:**
		• Crew should perform Plant Transient Response (PTR)
		• BOP should state: "Valid ICS runback is in progress for C/FDW suction pressure"
		• When the plant is stable/controllable OR as directed by ARG 1SA-8/A-1 FDW SUCTION PRESSURE LOW the team should elect to <u>manually</u> start the '1B' CBP (standby).
		  • Manual Actions
		  a. Verify standby condensate booster pump has started. (Start any available CBP manually if it has **<u>NOT</u>** started.)
		• Reset 1C-61 when FDWP suction pressure ≥235 psig (OP/1/A/11006/002 Condensate and Feedwater Enclosure 4.1 Normal Operation) as follows:
		  • Ensure 1C-61 is in Manual
		  • Manually open 1C-61
		  • Manually adjust 1C-61 to get 5-16 feet of H_2O
		  • Adjust 1C-61 setpoint as required to match ΔP
		  • Ensure 1C-61 to "AUTO"
		• Restore Powdex to service per (OP/1/A/11006/002 Condensate and Feedwater Enclosure 4.19 Placing Powdex In/Out of Service)
		  • When FDWP suction pressure is > 360 psig place the powdex In Service and maintain CBP suction pressure ≥ 70 psig by slowly closing 1C-14/15.
		Cue: Simulator operator call the Control Room (4911) as security and inform the operator that tremors have been felt in the area and no damage is visible:

		The event is complete when the plant stabilizes ~ 85% power or when determined by the Lead Examiner.

Op-Test No.: _____ Scenario No.: **1** Event No.: **3** Page 1 of 2

Event Description: **Controlling NI Fails High: (I, OATC/SRO)**

Time	Position	Applicant's Actions or Behavior

	BOP/OATC/ SRO	**Plant response:**
		• 1SA-01/A-1, RP Channel A Trip
		• 1SA-01/A-8, RP NI-5 High Flux Trip
		• NI-5 and NI-9 indicate 125%
		Crew response:
		• When the RPS Statalarms are received, the candidates should utilize the "Plant Transient Response" process to stabilize the plant.
		  • Verbalize to the SRO reactor power level and direction of movement.
		  • Place the Diamond and both FDW Masters in manual and position as necessary to stabilize the plant.
		  • The SRO should:
		  • Refer to AP/28, ICS Instrument Failures
		  • Contact SPOC to repair controlling NI.
		Note: The ICS will remain in manual for the remainder of the scenario.

	SRO	AP/28
		• Verify entry into AP is due to an instrument or component failure.
		• **WHEN** plant conditions are stable as indicated by the following:
		  • NI power change of < 2% from current NI power indication **AND** thermal power best ≤ pre-transient power level
		  • Tave change of < 2°F from current Tave indication
		  • THP/SG Outlet Press. change of < 30 psig from current THP/SG Outlet Press.
		  • RCS pressure change of < 150 psig from current RCS pressure
		THEN continue this procedure.

Op-Test No.: _____ Scenario No.: **1** Event No.: **3** Page 2 of 2 Event Description: **Controlling NI Fails High: (I, OATC/SRO)**	
Position	Applicant's Actions or Behavior

BOP/OATC/ SRO	**Crew response:**
	
	AP/28 (Continued)
	• Verify that current thermal power best is different than pre-transient thermal power best.
	• Notify Rx Engineering to provide Control Room with a maneuvering plan.
	• **GO TO** the applicable section per the following table:
	• Section 4C: Controlling NI
	
	AP/28: Section 4C (Controlling NI Failure)
	• Ensure DIAMOND in MANUAL.
	• Ensure the following in HAND:
	  • 1A FDW MASTER
	  • 1B FDW MASTER
	• Notify SPOC to perform the following:
	  • Select a valid NI input to ICS per AM/0/B/0326/020 (Control of Star Module Signal Selection Function).
	  • Investigate and repair the failed NI.
	• **PERFORM** an instrumentation surveillance using applicable table in Encl 5.3 (ICS Instrument Surveillances) for the failed instrument.
	• Verify instrumentation surveillance in Encl 5.3 (ICS Instrument Surveillances) was performed satisfactorily as written.
	• **WHEN** notified by SPOC that a valid NI input has been restored to ICS, **THEN GO TO** Encl 5.1 (Placing ICS in AUTO).

	The event is complete when SPOC is notified or when determined by the Lead Examiner.

Op-Test No.: _____ Scenario No.: 1 Event No.: **4** Page 1 of 2

Event Description: **"1A" HPI Pump sheared shaft STBY HPI pump fails to auto start: (C; BOP, SRO) (TS)**

Time	Position	Applicant's Actions or Behavior

	OATC
	
	SRO
	
	BOP
		Plant response:
		Statalarms:
		• 1SA-2/B-2 (HP RCP Seal Injection Flow High/Low)
		• 1SA-2/C-2 (HP Injection Pump Disch. Header Pressure High/Low)
		Board indications:
		• RC Makeup Flow = 0 gpm
		• 1A HPI Pump amps low
		• PZR level will begin to decrease and LDST level will begin to increase.
		Crew response:
		• Refer to ARG for above Statalarms
		• SRO should initiate AP/14 (Loss of Normal HPI Makeup and/or RCP Seal Injection)
		<u>AP/14</u>
		• **IAAT** loss of suction to operating HPI pumps is indicated:
		  • Motor amps low or cycling
		  • Discharge pressure low or cycling
		  • Abnormal LDST level trend
		THEN GO TO Step 3.3 (Stop <u>all</u> HPIPs)
		NOTE: Crew should recognize a sheared shaft and NOT a loss of suction.
		• Verify 1A HPI pump not operating
		• Close 1HP-5 (Letdown Isolation)
		• Place 1HP-120 (RC Volume Control) in HAND and closed
		• Place 1HP-31 (RCP Seal Flow Control) in HAND and closed
		• Attempt to start standby HPI pump (1B HPI pump)
		• Slowly open 1HP-31 in small increments until ≈ 8 gpm/RCP is achieved.
		• Re-establish normal makeup through 1HP120.
		• Reduce 1HP-7 (Letdown Control) demand to 0%.
		• Close 1HP-6 (Letdown Orifice Stop)

Op-Test No.: _____ Scenario No.: 1 Event No.: **4** Page 2 of 2

Event Description: **"1A" HPI Pump sheared shaft STBY HPI pump fails to auto start: (C; BOP, SRO) TS**

Time	Position	Applicant's Actions or Behavior

	SRO/BOP	• Open the following:
		  • 1HP-1 (1A Letdown Cooler Inlet)
		  • 1HP-2 (1B Letdown Cooler Outlet)
		  • 1HP-3 (1A Letdown Cooler Inlet)
		  • 1HP-4 (1B Letdown Cooler Outlet)
		• Open 1HP-5
		• Throttle open 1HP-7 for ≈ 20 gpm letdown flow.
		• Open 1HP-6
		• Adjust 1HP-7 for desired letdown flow.
		• Place 1HP-31 in auto.

	SRO	Refer to Tech Spec 3.5.2 High Pressure Injection • Condition "A" • Required Action: Restore HPI pump to OPERABLE status • Completion Time: 72 hours **Note: Due to sequence of events, SRO may not review the TS during the scenario. Follow-up questions may be required to ensure knowledge of this competency.**
		Event is complete when normal makeup and letdown is established or when directed by the lead examiner.

Op-Test No.: _____ Scenario No.: **1** Event No.: **5** Page 1 of 2

Event Description: **1A SGTL 1 - 50 gpm over 10 minutes: (SRO) (TS)**

Time	Position	Applicant's Actions or Behavior

	BOP/SRO	**Plant response:**
		1SA8/E10 (N-16 RM PRIMARY TO SECONDARY TUBE LEAK)
		1SA8/D10 (RM CSAE EXHAUST RADIATION HIGH)
		1SA8/B9 (RM PROCESS MONITOR RADIATION HIGH)
		1RIA 59 indicating 3 gpm increasing.
		NOTE: Leak rate will ramp to 50 gpm over the next 10 minutes.
		Crew response:
		Crew will enter AP/31 (Primary to Secondary Leakage)
		• **IAAT** primary to secondary leak rate is ≥ 25 gpm (36,000gpd), **THEN GO TO** Unit 1 EOP.
		• **IAAT** either of the following exists for 1RIA-54:
		  • is in High alarm
		  • inoperable
		  THEN Dispatch an operator to open and white tag the following:
		  • 1XD-R3C (1A TURBINE BUILDING SUMP PUMP BKR)
		  • 1XE-R3D (1B TURBINE BUILDING SUMP PUMP BKR)
		• **IAAT** gross tube leakage is indicated by an increase in normal RC makeup flow, **THEN GO TO** Step 4.79.
		• Verify OAC primary to secondary leak rate calculation available (including 1RIA-40 operable).
		• Determine primary to secondary leakage rate using OAC point O1P1599 (EST TOTAL PRI TO SEC LEAKRATE).

Op-Test No.: _____ Scenario No.: **1** Event No.: **5** Page 2 of 2

Event Description: **1A SGTL 1 - 50 gpm over 10 minutes: (SRO) (TS)**

Time	Position	Applicant's Actions or Behavior

	BOP/SRO	**Crew response:**
		1. AP/31 (Primary to Secondary Leakage) Continued
		• **IAAT** primary to secondary leak rate is ≥ 25 gpm (36,000gpd), **THEN GO TO** Unit 1 EOP.
		• **IAAT** either of the following exists for 1RIA-54:
		  • is in High alarm
		  • inoperable
		  THEN perform Dispatch an operator to open and white tag the following:
		  • 1XD-R3C (1A TURBINE BUILDING SUMP PUMP BKR)
		  • 1XE-R3D (1B TURBINE BUILDING SUMP PUMP BKR)
		• Verify OAC primary to secondary leak rate calculation available (including 1RIA-40 operable).
		• Determine primary to secondary leakage rate using OAC point O1P1599 (EST TOTAL PRI TO SEC LEAKRATE).
		• Make notifications of primary to secondary leakage per OMP 1-14
		• Initiate a unit shutdown using the following as necessary to meet requirements of Encl 5.1 (Unit Shutdown Requirements):
		  • OP/1/A/1102/004 (Operation at Power)
		  • OP/1/A/1102/010 (Controlling Procedure for Unit Shutdown)
		• **IAAT** primary to secondary leakage increases, **THEN** modify shutdown as required by Encl 5.1 (Unit Shutdown Requirements).
		• Notify Radwaste to stop all liquid releases in progress until sample results assure release rates within limits.
		• Stop all gaseous releases in progress until sample results assure release rates within limits.
		• Make up to the UST only as necessary to maintain UST level > 7'.

		Event is complete when EOP entry is made or when directed by the lead examiner.

Op-Test No.: _____ Scenario No.: **1** Event No.: **6** Page 1 of 1

Event Description: **Manuel Plant Shutdown: (R, OATC/SRO)**

Time	Position	Applicant's Actions or Behavior

	BOP/SRO
	
	OATC
	
	BOP
		Crew response:
		SGTR tab of EOP
		• Maintain Pzr level ≥ 220″ by initiating Encl 5.5 (Pzr and LDST Level Control).
		• **IAAT** Pzr level decreasing with all available HPI, **AND** Rx power is > 15%, **THEN** perform the following:
		  • Trip the Rx.
		  • **GO TO** IMA tab.
		• Verify all of the following:
		  • Rx power > 40%
		  • 1RIA-59 operable
		  • 1RIA-60 operable
		• Determine leak rate using the following:
		  • 1RIA-59
		  • 1RIA-60
		• Initiate manual power reduction to < 15%.
		
		NOTE: For event 7 to initiate correctly, it must occur prior to Reactor power decreasing below 30%.
		
		Initiate Encl 5.19 (Control of Plant Equipment During Shutdown for SGTR).
		• **WHEN** both of the following exist:
		  • Reactor power is ≈ 15% FP
		  • Unit auxiliaries have been transferred
		  THEN continue in this procedure.
		• Depress turbine TRIP pushbutton.
		• Verify all TURBINE STOP VALVES closed.
		• Open the following:
		  • PCB 20
		  • PCB 21
		• Perform the following:
		  • Open the Generator Field Breaker.
		  • Position EXCITATION switch to OFF.
		• Verify TBVs controlling SG pressure as expected.
		• Reduce Rx power to ≤ 5% FP.

		Event is complete when reactor power has been reduced by 5-15% or when directed by the lead examiner.

Op-Test No.: _____ Scenario No.: **1** Event No.: **7** Page 1 of 1

Event Description: **Spurious Turbine Trip; Reactor fails to trip: (C, OATC, SRO)**

Time	Position	Applicant's Actions or Behavior
	OATC/SRO	**Plant response:** • Main Turbine trips • 1SA1/A1 (RP CHANNEL A TRIP) • 1SA1/B1 (RP CHANNEL B TRIP) • 1SA1/C1 (RP CHANNEL C TRIP) • 1SA1/D1 (RP CHANNEL D TRIP) **Crew response:** Crew recognizes that the reactor should have tripped but did not. OATC to SRO "Reactor Should Have Tripped" • Perform Immediate Manual Actions (IMAs) • Depress REACTOR TRIP pushbutton. **(CT-24)** **NOTE: Reactor will trip when the pushbutton is depressed.** • Verify reactor power < 5% FP and decreasing. • Depress turbine TRIP pushbutton. • Verify all turbine stop valves closed. • Verify RCP seal injection available. **NOTE: A Blackout will occur when the turbine trips (Event 8).**
		Event is complete when the reactor has been manually tripped or when directed by the lead examiner.

Op-Test No.: _____ Scenario No.: **1** Event No.: **8** Page 1 of 6

Event Description: **Blackout: (M, ALL)**

Time	Position	Applicant's Actions or Behavior
		Plant response: • KHU #2 Emergency Lockout • CT-1 Lockout • MFBs will de-energize • TD EFDWP trip **Crew response:**

	OATC/SRO	• Perform Immediate Manual Actions (IMAs)
		  • Depress REACTOR TRIP pushbutton.
		NOTE: Reactor will trip when the pushbutton is depressed.
		  • Verify reactor power < 5% FP and decreasing.
		  • Depress turbine TRIP pushbutton.
		  • Verify all turbine stop valves closed.
		  • Verify RCP seal injection available.
		  • **IF** CC is unavailable, **THEN** immediately perform the following:
		  • Stop all RCPs.
		  • Notify CR SRO to initiate AP/25 (Standby Shutdown Facility Emergency Operating Procedure).

	BOP	AP/25
		• Obtain the following items:
		  • Vital area access key ring
		  • Flashlight
		• Proceed to the SSF.
		NOTE: BOP will be stopped before leaving the control room and informed that Unit 2 RO will perform SSF actions.

	OATC/BOP	Perform Symptom Check
		• Power Range NIs **NOT** < 5%
		• Power Range NIs **NOT** decreasing
		• Any SCM < 0°F
		• Loss of Main and Emergency FDW (including unsuccessful manual initiation of EFDW)
		• Uncontrolled Main steam line(s) pressure decrease
		• SGTR
		  • CSAE Offgas alarms
		  • Process monitor alarms (RIA-40, 59, 60)
		  • Area monitor alarms (RIA-16/17)

Op-Test No.: _____ Scenario No.: **1** Event No.: **8** Page 2 of 6

Event Description: **Blackout: (M, ALL)**

Time	Position	Applicant's Actions or Behavior

	OATC	**Crew response:**
		
		Rule 3 (Loss of Main or Emergency Feedwater)
		• **IAAT NO** SGs can be fed with FDW (Main/CBP/Emergency), **AND** any of the following exist:
		  • RCS pressure reaches 2300 psig **OR**
		  • NDT limit __ Pzr level reaches 375″ [340″ acc]
		  THEN PERFORM Rule 4 (Initiation of HPI Forced Cooling).
		• Start EFDW pumps to feed all intact SGs.
		• Place the following in MANUAL and close:
		  • 1FDW-315
		  • 1FDW-316
		• Dispatch an operator to perform Encl 5.26 (Manual Start of TDEFDWP).
		• Dispatch an operator to open the following:
		  • 2FDW-313 (2A EFDW LINE DISCH TO 2A S/G X-CONN)
		  • 2FDW-314 (2B EFDW LINE DISCH TO 2B S/G X-CONN)
		  • Dispatch an operator to 1FDW-313 and have them notify the CR when in position.

	SRO	1. SRO will transfer to the BLACKOUT tab. • SRO will direct the BOP to perform Encl. 5.38 (Restoration of Power)

Op-Test No.: _____ Scenario No.: **1** Event No.: **8** Page 3 of 6

Event Description: **Blackout: (M, ALL)**

Time	Position	Applicant's Actions or Behavior

	SRO/BOP OATC	**Crew response:**
		
		SRO will transfer to the BLACKOUT tab. (Continued)
		• SRO will direct the BOP to perform Encl. 5.38 (Restoration of Power)
		• Position the following to OFF:
		  • 1A MD EFDWP
		  • 1B MD EFDWP
		• Feed and steam available SGs as necessary to stabilize RCS P/T.

		NOTE: Feeding SGs with EFDW is desired above HPI Forced Cooling. Step 6 should be performed prior to re-performing Rule 3.

	SRO	• **IAAT NO** SGs are being fed, **AND** any source of EFDW (Unit 1 or another unit) becomes available, **THEN** perform the following:
		  • Establish 100 gpm to each intact SG.
		  • Perform one of the following:
		  • Tc > 550°F- Initiate cool down to Tc 540°F - 550°F by feeding and steaming intact SGs at a rate that prevents RCS saturation.
		  • Tc ≤ 550°F- Feed and steam intact SGs to stabilize Tc ≤ 550°F.
		• **IAAT** EFDW from any source is insufficient to maintain stable RCS P/T, **THEN** notify SSF operator that feeding SGs with SSF ASW is required.
		• **IAAT** power is restored to any of the following:
		  • 1TC
		  • 1TD
		  • 1TE
		  THEN Initiate AP/11 (Recovery from Loss of Power).
		  GO TO Subsequent Actions Tab

	SRO	SRO will transfer to the Subsequent Actions tab. SRO will transfer to the SGTR tab

Op-Test No.: _____ Scenario No.: **1** Event No.: **8** Page 4 of 6

Event Description: **Blackout: (M, ALL)**

Time	Position	Applicant's Actions or Behavior

	OATC/BOP	**Crew response:**
		RO will perform Encl. 5.38 (Restoration of Power) **(CT-8)**
		• Place 1HP-31 in HAND and reduce demand to 0.
		• Close 1HP-21.
		• Verify both Standby Bus #1 and Standby Bus #2 are de-energized.
		• Emergency start Keowee units
		• Notify Keowee Operator to place all operating Keowee units in Oconee Control.
		• Ensure one of the following is closed for an operating Keowee unit:
		  • UNIT 1 EMER FDR
		  • ACB 3
		• Verify CT-4 indicates ≈ 4160 volts.
		• Place the following transfer switches in MAN:
		  • CT4 BUS 1 AUTO/MAN
		  • CT4 BUS 2 AUTO/MAN
		• Place the following switches in ON:
		  • STBY BUS 1 SYNCHRONIZING
		  • STBY BUS 2 SYNCHRONIZING
		• Close the following breakers:
		  • SK1 CT4 STBY BUS 1 FEEDER
		  • SK2 CT4 STDY BUS 2 FEEDER
		• Place the following switches in OFF:
		  • STBY BUS 1 SYNCHRONIZING
		  • STBY BUS 2 SYNCHRONIZING
		• Verify Standby Bus #1 energized.
		• Place the following switches in MAN:
		  • MFB1 AUTO/MAN
		  • MFB2 AUTO/MAN
		  • STANDBY 1 AUTO/MAN
		  • STANDBY 2 AUTO/MAN
		• Open the following breakers:
		  • $N1_1$ MFB1 NORMAL FDR
		  • $N2_1$ MFB2 NORMAL FDR
		  • $E1_1$ MFB1 STARTUP FDR
		  • $E2_1$ MFB2 STARTUP FDR
		• Close the following breakers:
		  • $S1_1$ STBY BUS 1 TO MFB1
		  • $S2_1$ STBY BUS 2 TO MFB2

Op-Test No.: _____ Scenario No.: **1** Event No.: **8** Page 5 of 6

Event Description: **Blackout: (M, ALL)**

Time	Position	Applicant's Actions or Behavior

	OATC/BOP	**Crew response:**
		RO will make up to RCS per Encl. 5.5 (Pzr and LDST Level Cont)
		• Utilize the following as necessary to maintain desired Pzr level: **(CT-30)**
		  • Standby HPI pump
		  • 1HP-26
		  • 1HP-7
		  • 1HP-5
		  • 1HP-120 setpoint or valve demand
		• **IAAT** LDST level **CANNOT** be maintained, **THEN o**pen 1HP-24, open 1HP-25 and close 1HP-16.
		NOTE: 1HP 24 and 1HP-25 fail closed.
		• **IF** both BWST suction valves (1HP-24 and 1HP-25) are closed, **THEN** perform the following:
		  • Start 1A LPI PUMP.
		  • Start 1B LPI PUMP.
		  • Open the following:
		  • 1LP-15
		  • 1LP-16
		  • 1LP-9
		  • 1LP-10
		  • 1LP-6
		  • 1LP-7
		• **IF** two LPI Pumps are running only to provide HPI pump suction, **THEN** secure one LPI pump.
		• Dispatch an operator to open 1HP-363 (LETDOWN LINE TO LPI PUMP SUCTION BLOCK)

Op-Test No.: _____ Scenario No.: **1** Event No.: **8** Page 6 of 6

Event Description: **Blackout: (M, ALL)**

Time	Position	Applicant's Actions or Behavior

	SRO	**Crew response:**
		SGTR tab
		• Maintain Pzr level 140″ - 180″
		• Start A and B Outside Air Booster Fan **(CT-27)**
		• Notify Unit 3 to start 3A and 3B Outside Air Booster Fans
		• Monitor RIAs 16 and 17 to identify all SGs with a tube rupture.
		• Notify RP to survey both MS lines for radiation.
		• Secure any unnecessary offsite release paths. (Main Vacuum Pumps, TDEFDWP, Emergency Steam Air Ejector, etc.)
		• Open the following:
		  • 1HP-24
		  • 1HP-25
		• Secure makeup to LDST. {8}
		• Maintain both SG pressures < 950 psig using either of the following:
		  • TBVs
		  • Dispatch two operators to perform
		Encl 5.24 (Operation of the ADVs)
		• Minimize core SCM using the following methods: **(CT-7)**
		  • De-energize all Pzr heaters
		  • Use Pzr spray
		  • Maintain Pzr level 140″ - 180″
		• **IAAT** RCS de-pressurization methods are inadequate in minimizing core SCM,
		• Cycle PORV as necessary

		When crew takes action to minimize SCM or when directed by the lead examiner, the event is complete.

CRITICAL TASKS

1. CT-24, ATWS
2. CT-30, Control RCS Inventory
3. CT-27, Implementation of Control Room Habitability Guidance
4. CT-7, Minimize SCM
5. CT-8, Electrical Power Alignment

Facility: **Oconee** Scenario No.: **2 fnl** Op-Test No.: **1**

Examiners: _____ Operators: _____

_____ _____

_____ _____

Initial Conditions:
- 50% Reactor Power EOL

Turnover:
- AMSAC/DSS bypassed for I&E testing
- SASS in Manual for I&E testing

Event No.	Malfunction No.	Event Type*	Event Description
0a	Pre-Insert Updater		SASS in MANUAL
0b	Pre-Insert Updater		AMSAC/DSS bypassed
0c	Pre-insert Updater		Main Turbine fail to trip
0d	Pre-Insert Updater		1HP-26 fails CLOSED
1	Override	N, BOP, SRO, TS	Swap operating RBCUs, High Vibration (TS)
2	MPI121	C, OATC, SRO	Pzr Level #1 fails LOW
3	MCS008	C, BOP, SRO	Failure of AS controller
4	MSS200	C, BOP, SRO	1B1 RCP upper seal failure
5	MPS249	I, OATC, SRO	ΔTc failure upon securing 1B1 RCP
6	MPS248 MPS247 MPS400	SRO, TS	1B1 RCP all seals fail (RCS Leak) (TS) 1HP 26 will not open
7		R, OATC, SRO	Manual Reactor power decrease
8	MPS400	M, ALL	SBLOCA Turbine fail to trip 1A2 RCP will not trip

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

Op-Test No.: _____ Scenario No.: 2 Event No.: **1** Page 1 of 1

Event Description: **Swap operating RBCUs: (N, BOP/SRO) (TS)**

Time	Position	Applicant's Actions or Behavior

	BOP/SRO	**NOTE: Event 2 will run in parallel with Event 1.**
		Crew response:
		OP/1/A/1104/015 (Reactor Building Cooling system)
		• BOP will stop the C RBCU
		• Verify RB pressure within limits of PT/1/A/0600/001 (Periodic Instrument Surveillance).
		• Begin monitoring the following:
		  • RB pressure
		  • RB temperature
		  • Place desired switch to "OFF":
		  • 1C RBCU
		  • BOP will start the B RBCU
		• Verify RB pressure within limits of PT/1/A/0600/001 (Periodic Instrument Surveillance).
		• Begin monitoring the following:
		  • RB pressure
		  • RB temperature
		  • Place desired switch to "HIGH":
		  • 1B RBCU
		Plant response:
		OAC alarm "High Vibration 1B RBCU"
		Crew response:

	BOP	• BOP will attempt to reset vibration alarm (Panel 1AB3)
		NOTE: Reactor Building Cooling System (OP/1/A/1104/015) Limit & Precaution: • **If RBCU vibration alarms are received after RBCU is in operation and CANNOT be promptly cleared, Immediately stop the affected RBCU.** • **Once selected to "OFF" RBCU must remain "OFF" for 30 minutes before restarting except in emergencies.**
	SRO	• BOP should secure the 1B RBCU • SRO should refer to TS 3.6.5 Reactor Building Spray and Cooling Trains Condition B: Restore to operable within 7 days.
		When the 1B RBCU has been secured and SRO has referred to TS or when directed by the lead examiner this event is completed.

Op-Test No.: _____ Scenario No.: **2** Event No.: **2** Page 1 of 1

Event Description: **PZR Level fails LOW: (C, OATC/SRO)**

Time	Position	Applicant's Actions or Behavior
	OATC SRO/OATC	**NOTE: Event 2 will run in parallel with Event 1.** **Plant response**: Statalarms • 1SA-2/C-3, RC Pressurizer Level High/Low • 1SA-2/C-4, RC Pressurizer Level Emerg. High/Low Front board (1UB1) indications: • PZR Level 1 indicates 0” • 1HP-120 (RC Volume Control) throttles open • Makeup flow Increases. **Crew response**: <u>1SA-2/C-3:</u> • Check alternate PZR level indications (1UB1 and OAC) and determine that PZR level 1 has failed high. • Check for proper Makeup/Letdown flows and adjust to restore proper level. • SRO should direct the BOP to take actions to restore normal PZR level. • SRO should refer to PT/600/001 (Periodic Instrument Surveillance) SASS Manual Operation and have the BOP select an alternate PZR level channel on 1UB1.
		When an alternate PZR level channel has been selected or when directed by the lead evaluator this event is completed.

Op-Test No.: _____ Scenario No.: **2** Event No.: **3** Page 1 of 1

Event Description: **Failure of AS Controller: (C, BOP/SRO)**

Time	Position	Applicant's Actions or Behavior

	SRO/BOP	**Plant response:**
		• 1SA06/C10, AS HDR PRESS LOW will actuate
		• 1MS-126 & 1MS-129 MAIN STM TO SU STM PRESS controller will indicate AS pressure < 300 psig and decreasing.
		Crew response:
		1SA06/C10
		• Verify proper operation of MS/AS controller on Unit supplying Auxiliary Steam Header.
		• **IF** necessary, transfer AS Header to another Unit per OP/1,2,3/A/1106/22 (Auxiliary Steam System).
		• OP/1,2,3/A/1106/22 (Auxiliary Steam System) Encl 4.2.
		  • Ensure 1MS-126 & 1MS-129 (MAIN STM TO SU STM PRESS) controller in "MANUAL".
		  • Ensure closed 1MS-126 & 1MS-129 (MAIN STM TO SU STM PRESS).
		NOTE:
		1MS-24 is preferred source of MS to AS. 1MS-33 may be opened by R&R.
		  • Perform one of the following:
		  • Open 1MS-24 (1A MS TO AS HDR).
		  Or
		  • Open 1MS-33 per R&R.
		NOTE:
		MS to Aux Steam flow should NOT exceed 240,000 lbm/hr on any single unit.
		  • Manually throttle open 1MS-126 & 1MS-129 (MAIN STM TO SU STM PRESS) to increase Aux Steam Header pressure.
		  • Continue to throttle 1MS-126 & 1MS-129 (MAIN STM TO SU STM PRESS) to increase Aux Steam Header pressure to ≈ 300 psig.
		  • **WHEN** Aux Steam Header is ≈ 300 psig: Adjust 1MS-126 & 1MS-129 (MAIN STM TO SU STM PRESS) controller setpoint to match Aux Steam Header pressure.
		  • Place 1MS-126 & 1MS-129 (MAIN STM TO SU STM PRESS) controller to "AUTO".
		  • **IF** required, adjust 1MS-126 & 1MS-129 (MAIN STM TO SU STM PRESS) controller setpoint to ≈ 300 psig.

		When the Unit 1 AS controller is in AUTO or when directed by the lead examiner this event is completed.

Op-Test No.: _____ Scenario No.: **2** Event No.: **4** Page 1 of 2

Event Description: **1B1 RCP Upper Seal Failure: (C, BOP/SRO)**

Time	Position	Applicant's Actions or Behavior

	SRO/BOP
	
	SRO
	
	BOP
		Plant response:
		• 1SA-06/C-5, RC PUMP 1B1 CAVITY PRESS HI/LOW
		• 1SA-06/C-6, RC PUMP 1B1 SEAL RETURN FLOW HI/LOW
		
		Crew response:
		Refer to the ARG and AP/16, Abnormal Reactor Coolant Pump Operations.
		<u>Refer to AP/16</u>:
		• **IAAT** the failure is identified, **THEN GO TO** the applicable section: 4A Seal Failure
		• **IAAT** any of the following indicate loss of all RCP seals:
		  • RB RIAs increasing or in alarm
		  • RCS Tave constant with LDST level decreasing more than normal
		  • Quench Tank level rate increasing
		• RB Normal Sump rate increasing
		THEN initiate AP/02 (Excessive RCS Leakage).
		• Verify the following are open:
		  • 1HP-20
		  • 1HP-21
		• Verify the following are open for the affected RCP:
		(Seal Return Stop RCP)
		  • 1HP-228 1A1
		  • 1HP-226 1A2
		  • 1HP-232 1B1
		  • 1HP-230 1B2
		  • Calculate RCP seal ΔP for affected RCPs per the following:
		(Turn-on Code "RCP")
		Lower Seal ΔP = _____ psig - _____ psig = _____ psid
		(RCS Press) (Lower Seal Cavity Press)
		Middle Seal ΔP = _____ psig - _____ psig = _____ psid
		(Lower Seal Cavity Press) (Upper Seal Cavity Press)
		Upper Seal ΔP = _____ psig - _____ psig = _____ psid
		(Upper Seal Cavity Press) (RB Press)

		When the 1B1 RCP has been secured or when directed by the lead Examiner, the event is complete.

Op-Test No.: _____ Scenario No.: **2** Event No.: **4** Page 2 of 2

Event Description: **1B1 RCP upper seal failure: (C, BOP/SRO)**

Time	Position	Applicant's Actions or Behavior

	BOP/SRO	**Crew response:**
		
		Refer to AP/16 Continued.
		• Request Operations Duty Person and RCP Component Engineer provide the following:
		  • Immediate evaluation
		  • Additional monitoring requirements
		  • Extended limits
		
		CUE: Notify the crew to secure the 1B1 RCP.
		• **IAAT** shutdown of an RCP is desired, **THEN** perform Steps 13 - 18.
		• Verify four RCPs operating.
		• Verify Rx power is ≤ 70% as indicated on all NIs.
		• Stop the affected RCP.

		When the 1B1 RCP has been secured or when directed by the lead Examiner, the event is complete.

Op-Test No.: _____ Scenario No.: **2** Event No.: **5** Page 1 of 2

Event Description: **ΔTc Failure upon securing 1B1 RCP (I, OATC, SRO)**

Time	Position	Applicant's Actions or Behavior
	OATC/SRO	**Plant response:** When the 1B1 RCP is secured the ΔTC controller will fail at ~ +3.6 Feedwater flow will continue to increase to the A SG and decrease to the B SG causing the actual ΔTc to become increasingly negative. **Crew response:** AP/16 (Continued) • Verify ICS re-ratios feedwater to establish ≈ 0°F ΔTc. **NOTE: ΔTC controller will fail** • Place DELTA Tc station in HAND. • Manually adjust DELTA Tc station to achieve ≈ 0° Δ Tc.
		CAUTION: Total feedwater flow should be maintained constant to prevent changes in core reactivity.

	SRO/OATC BOP	• **IF** DELTA Tc station does **NOT** control, **THEN** perform the following:
		  • Place the following in HAND:
		  • 1A FDW MASTER
		  • 1B FDW MASTER
		  • Manually adjust FDW masters to achieve ≈ 0° Δ Tc.
		• Initiate AP/28 (ICS Instrument Failure).
		• Initiate Encl 4.3 (Special Instructions for < 4 RCP Operation) of OP/1/A/1102/004 (Operation at Power).
		AP/28
		• Verify entry into AP is due to an instrument or component failure.
		• **WHEN** plant conditions are stable as indicated by the following:
		• NI power change of < 2% from current NI power indication **AND** thermal power best ≤ pre-transient power level
		  • Tave change of < 2°F from current Tave indication
		  • THP/SG Outlet Press. change of < 30 psig from current THP/SG Outlet Press.
		  • RCS pressure change of < 150 psig from current RCS pressure
		THEN continue this procedure.

		When the plant is stable and SPOC has been notified, or when directed by the lead examiner this event is completed.

Op-Test No.: _____ Scenario No.: **2** Event No.: **5** Page 2 of 2

Event Description: **ΔTc Failure upon securing 1B1 RCP (I, OATC, SRO)**

Time	Position	Applicant's Actions or Behavior
	OATC/SRO BOP	**Crew response:** AP/28 (Continued) • Verify that current thermal power best is different than pre-transient thermal power best. • Notify Rx Engineering to provide Control Room with a maneuvering plan. • **GO TO** the applicable section per the following table: 4F Delta Tc • Ensure the following in HAND: • 1A FDW MASTER • 1B FDW MASTER • DELTA Tc • Re-ratio feedwater flow, as required, to establish ≈ 0°F DELTA Tc while maintaining total feedwater flow constant. • Notify SPOC to perform the following: • Investigate and repair the failed Delta Tc controller. • **WHEN** notified by SPOC that Delta Tc controller has been repaired, **THEN GO TO** Encl 5.1 (Placing ICS in AUTO).
		When the plant is stable and SPOC has been notified, or when directed by the lead examiner this event is completed.

Op-Test No.: _____ Scenario No.: **2** Event No.: **6** Page 1 of 2

Event Description: **1B1 RCP all seals fail (RCS Leak) (TS)**
1HP-26 will not open

Time	Position	Applicant's Actions or Behavior

	BOP/SRO	**Plant response:**
		• 1B1 RCP lower pump cavity pressure will equal upper seal cavity pressure.
		• LDST level will decrease as ~ 80 gpm will leak out of the RCS through the failed pump seals.
		• Reactor Building Normal Sump level will increase.
		Crew response:
		AP16
		• Per **IAAT** step 7, loss of all RCP seals, **THEN** initiate AP/2 (Excessive RCS Leakage).
		AP2
		• **IAAT** RC makeup flow is > 100 gpm, **AND** Pzr level is decreasing, **THEN** close 1HP-5.
		• **IAAT** RCS leakage > NORMAL MAKEUP CAPABILITY with letdown isolated, **AND** Pzr level decreasing, **THEN** trip Rx.
		• Initiate makeup to LDST using any of the following, as directed by CR SRO:
		  • Encl 5.5 Pzr and LDST Level Control of U1 EOP
		  • OP/1/A/1103/004 (Soluble Poison Control) for batch additions
		• Place 1HP-14 in NORMAL.
		• Announce AP entry using the PA system.
		• Initiate Encl 5.1 (Leak Rate Determination).
		Calculation of RCS Volume Loss:
		Leak Rate = _____ + _____ - _____ - _____ = _____
		MU SI LD TSR
		Where: MU = Makeup Flow
		SI = Seal Inlet Hdr Flow
		LD = Letdown Flow
		TSR = Total Seal Return Flow
		• **IAAT** additional makeup flow to LDST is desired, **AND** 1A Bleed Transfer Pump is operating, **THEN** dispatch an operator to close 1CS-48 (1A BHUT RECIRC)

		When the OATC has reduced power ~ 10%, or when directed by the lead examiner this event is completed.

Op-Test No.: _____ Scenario No.: **2** Event No.: **6** Page 2 of 2

Event Description: **1B1 RCP all seals fail (RCS Leak) (TS)**
1HP-26 will not open

Time	Position	Applicant's Actions or Behavior

	BOP/SRO	**Crew response:**
		
		AP2 (Continued)
		• Initiate the following notifications:
		  • OSM to reference the following:
		  • RP/0/B/1000/001 (Emergency Classification)
		  • OMP 1-14 (Notifications)
		  • STA
		  • RP
		• **IAAT** Unit shut down is desired, **THEN** intiate shut down by one of the following:
		  • AP/29 (Rapid Unit Shutdown)
		  • OP/1/A/1102/004 (Operation At Power)
		  • OP/1/A/1102/010 (Controlling Procedure For Unit Shutdown).
		NOTE: Crew will use AP/29
		
		• Verify leakage is caused by 1HP-14 failure in BLEED position.
		• Monitor trend of "T6 AP02" for increases.
		• Dispatch NEOs to check for leaks in both Penetration Rooms.
		• Verify location of leak has been identified.

		When the OATC has reduced power ~ 10%, or when directed by the lead examiner this event is completed.

Op-Test No.: _____ Scenario No.: **2** Event No.: 7 Page 1 of 3

Event Description: **Manual Reactor power decrease: (R, OATC, SRO)**

Time	Position	Applicant's Actions or Behavior

	OATC/SRO
	
	BOP
		Crew response:
		AP/29 (Rapid Unit Shutdown)
		NOTE
		The CR SRO should read this procedure and it should NOT be used when EOP entry conditions exist.
		• Initiate Encl 5.1 (Support Actions During Rapid Unit Shutdown).
		• Notify WCC SRO to initiate Encl 5.2 (WCC SRO Support During Rapid Unit Shutdown).
		• Announce AP entry using the PA system.
		• Verify ICS in AUTO.
		NOTE: ICS is in MANUAL
		RNO: Initiate manual power reduction to desired power level.
		• Verify both Main FDWPs operating.
		• Verify 1B FDWP to be shut down first.
		• Adjust the FWP bias counterclockwise to lower 1B FDWP suction
		• flow ~ 1 x 10^6 lb/hr < 1A FDWP suction flow.
		• **IAAT** any of the following statalarms are received:
		  • 1SA-16/A-1 (FWP A FLOW MINIMUM)
		  • 1SA-16/A-2 (FWP A FLOW BELOW MIN)
		  • 1SA-16/A-3 (FWP B FLOW MINIMUM)
		  • 1SA-16/A-4 (FWP B FLOW BELOW MIN),
		• **AND** CTP < 65% FP, **THEN** trip the associated FDWP.
		• Maintain Pzr level between 220″ - 250″.

		When the OATC has reduced power ~ 10%, or when directed by the lead examiner this event is completed.

Op-Test No.: _____ Scenario No.: **2** Event No.: **7** Page 2 of 3

Event Description: **Manual Reactor power decrease: (R, OATC, SRO)**

Time	Position	Applicant's Actions or Behavior

	BOP	**Crew response:**
		AP/29 Encl 5.1
		• Stop the following: {5}
		  • 1A MSRH DRN PUMP
		  • 1B MSRH DRN PUMP
		• Place the following in MANUAL and close:
		  • 1FDW-53
		  • 1FDW-65
		• Place the following in DUMP: {5}
		  • 1HD-37
		  • 1HD-52
		• Start the following pumps:
		  • 1A FDWP SEAL INJECTION PUMP
		  • 1A FDWP AUXILIARY OIL PUMP
		  • 1B FDWP AUXILIARY OIL PUMP
		  • 1B FDWP SEAL INJECTION PUMP
		• **WHEN** NI power ≤ 80%, **THEN** stop the following pumps:
		  • 1E1 HTR DRN PUMP
		  • 1E2 HTR DRN PUMP
		• Verify Turbine-Generator shutdown is required.
		• Place the following transfer switches to MAN:
		  • 1TA AUTO/MAN
		  • 1TB AUTO/MAN
		• Close 1TA SU 6.9 KV FDR.
		• Verify 1TA NORMAL 6.9 KV FDR opens.
		• Close 1TB SU 6.9 KV FDR.
		• Verify 1TB NORMAL 6.9 KV FDR opens.
		Place the following transfer switches to MAN:
		  • MFB1 AUTO/MAN
		  • MFB2 AUTO/MAN
		• Close E11 MFB1 STARTUP FDR.
		• Verify N11 MFB1 NORMAL FDR opens.
		• Close E21 MFB2 STARTUP FDR.
		• Verify N21 MFB2 NORMAL FDR opens.
		• Notify CR SRO that unit auxiliaries have been transferred.
		• **WHEN** ≤ 450 MWe, **THEN** close 1SSH-9.

		When the OATC has reduced power ~ 10%, or when directed by the lead examiner this event is completed.

Op-Test No.: _____ Scenario No.: **2** Event No.: **7** Page 3 of 3

Event Description: **: Manual Reactor power decrease: (R, OATC, SRO)**

Time	Position	Applicant's Actions or Behavior

	BOP/SRO	**Crew response:**
		
		AP29 Encl 5.1 (Continued)
		• Verify 1AS-8 open.
		• Verify 1C CBP operating.
		• Stop the following:
		  • 1A CBP
		  • 1B CBP
		• Place control switch for one shutdown CBP in AUTO.
		• Ensure CBP LOAD SHED DEFEAT switch is positioned to a running CBP.
		• **WHEN** ≤ 400 MWe, **THEN** stop the following pumps:
		  • 1D1 HTR DRN PUMP
		  • 1D2 HTR DRN PUMP
		• **WHEN** ≤ 325 MWe, **THEN** verify ≤ two HWPs operating.
		• **WHEN** ≤ 225 MWe, **THEN** stop all but one HWP.
		• Place control switch for one idle HWP in AUTO.
		• Ensure HWP LOAD SHED DEFEAT switch is positioned to a running HWP.
		• **WHEN** CTP DEMAND is < 20%, **THEN** close the following valves:
		  • 1MS-76
		  • 1MS-79

		When the ICS has been placed in AUTO, or when directed by the lead examiner this event is completed.

Op-Test No.: _____ Scenario No.: **2** Event No.: **8** Page 1 of 6

Event Description: **SBLOCA, Turbine fail to trip, 1A2 RCP will not trip: (M, ALL)**

Time	Position	Applicant's Actions or Behavior
	ALL	**Plant response:** Control board indications: • 1SA-2/D-3, RC PRESS HI/LOW • RCS Pressure and PZR level decreasing • ES 1-6 actuate • Reactor Trip • RCS subcooling margin will indicate 0°F
	ALL	**Crew response:** IMAs (IAAT steps) from AP-2 give direction to close 1HP-5 if MU flow is > 100 GPM with Pzr level decreasing, and to TRIP the Rx if MU is beyond “Normal Makeup Capability” (160gpm) with 1HP5 closed

	OATC	• The OATC may trip the reactor based on the above IAAT.
		• The SRO will direct the OATC to perform IMAs and the BOP a symptom check.
		• The OATC will perform IMAs
		  • Depress REACTOR TRIP pushbutton.
		  • Verify reactor power < 5% FP and decreasing.
		  • Depress turbine TRIP pushbutton.
		  • Verify all turbine stop valves closed.
		  NOTE: Turbine stop valves will not close
		  RNO: Place both EHC pumps in PULL TO LOCK
		  • Verify RCP seal injection available.

	BOP	• The BOP will perform a symptom check and will have no symptoms to report.
	SRO	• The SRO will transfer to the Subsequent Actions Tab. **NOTE: As RCS pressure decreases and Pzr level decreases, the RCS will Saturate.** <u>SA tab</u> • Verify all control rods fully inserted. • Verify Main FDW in operation • Verify Main FDW operating properly • Verify TBVs controlling at ~ 1010 psig

Op-Test No.: _____ Scenario No.: **2** Event No.: **8** Page 2 of 6

Event Description: **SBLOCA, Turbine fail to trip, 1A2 RCP will not trip: (M, ALL)**

Time	Position	Applicant's Actions or Behavior
	OATC/BOP	OATC/BOP should recognize that the RCS has saturated and obtain SRO concurrence to perform: Rule 2, Loss of SCM • Stop all RCPs (**CT-1**) 1A2 RCP will NOT trip. **RNO**: Place 1TA/1TB AUTO/MAN switch in MAN. Open 1TA/1TB SU 6.9 KV FDR. • Open 1HP-24/25 (1A/1B BWST Suction) • Start all available HPI pumps operating. • Open 1HP-26/27 (1A/1B HP Injection) open (**1HP-26 is failed CLOSED**) • Verify at least two HPI pumps are operating using two diverse indications. (**i.e. pump amps and flow**) • **IAAT** ≥ 2 HPI pumps operating **AND** HPI flow in any header is in the Unacceptable Region of Figure 1 (**flow is NOT acceptable**) then Open 1HP-410 **(CT-2)** • Verify TBVs available • Select OFF on both Digital Channels on AFIS HEADER A&B • Verify any EFDW pump operating. **NOTE: EFDW will not be operating** RNO: Place the following in MANUAL and close: • 1FDW-315 • 1FDW-316 • Start MD EFDWPs on all intact SGs • Establish 300 gpm to each SG (feed to LOSCM Setpoint) (**CT-10**)

Op-Test No.: _____ Scenario No.:**2** Event No.: **8** Page 3 of 6

Event Description: **SBLOCA, Turbine fail to trip, 1A2 RCP will not trip: (M, ALL)**

Time	Position	Applicant's Actions or Behavior

		Rule 2 (Continued)
		Note: The CT is satisfied if the SGs are being fed and SG levels are increasing.
		• Place 1TD EFDWP in Pull to Lock
		• Trip both MFW pumps
		• Place FDW block valve switches to CLOSE for 1FDW-33,31,42 & 40
		• IAAT SG press > RCS press, THEN reduce SG press to <RCS press using TBVs.
		• Ensure Rule 3 is in progress or complete
		Rule 3
		• Verify any EFDW operating
		• Verify any SCM ≤ 0^0F
		• **IAAT** Unit 1 EFDW is in operation, **THEN** initiate Encl 5.9 (Extended EFDW Operation).
		Encl. 5.9
		• Monitor EFDW parameters on EFW graphic display.
		• Perform the following as required to maintain UST level > 7.5':
		  • Makeup with demin water.
		  • Place CST pumps in AUTO.
		• **IAAT** all the following exist:
		  • Rapid cooldown **NOT** in progress
		  • MD EFDWP operating for each available SG
		  • EFDW flow in each header < 600 gpm
		THEN place 1 TD EFDW PUMP switch in PULL TO LOCK.
		NOTE
		• If the condensate system has been lost, restoring the condensate system within 25 minutes will reduce the possibility of a steam-induced water hammer when a Hotwell Pump is started. It will also aid in maintaining condenser vacuum.
		• If the condensate system is operating, establishing FDW recirc will aid in maintaining condenser vacuum.
		• Notify CR SRO to set priority based on the NOTE above and EOP activities.

Op-Test No.: _____ Scenario No.: **2** Event No.: **8** Page 4 of 6

Event Description: **SBLOCA, Turbine fail to trip, 1A2 RCP will not trip: (M, ALL)**

Time	Position	Applicant's Actions or Behavior

	OATC/BOP	OATC will perform Enclosure 5.1 (ES actuation)
		Enclosure 5.1
		• Determine all ES channels should have actuated based on RCS pressure and RB pressure.
		• Verify all ES digital channels associated with actuation setpoints have actuated.
		• Place HPI in Manual.
		• Verify Rule 2 in progress or complete.
		• Verify any RCP operating
		RNO: **GO TO** Step 8
		• **IAAT** ES Channels 3 & 4 are actuated, **THEN GO TO** Step 12.
		• Place the following in manual control:
		  • 1A LPI PUMP
		  • 1LP-17
		  • 1B LPI PUMP
		  • 1LP-18
		CAUTION
		LPI pump damage may occur if operated in excess of 30 minutes against a shutoff head.
		• **IAAT** any LPI pump is operating against a shutoff head, **THEN** at the CR SRO's discretion, stop affected LPI pumps.
		• Start A and B OUTSIDE AIR BOOSTER FAN **(CT-27)**
		• Notify Unit 3 to start 3A and 3B OUTSIDE AIR BOOSTER FANS
		• Verify the following are open:
		  • 1CF-1
		  • 1CF-2
		• Verify 1HP-410 closed.
		• Secure makeup to the LDST.
		• Verify all ES channel 1 - 4 components are in the ES position.

Op-Test No.: _____ Scenario No.: **2** Event No.: **8** Page 5 of 6

Event Description: **SBLOCA, Turbine fail to trip, 1A2 RCP will not trip: (M, ALL)**

Time	Position	Applicant's Actions or Behavior

	OATC/BOP	Enclosure 5.1 (Continued)
		• Close 1LPSW-139.
		• Place the following in FAIL OPEN:
		  • 1LPSW-251 FAIL SWITCH
		  • 1LPSW-252 FAIL SWITCH
		• Verify either of the following:
		  • Three LPSW pumps operating
		  • Two LPSW pumps operating when Tech Specs only requires two to be operable
		• Open the following:
		  • 1LPSW-4
		  • 1LPSW-5
		• Dispatch an operator to perform Encl 5.2 (Placing RB Hydrogen Analyzers In Service).
		• Select DECAY HEAT LOW FLOW ALARM SELECT switch to ON.
		• **IAAT** ES channels 5 & 6 have actuated, **THEN** perform Step 39.
		• Verify all ES channel 5 & 6 components are in the ES position.

	SRO/BOP
	OATC
		The SRO will transfer to the LOSCM tab.
		LOSCM tab
		• Ensure Rule 2 (Loss of SCM) is in progress or complete.
		• **IAAT** either of the following exists:
		  • LPI FLOW TRAIN A plus LPI FLOW TRAIN B ≥ 3400 gpm
		  • Only one LPI header in operation with header flow ≥ 2900 gpm
		  THEN GO TO LOCA CD tab.
		• Verify all of the following exist:
		  • **NO** RCPs operating
		  • HPI flow in both HPI headers
		  • Adequate total HPI flow per Figure 1 (Total Required HPI Flow)
		• Open 1AS-40 while closing 1MS-47.

Op-Test No.: _____ Scenario No.: **2** Event No.: **8** Page 6 of 6

Event Description: **SBLOCA, Turbine fail to trip, 1A2 RCP will not trip: (M, ALL)**

Time	Position	Applicant's Actions or Behavior

	SRO/BOP
	OATC
		LOSCM tab (Continued)
		• Perform the following:
		  • Control steaming and feed rates on all intact SGs to maintain cooldown rate within Tech Spec limits:
		  • Tcold > 280°F: ≤ 50°F / ½ hr
		  • Tcold ≤ 280°F: ≤ 25°F / ½ hr
		  • Utilize either of the following:
		  • TBVs
		  • ADVs
		• Close the following:
		  • 1GWD-17
		  • 1HP-1
		  • 1HP-2
		  • 1RC-3
		• Maintain SG pressure < RCS pressure utilizing either of the following:
		  • TBVs
		  • ADVs
		• Verify primary to secondary heat transfer exists.
		• Verify CETCs increasing.
		• Verify required RCS makeup flow within normal makeup capability.
		NOTE: RCS makeup will NOT be within normal makeup capability.
		RNO: **GO TO** LOCA CD tab.

		When the SRO transfers to the LOCA CD tab or when directed by the lead examiner this event is completed.

CRITICAL TASKS

1. CT-1, Trip ALL RCPS
2. CT-27, Implementation of Control Room Habitability Guidance
3. CT-2, Initiate HPI
4. CT-10, Establish FW Flow and Feed SGs

Facility: **Oconee** Scenario No.: **3 fnl** Op-Test No.: **1**

Examiners: _____ Operators: _____

_____ _____

_____ _____

Initial Conditions:
- 75% Reactor Power EOL

Turnover:
- AMSAC/DSS bypassed for I&E testing
- SASS in Manual for I&E testing
- 1B GWD Tank release in progress
- Crew is to perform groups 6 - 8 of PT/1/A/0600/015 (CRD Movement)

Event No.	Malfunction No.	Event Type*	Event Description
0a	AOR		PORV fails to open
0b	Pre-Insert Updater		AMSAC/DSS bypassed
0c	Pre-Insert Updater		SASS in Manual
1		N, OATC, SRO	Perform PT/600/15 (CRD Movement)
2	Override	C, BOP, SRO	1RIA-37 and 38 fails to terminate GWR (SLC)
3		TS, SRO	TD EFDWP oil low (TS)
4	Override	C, BOP, SRO	1HP-120 Fails CLOSED
5	MPI011	TS, SRO	WR RCS pressure failure LOW (TS)
6	MPI171 MPI 500	I, OATC, SRO	Th fails HIGH
7	Override	R, OATC, SRO	1A MFWP oil leak, Manual power reduction
8	Override	C, BOP, SRO	Turbine oil press low Manual Turbine Trip
9	MSS010 MSS020 MSS260 MSS270	M, ALL	Loss of Main and Emergency FDW LOHT CBP feed
10	Override	ALL	CBPs trip HPI Forced Cooling Spray Valve Fails Closed

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

Op-Test No.: _____ Scenario No.: **3** Event No.: **1** Page 1 of 4

Event Description: **Perform PT/600/15 (CRD Movement): (N, OATC/SRO)**

Time	Position	Applicant's Actions or Behavior

	OATC/SRO	**Crew response:**
		
		• PT/1/A/0600/015 Encl 13.2 (Control Rod Movement at Power)
		
		• Place Rx Diamond/FDW Masters To Hand per OP/1/A/1102/004 A (ICS Operation)
		
		OP/1/A/1102/004 A
		
		• **IF** either 1SA-02 E8 "STM GEN A LEVEL LOW LIMIT" **OR** 1SA-02 E9 "STM GEN B LEVEL LOW LIMIT" is clear, simultaneously place FDW control to manual:
		  • Place 1A FDW MASTER to "HAND"
		  • Place 1B FDW MASTER to "HAND"
		
		• Place DIAMOND to "MANUAL".
		
		• Ensure CRD group PI panel CONTROL ON lights are on for controlling CRD group.
		
		PT/1/A/0600/015 Encl 13.2
		
		• Perform the following: (R.M.)
		  • Ensure SEQ OR is ON.
		  • Ensure SAFETY RODS OUT BYPASS is ON.
		  • Ensure RUN is ON.
		  • Ensure SINGLE SELECT SWITCH to ALL.

Op-Test No.: _____ Scenario No.: **3** Event No.: **1** Page 2 of 4

Event Description: **Perform PT/600/15 (CRD Movement): (N, OATC/SRO)**

Time	Position	Applicant's Actions or Behavior

	OATC/SRO	**Crew response:**
		PT/1/A/0600/015 Encl 13.2 (Continued)
		
		• Test CRD Group 5:
		  • Ensure GROUP SELECT SWITCH to 5.
		  • Ensure Group 5 CONTROL ON lights are ON.
		  • Perform:
		  • Insert CRD Group 5.
		  • **WHEN** all 100% lights OFF, stop insertion.
		  • Begin Group 5 withdraw to 100%.
		
		NOTE:
		In RUN speed, all rod motion is inhibited 12 seconds after first rod reaches OUT LIMIT.
		
		• **WHEN** OUT LIMIT is ON, maintain WITHDRAW until CRD TRAVEL "Out" light OFF.
		• Ensure all Group 5 100% lights are ON.
		• Verify expected plant parameter response.
		
		• Test CRD Group 6:
		  • Ensure GROUP SELECT SWITCH to 6.
		  • Ensure Group 6 CONTROL ON lights are ON.
		  • Perform:
		  • Insert CRD Group 6.
		  • **WHEN** all 100% lights OFF, stop insertion.
		  • Begin Group 6 withdraw to 100%.
		
		NOTE:
		In RUN speed, all rod motion is inhibited 12 seconds after first rod reaches OUT LIMIT.
		
		• **WHEN** OUT LIMIT is ON, maintain WITHDRAW until CRD TRAVEL "Out" light OFF.
		• Ensure all Group 6 100% lights are ON.
		• Verify expected plant parameter response.

Op-Test No.: _____ Scenario No.: **3** Event No.: **1** Page 3 of 4

Event Description: **Perform PT/600/15 (CRD Movement): (N, OATC/SRO)**

Time	Position	Applicant's Actions or Behavior

	OATC/SRO	**Crew response:**
		PT/1/A/0600/015 Encl 13.2 (Continued)
		
		• Test CRD Group 7:
		  • Ensure GROUP SELECT SWITCH to 7.
		  • Ensure Group 7 CONTROL ON lights are ON.
		  • Record CRD Group 7 initial position:_____
		NOTE:
		Group 7 may cause more reactivity change than previous groups.
		  • Perform:
		  • Insert CRD Group 7 ≈ 2.5%).
		  • Withdraw CRD Group 7 to desired position.
		  • Verify expected plant parameter response.
		
		• Test CRD Group 8:
		  • Ensure GROUP SELECT SWITCH to 8.
		  • Ensure Group 8 CONTROL ON lights are ON.
		  • 2.10.3 Record CRD Group 8 initial position:_____
		  • Perform:
		  • Insert CRD Group 8 ≈ 2.5%
		  • Withdraw CRD Group 8 to desired position.
		  • Verify expected plant parameter response.
		• Perform the following:
		  • Ensure SEQ is ON.
		  • Ensure GROUP SELECT SWITCH to OFF.
		  • Ensure SAFETY RODS OUT BYPASS is OFF.
		
		• Return Rx Diamond/FDW Masters To Automatic per OP/1/A/1102/004 A (ICS Operation).

		When the ICS has been placed in AUTO, or when directed by the lead examiner this event is completed.

Op-Test No.: _____ Scenario No.: **3** Event No.: **1** Page 4 of 4

Event Description: **Perform PT/600/15 (CRD Movement): (N, OATC/SRO)**

Time	Position	Applicant's Actions or Behavior

	OATC/SRO
	BOP
		Crew response:
		OP/1/A/1102/004 A (ICS Operation).
		• **IF** DIAMOND is in manual, perform the following:
		• Verify REACTOR MASTER in AUTO
		• Compare Tave setpoint to Tave:
		  • O1E2087 (ICS TAVE SETPOINT)
		  • O1E2086 (ICS SELECTED
		• **IF** selected Tave (O1E2086) is different from Tave Setpoint (O1E2087) by more than + 0.3°F, on REACTOR MASTER adjust Tave Setpoint (O1E2087) to ≈ selected Tave (O1E2086).
		• Verify selected Tave is within + 0.3°
		• Place DIAMOND to "AUTO".
		• **IF** 1A or 1B FDW Master is in "HAND", perform the following:
		  • Position the following:
		  • Place 1A FDW MASTER to "MEAS VAR"
		  • Place 1B FDW MASTER to "MEAS VAR".
		  • **IF** either 1A or 1B FDW Master Measured Variable is **NOT** on the caret, notify SPOC to investigate and repair the problem.
		  • Verify the following
		  • 1A FDW MASTER Measured Variable on the caret
		  • 1B FDW MASTER Measured Variable on the caret.
		  • Position the following:
		  • Place 1A FDW MASTER to "POS"
		  • Place 1B FDW MASTER to "POS".
		  • Simultaneously position the following:
		  • 1A FDW MASTER to "AUTO"
		  • 1B FDW MASTER to "AUTO".

		When the ICS has been placed in AUTO, or when directed by the lead examiner this event is completed.

Op-Test No.: _____ Scenario No.: **3** Event No.: **2** Page 1 of 1

Event Description: **1RIA-37 and 38 Fail to Terminate GWR: (C, BOP/SRO)**

Time	Position	Applicant's Actions or Behavior
		Plant response: • 1SA-9/A-4, GWD DISCH RADITION INHIBIT • 1SA-8/B-9, RM AREA MONITOR HIGH **Crew response:** <u>1SA-8/B-9</u>
	BOP	• Verify automatic action has taken place
	SRO	1RIA-37 **AND**/**OR** RIA-38 will close valves 1GWD-4, -5, -6, -7, GWD-206, 207 and stop the W. G. exhauster if high setpoint is received.
	BOP	• Ensure automatic actions, if required, have taken place; **IF NOT**, perform actions manually. • Refer to OP/1-2/A/1104/018 (GWD Tank Release) • Refer to AP/1/A/1700/018 (Abnormal Release of Radioactivity)
		<u>Encl. 4.9 of OP/1-2/A/1104/018</u> (GWD Tank Release) • Close GWR Discharge Flow Controller • Record maximum cpm of RIA-37 or 38 • Terminate release • Close GWD-99 (Tank 1B Discharge Block), GWD-100 (Decay Tanks Discharge Header Block), and GWD-5 (B GWD Tank Discharge)
	SRO	<u>AP/18</u>, Abnormal Release of Radioactivity • IAAT RIA is in High alarm, THEN verify Automatic Systems Actions in Section 2 have occurred. • SRO should refer to SLC 16.11.3 Condition I (2 samples prior to subsequent release)
		When the GWD release is terminated or when directed by the lead Examiner this event is completed.

Op-Test No.: _____ Scenario No.: **3** Event No.: **3** Page 1 of 1

Event Description: **TD EFDWP oil low**: **(TS, SRO)**

Time	Position	Applicant's Actions or Behavior
	SRO	**Simulator Operator call Control Room as a NEO and report that Unit 1 TD EFDWP oil sump is dry.** **Crew Response**: • SRO should make the decision to place TD EFDWP in “Pull to Lock”. • SRO refer to TS 3.3.14 Condition B. Declare the affected EFWP inoperable Immediately • SRO refer to TS 3.7.3 Condition B. Restore TD EFDWP within 72 hours
		When SRO refers to TS, or when directed by the lead examiner this event is completed.

Op-Test No.: _____ Scenario No.: **3** Event No.: **4** Page 1 of 1

Event Description: **1HP120 Fails Closed: (C, BOP, SRO)**

Time	Position	Applicant's Actions or Behavior
		Plant Response: • Red OPEN light goes out • RC makeup decreases to ~ 9gpm (bypass flow) • Pzr Level decreases • LDST increases • Stat Alarm 1SA2/C3 (RC PRERSSURIZER LEVEL HIGH/LOW) **Crew Response:**
	BOP/SRO	• Crew should recognize 1HP-120 has failed closed (high demand with closed valve indication). • SRO should enter AP/14 (Loss of Normal HPI Makeup and/or RCP Seal Injection)

	SRO/BOP	<u>AP/14</u>
		
		• Announce AP entry using PA System.
		
		• Verify any HPI pump operating.
		
		• Verify RCP seal injection or HPI makeup line leak.
		
		• Verify RCP seal injection flow exists.
		
		• Verify 1HP-120 has failed.
		
		• Perform the following as necessary to maintain Pzr level > 200″:
		
		  • Close 1HP-6.
		  • Throttle 1HP-7.
		  • Throttle 1HP-26.
		
		• Place 1HP-120 in HAND and close.
		
		• Notify SPOC to investigate and repair 1HP-120.

		When SPOC is notified to repair 1HP-120, or when directed by the lead examiner this event is completed.

Op-Test No.: _____ Scenario No.: **3** Event No.: **5** Page 1 of 1

Event Description: **WR RCS pressure failure LOW (TS, SRO)**

Time	Position	Applicant's Actions or Behavior
		Plant Response: Computer Alarm WR A RCS Press LO LO Stat Alarm 1SA7/A1 (ES HP INJECTION CHANNEL A TRIP) Stat Alarm 1SA7/A2 (ES LP INJECTION CHANNEL A TRIP) **Crew Response:**
	BOP	<u>1SA7/A1 (ES HP INJECTION CHANNEL A TRIP)</u> • Check RCS pressure. • **IF** alarm is **NOT** valid, determine cause of Bistable A trip.
	SRO	SRO should refer to TS 3.3.5 (ESPS Analog Instrumentation) Condition A. • Place Channel in trip / within 1 hour
		When 1A ES channel is placed in trip, or when directed by the lead examiner this event is completed.

Op-Test No.: _____ Scenario No.: **3** Event No.: **6** Page 1 of 1

Event Description: **Th Fails HIGH (I, OATC/SRO)**

Time	Position	Applicant's Actions or Behavior
	SRO/OATC/ BOP	**Plant Response**: • 1A Th will fail HIGH • Tave will indicate high • Feedwater flow will increase • Control Rods will insert • Stat Alarm 1SA2/C11 (ICS LOSS OF OAC CTP SIGNAL) **Crew Response**: • When the Statalarms are received, the candidates should utilize the "Plant Transient Response" process to stabilize the plant. • Verbalize to the SRO reactor power level and direction of movement. • Place the Diamond and both FDW Masters in manual and position as necessary to stabilize the plant. • The SRO should: • Refer to AP/28, ICS Instrument Failures • Contact SPOC to repair the failed instrument. **Note: The ICS will remain in manual for the remainder of the scenario.**
	SRO/BOP	1. AP/28 • Verify plant conditions are stable as indicated by the following: • NI power change of < 2% from current NI power indication **AND** thermal power best ≤ pre-transient power level • Tave change of < 2°F from current Tave indication • THP/SG Outlet Press. change of < 30 psig from current THP/SG Outlet Press. • RCS pressure change of < 150 psig from current RCS pressure • **GO TO** the section 4A (RCS Temperature) • Notify SPOC • **PERFORM** an instrumentation surveillance using applicable table in Encl 5.3 (ICS Instrument Surveillances) for the failed instrument. • Verify computer readouts O1A1692 and O1A1693 agree within 3°F (5°F in RPS Cab).
		When Encl 5.3 has been performed, or when directed by the lead examiner this event is completed.

Op-Test No.: _____ Scenario No.: **3** Event No.: **7** Page 1 of 1

Event Description**: 1A MFWP oil leak, Manual power reduction (R, OATC/SRO)**

Time	Position	Applicant's Actions or Behavior
		Simulator Operator call Control Room as a NEO and report that 1A Main Feedwater Pump oil sump is -4" (4 inches below normal) and decreasing.
		Crew Response:
	SRO	SRO should make the decision to reduce power to < 65% and secure the 1A Main Feedwater pump.
	SRO/OATC	SRO should enter AP/29 (Rapid Unit Shutdown)
		<u>AP/29</u>
	BOP	• Initiate Encl 5.1 (Support Actions During Rapid Unit Shutdown).
	OATC	• Initiate manual power reduction to desired power level.
		<u>AP/29 Encl 5.1</u>

	BOP	• Stop 1A and 1B MSRH DRN PUMP
		• Place 1FDW-53 and 1FDW-65 in MANUAL and close:
		• Place 1HD-37 and 1HD-52 in DUMP: {5}
		• Start the following pumps:
		  • 1A FDWP SEAL INJECTION PUMP
		  • 1A FDWP AUXILIARY OIL PUMP
		  • 1B FDWP AUXILIARY OIL PUMP
		  • 1B FDWP SEAL INJECTION PUMP

		When power is stabilized below 65% power, or when directed by the lead examiner this event is completed.

Op-Test No.: _____ Scenario No.: **3** Event No.: **8** Page 1 of 1

Event Description: **Turbine oil pressure LOW / Manual Turbine Trip (C, BOP/SRO)**

Time	Position	Applicant's Actions or Behavior

	SRO/BOP	**Plant Response**:
		
		Stat alarm 1SA3/E7 (TO BRNG OIL HEADER PRESS LOW)
		
		OAC turbine bearing pressure reading ~ 13 psig
		
		Crew Response:
		
		<u>1SA3/E7</u>
		
		• Verify Turning Gear Oil Pump has started.
		
		• Check BEARING HEADER pressure gauge at Turbine Front Standard.
		
		<u>NOTE:</u>
		EBOP will also start on a loss of power to Turning Gear Oil Pump
		
		• **IF** BEARING HEADER pressure < 15 psig, verify EBOP is on.
		
		• **IF** EBOP has **NOT** started, start EBOP.
		
		• **IF** BEARING HEADER pressure is still < 15 psig:
		  • TRIP THE TURBINE
		  • Place Turbine Turning Gear switch in PULL TO LOCK.

	SRO/BOP	**NOTE: The SRO should direct tripping of the reactor before tripping the turbine.**
		When the turbine has been tripped, or when directed by the lead examiner this event is completed.

Op-Test No.: _____ Scenario No.: **3** Event No.: **9** Page 1 of 3

Event Description: **Loss of Main and Emergency FDW, LOHT, CBP Feed (M, ALL)**

Time	Position	Applicant's Actions or Behavior
		Plant Response: When the reactor is tripped, a Loss of Main and Emergency Feedwater will occur. **Crew Response**:
	SRO/OATC	Perform Immediate Manual Actions (IMAs) • Depress REACTOR TRIP pushbutton. • Verify reactor power < 5% FP and decreasing. • Depress turbine TRIP pushbutton. • Verify all turbine stop valves closed. • Verify RCP seal injection available.

	BOP/SRO	BOP will perform a symptom check and initiate Rule 3 (Loss of Main and / or Emergency Feedwater)
		
		SRO will transfer to the Loss Of Heat Transfer Tab
		
		<u>Rule 3</u>
		
		• **IAAT NO** SGs can be fed with FDW (Main/CBP/Emergency), **AND** any of the following exist:
		  • RCS pressure reaches 2300 psig **OR** NDT limit
		  • Pzr level reaches 375″ [340″ acc]
		  THEN PERFORM Rule 4 (Initiation of HPI Forced Cooling).
		
		• Start EFDW pumps to feed all intact SGs.
		  NOTE: EFDW pumps will not start
		
		• Place the following in MANUAL and close:
		  • 1FDW-315
		  • 1FDW-316
		
		• Verify both of the following: **(CT-10)**
		  • Any CBP operating
		  • TBVs available on an intact SG
		
		• Select OFF for both digital channels on AFIS HEADER A.
		
		• Select OFF for both digital channels on AFIS HEADER B.

Op-Test No.: _____ Scenario No.: **3** Event No.: **9** Page 2 of 3

Event Description: **Loss of Main and Emergency FDW, LOHT, CBP Feed (M, ALL)**

Time	Position	Applicant's Actions or Behavior

	BOP	**Crew Response**:
		
		Rule 3 (Continued)
		
		• Place Startup Block valve (1FDW-33 1FDW-42) control switch for all intact SGs in OPEN:
		
		• Simultaneously position Startup Control valves (1FDW-35 1FDW-44) 10 - 20% open on all intact SGs:Perform the following:
		  • Place 1FDW-31 switch in CLOSE.
		  • Place 1FDW-40 switch in CLOSE.
		  • Close 1FDW-32.
		  • Close 1FDW-41.
		
		• Lower SG pressure in available SGs to ≈ 500 psig.
		
		• Control FDW flow to stabilize RCS P/T by throttling the Startup Control valves and TBVs as necessary:
		
		• Place 1FDW-38 and 1FDW-47 switches to OPEN:
		
		• Place 1FDW-36 and 1FDW-45 switches to CLOSE:
		
		• Dispatch an operator to perform Encl 5.26 (Manual Start of TDEFDWP).
		
		• Verify cross-tie with Unit 2 is desired.
		
		• Dispatch an operator to open 2FDW-313 and 2FDW-314)
		
		• Dispatch an operator to 1FDW-313 and have them notify the CR when in position.

Op-Test No.: _____ Scenario No.: **3** Event No.: **9** Page 3 of 3

Event Description: **Loss of Main and Emergency FDW, LOHT, CBP Feed (M, ALL)**

Time	Position	Applicant's Actions or Behavior

	SRO
	
	BOP
		Crew Response:
		
		<u>Loss Of Heat Transfer Tab</u>
		
		• **IAAT NO** SGs can be fed with FDW (Main/CBP/Emergency), **AND** any of the following exist:
		  • RCS pressure reaches 2300 psig **OR** NDT limit
		  • Pzr level reaches 375″ [340″ acc]
		THEN PERFORM Rule 4 (Initiation of HPI Forced Cooling).
		
		NOTE: 1A1 RCP provides the best Pzr spray.
		
		• Reduce operating RCPs to one pump/loop.
		• **WHEN** any of the following exists:
		  • Unit 1 EFDW available
		  • EFDW aligned from another unit
		  • Main FDW pump available **AND** reset
		THEN CONTINUE

		When RCS temperature is stabilized on Condensate Booster Pump feed, or when directed by the lead examiner this event is completed.

Op-Test No.: _____ Scenario No.: **3** Event No.: **10** Page 1 of 2

Event Description: **CBPs trip, HPI Forced Cooling, Spray Valve Fails Closed (ALL)**

Time	Position	Applicant's Actions or Behavior
		Plant Response: CBPs trip Feedwater flow decreases RCS temperature increases **Crew Response**: SRO may direct RO to re-perform Rule 3 At 2300 psig RCS pressure, perform Rule 4 (HPI Forced Cooling). Rule 4 **(CT-14)** BOP/SRO • Open 1HP-24 and 1HP-25. • Start all available HPI pumps. • Open 1HP-26 and 1HP-27 • Open 1RC-4. • Verify flow exists in any HPI header. • Open PORV. **NOTE: PORV will NOT open** • Verify at least two HPI pumps operating. • Verify flow in both HPI headers is in the acceptable region of Figure 1 • Stop all but one RCP. • De-energize all Pzr heaters. • Close 1HP-5. • Verify HPI Forced Cooling initiated due to a loss of CBP feed. • Close TBVs, 1FDW-35 and 1FDW-44.

Op-Test No.: _____ Scenario No.: **3** Event No.: **10** Page 2 of 2

Event Description: **CBPs trip, HPI Forced Cooling, Spray Valve Fails Closed (ALL)**

Time	Position	Applicant's Actions or Behavior

	SRO
	
	BOT/OATC
		Crew Response:
		
		LOHT tab
		
		• **PERFORM** Rule 4 (Initiation of HPI Forced Cooling).
		• Verify all the following:
		  • At least two HPI pumps operating
		  • Acceptable HPI flow exists in both HPI headers per Rule 4
		  • PORV open
		  • 1RC-4 open
		
		NOTE: 1RC-4 is NOT Open.
		
		• Verify SSF-ASW available.
		• Dispatch a licensed operator to perform Encl 5.34 (Aligning SSF-ASW for SG Feed).
		• Locally close the following (Unit 1 Cable Rm):
		  • 1SKJ-08 (1RC-155/1RC-156)
		  • 1SKK-08 (1RC-157/1RC-158)
		  • 1SKL-08 (1RC-159/1RC-160)
		• Open RCS vents:1RC-155, 1RC-156, 1RC-157, 1RC-158, 1RC-159, 1RC-160
		• **GO TO** HPI CD tab.
		
		HPI CD tab
		
		• Ensure all RBCUs in low speed.
		• Open 1LPSW-18, 1LPSW-21 and .1LPSW-24.
		• Initiate Encl 5.35 (Containment Isolation)
		• Start A & B Outside Air Booster Fans
		• Notify Unit 3 to start 3A and 3B Outside Air Booster Fans

		When SRO transfers to HPI CD tab, or when directed by the lead examiner this event is completed.

CRITICAL TASKS

1. CT-10, Establish FW Flow and Feed SG(s)
2. CT-14, Initiate HPI Cooling

Facility: **Oconee** Scenario No.: **4 fnl** Op-Test No.: **1**

Examiners: _____ Operators: _____

_____ _____

_____ _____

Initial Conditions:
- 75% Reactor Power EOL

Turnover:
- AMSAC/DSS bypassed for I&E testing
- SASS in Manual for I&E testing
- 1B GWD Tank release in progress
- TD EFDWP OOS for maintenance
- Keowee Unit 2 OOS for unplanned reasons
- Keowee Unit 1 aligned to underground
- Operability test of Keowee Unit 1 is to be performed per PT/620/009 (Keowee Hydro Operation) after turnover and before startup continues, ONS to perform remote Keowee start. Begin at Encl. 13.1 at Step 2.2

Event No.	Malfunction No.	Event Type*	Event Description
0a	Pre-Insert Updater		AMSAC/DSS bypassed
0b	Pre-Insert Updater		1C HPIP fail to start
0c	Pre-Insert Updater		1RC-4 failed open
0d	Pre-Insert MEL180		Keowee Unit 2 Emergency Lockout
1		N, BOP, SRO	Operability test Keowee Unit 1
2	Override	C, OATC, SRO	1HP-31 (RCP Seal Flow Control) Fail CLOSED
3	Updater	C, TS, BOP SRO	Operating LPSW pump trips, Standby fails to auto start (TS)
4	MCS004	I, OATC, SRO	Controlling Tave fails HIGH
5	Updater	C, BOP, SRO	HPSW Jockey pump trip, altitude valve fail CLOSED (SLC)
6	MCR021 MCR022	C, TS, OATC, SRO	Dropped Control Rod, Manual Power Reduction (TS)
7	MPI300 Override	M, ALL	2nd dropped CR ATWS Main FDW Pumps Trip PORV fails OPEN

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

Op-Test No.: _____ Scenario No.: **4** Event No.: **1** Page 1 of 3

Event Description: **Operability test Keowee Unit 1 (N, BOP/SRO)**

Time	Position	Applicant's Actions or Behavior
	SRO	Direct BOP to perform PT/620/009 (Keowee Hydro Operation) to operability test unit 1 Keowee underground.

	BOP	PT/620/009
		• Verify various Statalarms **NOT** in alarm
		• Ensure the following:
		  • PERMISSIVE AUTO START light on.
		  • UNIT 1 MASTER SELECTOR switch in "AUTO".
		  • EXCITER MANUAL/AUTO Red AUTO light ON, Green MANUAL light OFF.
		  • EXCITER STOP/START Green STOP light ON, Red START light OFF.
		• Notify Keowee Operator to perform the following:
		  • On CB2, verify all required PREREQ lights are lit.
		  • Position MASTER TRANSFER switch for KHU-1 to "REMOTE".
		• Ensure UNIT 1 SYNC 230 KV selector in "MAN".

		NOTE: Holding Unit 1 Local Master Switch for 5 seconds assures adequate starting relay actuation.
		• Place **AND** hold UNIT 1 LOCAL MASTER switch to "START" position ≈ 5 seconds until KHU-1 starts. • Verify EXCITER STOP/START Red START light ON, Green STOP light OFF. • Perform the following: • After 60 seconds steady operation, record the following: • KHU-1 OUTPUT VOLTS _____ KV (Oconee Control Room Indication - 2AB3) • KHU-1 digital speed _____ RPM (KHU-1 Control Room Indication - CB-3) **Simulator Operator: Keowee RPMs = 128.**

Op-Test No.: _____ Scenario No.: **4** Event No.: **1** Page 2 of 3

Event Description: **Operability test Keowee Unit 1 (N, BOP/SRO)**

Time	Position	Applicant's Actions or Behavior

	BOP	PT/620/009 (Continued)
		• Verify CT4 energized by 13.8 KV Underground Power Path:
		• **IF** both Standby Buses are **NOT** energized, perform the following:
		  • Ensure TS 3.8.1 Condition D has been entered for Underground Power Path.
		  • IF overhead powr path is inoperable, ensure TS 3.8.1 Condition I has been entered.
		• IF Standby Bus 1 NOT energized
		  • Verify ~ 4.16 KV on CT4 Volts
		  • Ensure CT5 BUS 1 AUTO/MAN transfer switch in MAN
		  • Ensure CT4 BUS 1 AUTO/MAN transfer switch in MAN
		  • Place STBY BUS 1 SYNCHRONIZING switch to ON
		  • Close SK1 CT4 STBY BUS 1 FEEDER
		  • Verify ~ 4.16 KV on Standby Bus 1 Volts
		  • Open SK1 CT4 STBY BUS 1 FEEDER
		  • Place STBY BUS 1 SYNCHRONIZING switch to OFF
		  • Place CT4 BUS 1 AUTO/MAN transfer switch to AUTO
		• IF Standby Bus 2 NOT energized
		  • Verify ~ 4.16 KV on CT4 Volts
		  • Ensure CT5 BUS 2 AUTO/MAN transfer switch in MAN
		  • Ensure CT4 BUS 2 AUTO/MAN transfer switch in MAN
		  • Place STBY BUS 2 SYNCHRONIZING switch to ON
		  • Close SK2 CT4 STBY BUS 2 FEEDER
		  • Verify ~ 4.16 KV on Standby Bus 2 Volts
		  • Open SK2 CT4 STBY BUS 2 FEEDER
		  • Place STBY BUS 2 SYNCHRONIZING switch to OFF
		  • Place CT4 BUS 2 AUTO/MAN transfer switch to AUTO

Op-Test No.: _____ Scenario No.: **4** Event No.: **1** Page 3 of 3

Event Description: **Operability test Keowee Unit 1 (N, BOP/SRO)**

Time	Position	Applicant's Actions or Behavior

	BOP	PT/620/009 (Continued)
		• IF SK breakers were cycled, perform the following as desired
		  • Ensure TS 3.8.1 Condition D has been exited
		  • IF overhead Power Path is inoperable, ensure TS 3.8.1 has been exited
		• **IF** KHU-1 was started from Oconee Control Room, perform the following:\
		• Position UNIT 1 SYNC 230 KV switch to "AUTO".
		• Verify ACB 1 KEOWEE 1 GENERATOR BKR closed.
		CAUTION: Do **NOT** lower MVARS to less than zero (0) before taking the KHU off line. This will prevent excitation current from burning the contacts on the generator breakers when KHU-1 is shut down.
		• Perform the following concurrently as required:
		  • Adjust load to zero (0) MWs with UNIT 1 SPEED CHANGER MOTOR.
		  • Adjust MVARS to zero (0) with UNIT 1 AUTO VOLTAGE ADJUSTER.
		• Place UNIT 1 LOCAL MASTER switch to "STOP" **AND** hold in "STOP" position for ≈ five (5) seconds.
		NOTE: Placing UNIT 1 MASTER SELECTOR to "AUTO" shuts off the AC H.P. Lift Pump and closes the Generator Cooling Water valve. This action prevents KHU-1 from creeping.
		• Ensure UNIT 1 MASTER SELECTOR to "AUTO".
		• Verify TURBINE 1 GATE POSITION indicator is at zero (0).
		• Notify Keowee to place KHU-1 MASTER TRANSFER switch in "LOCAL".
		• Ensure UNIT 1 SYNC 230 KV selector in "AUTO".
		• Perform the following:
		  • Verify acceptance criteria met.
		  • **IF** acceptance Criteria **NOT** met, notify SRO.

		Event is complete when operability test is finished, or when directed by the lead examiner.

Op-Test No.: _____ Scenario No.: **4** Event No.: **2** Page 1 of 2

Event Description: **1HP-31 (RCP Seal Flow Control) Fail Closed: (C, OATC, SRO)**

Time	Position	Applicant's Actions or Behavior

	SRO/OATC	**Note: This event is run in parallel with event 1.**
		Plant response:
		Stat Alarms
		1SA2/B2 (HP RCP SEA INLET HEADER FLOW HIGH/LOW)
		Seal Injection header flow decreases to 0 gpm
		Crew response:
		SRO directs the OATC to refer to the Alarm Response Guide
		<u>ARG 1SA2/B2</u>
		• Verify low seal flow condition with individual RCP seal flow indications.
		• Adjust 1HP-31 (RCP Seal Flow Control) per OP/1/A/1104/002 (HPI System)
		• Refer to AP/1/A/1700/014 (Loss of Normal HPI Makeup and/or RCP Seal Injection).
		<u>SRO enters AP/14</u>
		• **IAAT** RCP seal injection flow is lost, **AND** Component Cooling is lost, **THEN** perform the following:
		  • Trip the Rx.
		  • Stop all RCPs.
		  • Initiate AP/25 (SSF EOP).
		• Announce AP entry using PA System.
		• Start the standby HPI pump.
		• Place 1HP-31 in HAND and close.
		• Ensure proper operation of CC System.
		• Dispatch an operator to close RCP SEAL INJECTION THROTTLE VALVES: 1HP-64, 1HP-65, 1HP-66, 1HP-67

Op-Test No.: _____ Scenario No.: **4** Event No.: **2** Page 2 of 2

Event Description: **1HP-31 (RCP Seal Flow Control) Fail Closed: (C, OATC, SRO)**

Time	Position	Applicant's Actions or Behavior

	SRO/OATC	**Crew response:**
		AP/14 (Continued)
		• Notify OSM and RCP Component Engineer to provide the following:
		  • Immediate evaluation
		  • Additional monitoring requirements
		  • Extended limits
		• **WHEN** RCP SEAL INJECTION THROTTLE VALVES: 1HP-64, 1HP-65, 1HP-66, 1HP-67 are closed, **THEN** increase 1HP-31 demand to ~ 50%.
		NOTE: 1HP-31 is Failed Closed
		RNO
		• Locally open 1HP-140 (RCP SEAL FLOW CONTROL BYPASS)
		• Locally throttle open RCP SEAL INJECTION THROTTLE VALVES: 1HP-64, 1HP-65, 1HP-66, 1HP-67 to establish ≈ 8 gpm/RCP while limiting RCP seal return temperature change to an average of 1 F/min

		When 8 gpm Seal Injection flow to each RCP is established, or when directed by the lead Examiner this event is completed.

Op-Test No.: _____ Scenario No.: **4** Event No.: **3** Page 1 of 1

Event Description: **Operating LPSW pump trips, Standby fails to auto start: (C, BOP, SRO) (TS)**

Time	Position	Applicant's Actions or Behavior

	SRO/BOP	**Plant response:**
		Statalarms:
		• 1SA-9/A-9 (LPSW Header A/B Press Low)
		Control board indications:
		• LPSW Header A/B Pressure Low
		Crew response:
		• Refer to ARG for 1SA-9/A-9 (LPSW Header A/B Press Low)
		  • Refer to AP/24 (Loss of LPSW)
		<u>AP/24</u>
		• Open LPSW pump suction valves 1LPSW-2, 1LPSW-3, 1LPSW-1.
		• Verify LPSW pumps are cavitating
		  • Pump amps erratic
		  • LPSW header pressure fluctuating
		• Start all available (NOT previously cavitating) LPSW pumps.
		• Verify normal LPSW System operation is restored.

		<u>NOTE:</u> The SRO should call SPOC to troubleshoot the reason for the suction valve closing, the Auto Start failure and determine if the "A" LPSW pump was damaged due loss of suction.
	SRO	The SRO should refer to TS: • TS 3.7.7 (Low Pressure Service Water System) Condition "A" applies. Restore required LPSW pump to operable status. 72 hours completion time. • TS 3.3.28 (LPSW pump Auto-Start Circuitry) Condition "A". Restore Auto-Start Circuitry to operable. 7 day completion time.
		Event is complete when SRO has referred to TS or when directed by the Lead Examiner.

Op-Test No.: _____ Scenario No.: **4** Event No.: **4** Page 1 of 1

Event Description: **Controlling Tave failed HIGH (I, OATC, SRO)**

Time	Position	Applicant's Actions or Behavior
		Plant response: • 1SA-02/A-12, ICS Tracking, will actuate due to neutron and feedwater cross-limits. • Controlling Tave will indicate ≈ 596.4° F. • Actual loop A & B Tave will decrease until operator stops transient. • RCS pressure and temperature will decrease. **Crew response:**

	SRO/OATC	• When the Statalarms are received, the candidates should utilize the "Plant Transient Response" process to stabilize the plant.
		  • Verbalize to the SRO reactor power level and direction of movement.
		  • Place the Diamond and both FDW Masters in manual and position as necessary to stabilize the plant.
		  • The SRO should:
		  • Refer to AP/28, ICS Instrument Failures
		  • Contact SPOC to repair controlling Tave.

	SRO
	BOP/OATC
		Note: The ICS will remain in manual for the remainder of the scenario.
		1. <u>AP/28</u>
		• Verify plant conditions are stable as indicated by the following:
		  • NI power change of < 2% from current NI power indication **AND** thermal power best ≤ pre-transient power level
		  • Tave change of < 2°F from current Tave indication
		  • THP/SG Outlet Press. change of < 30 psig from current THP/SG Outlet Press.
		  • RCS pressure change of < 150 psig from current RCS pressure
		• **GO TO** the section 4A (RCS Temperature)
		• Notify SPOC
		• **PERFORM** an instrumentation surveillance using applicable table in Encl 5.3 (ICS Instrument Surveillances) for the failed instrument.
		• Verify computer readouts O1A1692 and O1A1693 agree within 3°F (5°F in RPS Cab).

		When the SRO reaches the WHEN step (5) in Section 4A or when directed by the lead examiner this event is completed.

Op-Test No.: _____ Scenario No.: **4** Event No.: **5** Page 1 of 2

Event Description: **HPSW Jockey pump trip, altitude valve fail closed: (C, BOP/SRO)**

Time	Position	Applicant's Actions or Behavior
	SRO BOP	**Plant Response**: Stat Alarm 1SA9/A-8 (HPSW HEADER A/B PRESS LOW) Stat Alarm 1SA9/D-8 (HPSW JOCKEY PUMP OFF) HPSW system pressure decreasing. **Crew Response**: SRO direct BOP to refer to alarm response guide 1SA9/A-8 <u>1SA9/A-8</u> • **IF** HPSW Header Pressure continues to decrease **AND** Elevated Storage Tank Level is **NOT** dropping; i.e., altitude valve stuck closed and jockey pump not providing adequate supply, manually start a HPSW Pump. • Refer to OP/0/A/1104/011 (High Pressure Service Water). <u>OP/0/A/1104/011 Limits & Precautions</u> • HPSW Pumps A & B have a minimum flow requirement of 1450 gpm. • Normal system flow demand is approximately 200 gpm. • **IF** altitude valve closes while an HPSW pump is still running, pump will be deadheaded. • Do **NOT** operate an HPSW pump with altitude valve isolated, unless provisions have been made to ensure pump will **NOT** be operated below its minimum flow. • SLC 16.9.8a requires any time a Turbine Driven Emergency Feedwater Pump **OR** a HPI Pump is required to be operable, EWST level shall be ≥ 70,000 gallons. • HPSW Pump(s) can operate with the Altitude Valve closed **AND NO** additional system flow for ≤ 15 minutes.

Op-Test No.: _____ Scenario No.: **4** Event No.: **5** Page 2 of 2

Event Description: **HPSW Jockey pump trip, altitude valve fail closed: (C, BOP/SRO)**

Time	Position	Applicant's Actions or Behavior
	SRO	**Crew Response**: SRO will refer to SLC 16.9.8a (HPSW requirements to support loss of LPSW and CCW). HPSW shall be available as follows: a. HPSW shall be available to provide the backup cooling water to HPI Pump motor coolers. b. EWST level shall be ≥ 70,000 gallons. c. HPSW shall be available to provide backup cooling water to the Turbine Driven Emergency Feedwater Pump bearing oil cooler Condition A: • Operations perform Risk Assessment considering equipment out of service. AND • Log unavailability duration in the Operations Log for Maintenance Rule performance monitoring.
		When it is determined that the HPSW pump has to be cycled, or when directed by the lead examiner this event is completed.

Op-Test No.: _____ Scenario No.: **4** Event No.: **6** Page 1 of 2

Event Description: **Dropped Control Rod, Manual Power Reduction (C, OATC/SRO) (TS)**

Time	Position	Applicant's Actions or Behavior

	SRO
	
	OATC
	
	BOP
		Plant Response:
		
		Stat alarm 1SA2/A10 (CRD SYSTEM TROUBLE)
		Stat alarm 1SA2/B10 (CRD POSITION ERROR)
		Stat alarm 1SA2/D9 (CRD OUT INHIBIT)
		
		Crew Response:
		
		SRO should enter AP/15 (Dropped or Misaligned Control Rods)
		
		<u>AP/15</u>
		
		• **IAAT** more than one control rod is dropped or misaligned > 9″ (6%) from the group average, **THEN** trip the Rx.
		• Verify Rx is critical.
		• Verify Rx runback to 55% FP in progress.
		
		NOTE: Runback will not be occurring due to ICS in MANUAL.
		
		RNO: Initiate power reduction to 55% FP at ≥ 1%/min.
		
		• Initiate Encl 5.1 (Control of Plant Equipment During Shutdown).
		• Notify SPOC to perform the following:
		  • Investigate cause of dropped or misaligned control rod.
		  • Prepare to reduce the following trip setpoints:
		  • RPS Flux/Flow-Imbalance
		  • RPS High Flux
		
		NOTE: Tech Spec 3.1.4 requires verification of SDM > 1% Δk/k or initiation of boration to achieve SDM within limits within an hour of the misaligned or dropped control rod.
		
		• Verify > 1% SDM with allowance for the inoperable control rod per PT/1/A/1103/015 (Reactivity Balance Calculation).

Op-Test No.: _____ Scenario No.: **4** Event No.: **6** Page 2 of 2

Event Description: **Dropped Control Rod, Manual Power Reduction (C, OATC/SRO) (TS)**

Time	Position	Applicant's Actions or Behavior
	SRO BOP/SRO	**Crew Response**: SRO should refer to TS for the dropped control rod. • Enter TS 3.1.4 (Control Rod Group Alignment Limits) Condition A: (One trippable CR inoperable or not aligned to within 6.5% of its group average height or both). 1. Restore Control Rod Alignment OR 2. Verify SDM OR Initiate Boron to restore SDM AND Reduce Thermal Power to ≤ 60% of allowable thermal power AND Reduce nuclear overpower trip setpoints (flux/flow imb) to ≤ 65.5% of the allowable thermal power AND Verify the potential ejected rod worth is within assumptions of rod ejection analysis. • Ensure requirements of TS 3.2.3 (Quadrant Power Tilt) are met.
		When TS 3.1.4 is entered, or when directed by the lead examiner this event is completed.

Op-Test No.: _____ Scenario No.: **4** Event No.: **7** Page 1 of 6

Event Description: **2nd dropped CR, ATWS, Main FDW Pumps Trip, PORV fails OPEN (M, ALL)**

Time	Position	Applicant's Actions or Behavior

	ALL
	
	OATC
		Plant Response:
		
		Second Control Rod drops
		Rod bottom lights for second dropped control rod
		MFWPs trip
		MD EFDWPs start
		SG levels decrease and go dry
		RCS Pressure decreases
		Pzr level decreases initially, then increases
		
		Crew Response:
		
		Upon recognizing the second dropped control rod, the crew manually trips the reactor.
		
		• OATC performs IMAs and determines that the reactor did not trip and performs Rule 1 (ATWS)
		
		<u>Rule 1</u> **(CT-24)**
		
		• Verify any Power Range NI ≥ 5% FP.
		• Initiate manual control rod insertion to the IN LIMIT.
		• Notify CR SRO to **GO TO** UNPP tab.
		• Open the following:
		  • 1HP-24
		  • 1HP-25
		• Ensure only one of the following operating:
		  • 1A HPI PUMP
		  • 1B HPI PUMP
		• Start 1C HPI PUMP.
		NOTE: The 1C HPIP will NOT start
		RNO: Start the standby HPIP and open 1HP-409
		• Open the following:
		  • 1HP-26
		  • 1HP-27
		• Dispatch one operator to open 600V CRD breakers on the following:
		  • 1X9-5C (U-1 CRD NORM FDR BKR)
		  • 2X1-5B (U-1 CRD ALTERNATE FDR BKR)
		• Verify only two HPI pumps operating
		• **EXIT** this rule.

Op-Test No.: _____ Scenario No.: **4** Event No.: **10** Page 2 of 6

Event Description: **2nd dropped CR, ATWS, Main FDW Pumps Trip, PORV fails OPEN (M, ALL)**

Time	Position	Applicant's Actions or Behavior

	ALL	**Crew Response**:
		
		UNPP tab
		
		• Ensure Rule 1 (ATWS / Unanticipated Nuclear Power Production) is in progress or complete.
		• Verify Main FDW is operating and in AUTO.
		• **IAAT** Main FDW is **NOT** operating, **THEN** perform the following:
		  • Trip the turbine-generator.
		  • Start all available EFDW pumps.
		• Verify any wide range NI > 1% FP.
		• Open the following:
		  • 1RC-4
		  • 1HP-5
		• Maximize letdown.
		• Secure makeup to LDST. {8}
		• **WHEN** all wide range NIs are ≤ 1% FP, **AND** decreasing, **THEN** continue.
		• Adjust SG pressure as necessary to stabilize RCS temperature using either of the following:
		  • TBVs
		  • Dispatch two operators to perform Encl 5.24 (Operation of the ADVs).
		• Throttle HPI per Rule 6 (HPI).
		• Adjust letdown flow as desired.
		• Verify RCP seal injection available
		• **GO TO** Subsequent Actions tab.

Op-Test No.: _____ Scenario No.: **4** Event No.: **10** Page 3 of 6

Event Description: **2nd dropped CR, ATWS, Main FDW Pumps Trip, PORV fails OPEN (M, ALL)**

Time	Position	Applicant's Actions or Behavior

	BOP	**Crew Response**:
		
		BOP will complete a symptom check and then perform Rule 3 (Loss of Main or Emergency Feedwater)
		
		Rule 3
		
		• Verify any EFDW pump operating.
		• Verify any SCM ≤ 0 F.
		
		CAUTION
		ATWS events may initially require throttling to prevent exceeding pump limits and additional throttling once the Rx is shutdown to prevent overcooling.
		
		• **IF** overcooling, **OR** exceeding limits in Rule 7 (SG Feed Control), **THEN** throttle EFDW, as necessary. **(CT-16)**
		• **IAAT** Unit 1 EFDW is in operation, **THEN** initiate Encl 5.9 (Extended EFDW Operation).
		
		Encl 5.9
		
		• Perform the following as required to maintain UST level > 7.5':
		  • Makeup with demin water.
		  • Place CST pumps in AUTO.

Op-Test No.: _____ Scenario No.: **4** Event No.: **10** Page 4 of 6

Event Description: **2nd dropped CR, ATWS, Main FDW Pumps Trip, PORV fails OPEN (M, ALL)**

Time	Position	Applicant's Actions or Behavior

	SRO/BOP/ OATC	**Plant Response:**
		
		With the PORV and 1RC-4 failed open and only 2 HPIPs to fill the RCS, SCM will slowly decrease to zero (saturation) while the Pzr fills. When solid, pressure will increase and SCM will be re-established
		
		Crew Response:
		
		The SRO will transfer to the Subsequent Actions tab from the UNPP tab.
		
		<u>Subsequent Actions tab</u>
		
		• Verify all control rods fully inserted.
		• Verify TBVs controlling SG pressure at desired setpoint.
		• Dispatch an operator with Encl 5.29 (MSRV Locations) to verify all MSRVs have reseated.
		• Initiate Encl 5.5 (Pzr and LDST Level Control).
		• Open the following:
		  • PCB 20
		  • PCB 21
		• Perform the following:
		  • Open the Generator Field Breaker.
		  • Position EXCITATION switch to OFF.
		• Verify Aux Bldg and Turbine Bldg Instrument Air pressure ≥ 90 psig.
		• Verify ICS/NNI power available.
		
		When subcooling is lost, the OATC/BOP will perform Rule 2 (Loss of Subcooling Margin) and the SRO will transfer to the LOSCM tab.

Op-Test No.: _____ Scenario No.: **4** Event No.: **10** Page 5 of 6

Event Description: **2nd dropped CR, ATWS, Main FDW Pumps Trip, PORV fails OPEN (M, ALL)**

Time	Position	Applicant's Actions or Behavior

	BOP/ OATC	**Plant Response:**
		
		Loss of Subcooling Margin
		
		Crew Response:
		
		The BOP/OATC will perform Rule 2 (Loss of Subcooling Margin).
		
		<u>Rule 2</u>
		
		• **IAAT** all the following exist:
		  • Any SCM ≤ 0□F
		  • Rx power ≤ 1%
		  AND either of the following exists:
		  • R≤ 2 minutes elapsed since loss of SCM
		  • CP motor amps stable **AND** ≈ normal **THEN** Stop all RCPs.
		• Open the following:
		  • 1HP-24
		  • 1HP-25
		• Start all available HPI pumps.
		• Open the following:
		  • 1HP-26
		  • 1HP-27
		• Verify at least two HPI pumps are operating using two diverse indications.
		• **IAAT** the following limits are exceeded
		  1A & 1B HPI pumps operating with 1HP-409 open and Total flow of 950 gpm (incl. seal injection) **THEN** throttle HPI to maximize flow ≤ flow limit.
		• Select OFF for both digital channels on AFIS HEADER A .
		• Select OFF for both digital channels on AFIS HEADER B.
		• Establish 300 gpm to each of the following:
		  • 1A SG
		  • 1B SG
		• **IAAT** any SCM ≤ 0 F, **THEN** feed to the LOSCM setpoint in all intact SGs.
		  IF SCM > 0 F, **THEN** control EFDW as required to raise level in intact SGs to proper setpoint per Rule 7 (SG Feed Control)
		
		• Place FDW block valve switches for 1FDW-33, 1FDW-31, 1FDW-42, and 1FDW-40 in CLOSE:

Op-Test No.: _____ Scenario No.: **4** Event No.: **10** Page 6 of 6

Event Description: **2nd dropped CR, ATWS, Main FDW Pumps Trip, PORV fails OPEN (M, ALL)**

Time	Position	Applicant's Actions or Behavior

	SRO
	OATC/BOP
		Plant Response:
		
		Loss of Subcooling Margin
		
		Crew Response:
		
		The SRO will transfer to the LOSCM tab
		
		<u>LOSCM tab</u>
		
		• Verify all of the following exist:
		  • **NO** RCPs operating
		  • HPI flow in both HPI headers
		  • Adequate total HPI flow per Figure 1 (Total Required HPI Flow)
		• Open 1AS-40 while closing 1MS-47.
		• Perform the following:
		  • Control steaming and feed rates on all intact SGs to maintain cooldown rate within Tech Spec limits:
		  Tcold > 280°F: ≤ 50°F / ½ hr
		  Tcold ≤ 280°F: ≤ 25°F / ½ hr
		  Utilize either TBVs or ADVs:
		• Close 1RC-4.
		NOTE: 1RC-4 will not close.
		• Close 1GWD-17, 1HP-1, 1HP-2, and 1RC-3
		• Maintain SG pressure < RCS pressure utilizing TBVs or ADVs
		• Verify primary to secondary heat transfer exists.
		• Initiate Encl 5.16 (SG Tube-to-Shell ΔT Control).
		• Verify required RCS makeup flow within normal makeup capability.
		NOTE: RCS makeup flow exceeds normal makeup capability.
		• **GO TO** LOCA CD tab.

		When transfer to LOCA CD tab is made, or when directed by the lead examiner this event is completed.

CRITICAL TASKS

1. CT-24, ATWS
2. CT-16, FW Flow Control

Facility: **Oconee** Scenario No.: **5 fnl** Op-Test No.: **1**

Examiners: _____ Operators: _____

_____ _____

_____ _____

Initial Conditions:
- 0.01% below POAH

Turnover:
- Unit 1 Startup in progress
- LDST pressure low, requires H2 addition

Event No.	Malfunction No.	Event Type*	Event Description
0a	Override		STBY CC pump fails to Auto start
0b	Override		ES 4 fails to initiate
0c	Override		AFIS Blocked
1		N, OATC, SRO	Increase power to 3%
2	Override	C, BOP, TS, SRO	Pressurize LDST with H2, 1H-1 fails OPEN (TS)
3		TS, SRO	CRACS (Chiller trips) (TS)
4	MPS290 Override	C, BOP, SRO	1A CC pump trips and 1B CC pump fails to auto start.
5	Override	C, OATC, SRO	PZR spray valve fails OPEN
6	MPS110	C, BOP, SRO (TS)	1HP-5 fails CLOSED while restoring letdown
7	MCS012	I, OATC, SRO	1A SG Outlet Pressure fails HIGH (TBV fails OPEN)
8	Override	M, ALL	Excessive Heat Transfer
9	MSS370	M, ALL	LBLOCA ES Channel 4 fails to initiate

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

Op-Test No.: _____	Scenario No.: **5**	Event No.: **1**	Page 1 of 1
Event Description: **Increase reactor power to 3%: (N, OATC, SRO)**			

Time	Position	Applicant's Actions or Behavior
	SRO/OATC BOP	**Crew response:** OP/1/A/1102/001 (Controlling Procedure for Unit Startup) • Begin reactor power increase to ≈3% FP. (Manual Control Rod Withdrawal). • Begin raising 1HP-120 (RC VOLUME CONTROL) setpoint to ≈ 220" as power increases. • At ≈3% Power as indicated on NI-5, NI-6, and NI-9 (ICS median select): • Place REACTOR MASTER to "AUTO". • Place DIAMOND to "AUTO". • Ensure TURBINE MASTER Setpoint to ≈ 885 psig.
		Event is complete when ICS is placed in AUTO or when directed by the lead examiner.

Op-Test No.: _____ Scenario No.: **5** Event No.: **2** Page 1 of 2

Event Description: **Pressurize LDST with H2, 1H-1 fails OPEN (C, BOP, SRO) (TS)**

Time	Position	Applicant's Actions or Behavior
		Plant response: • Stat alarm 1SA2/D2 (HP APPROACHING LDST OPERATING LIMITS) **Crew response:**
	SRO	• Verify LDST pressure/level are within the acceptable operating region of the LDST PRESSURE vs LEVEL enclosure in OP/0/A/1104/002 (Curves and General Information)
		• Direct the BOP to add H2 to the LDST using OP/1/A/1106/017 (Hydrogen System) Enclosure 3.5 (Unit 1 LDST H2 Addition).
	BOP	• Enclosure 3.5 (Unit 1 LDST H2 Addition)
		NOTE: • OP/0/A/1108/001 (Curves And General Information) and computer may be referred to for LDST Pressure vs. Level curve. • LDST Maximum Pressure vs Indicated Level Curve should **NOT** be exceeded when pressurizing LDST.
		• Immediately prior to pressurization determine lowest reading of diverse LDST level indications: _____ inches.
		• For existing LDST level determine LDST Pressure allowable per LDST Pressure vs. Level curve: _____ psig.
		• Notify Operator at H2 Cage to pressurize primary hydrogen.
		NOTE: Operator should be in constant communication with CR to close 1H-26 if 1H-1 fails open.
		• Direct Operator to open 1H-26 (LDST Block).
		• Cycle 1H-1 (LDST SUPPLY) as required to pressurize LDST per LDST Pressure vs Level curve.
		Note: 1H-1 (LDST SUPPLY) will fail open.

Op-Test No.: _____ Scenario No.: **5** Event No.: **2** Page 2 of 2

Event Description: **Pressurize LDST with H2, 1H-1 fails OPEN (C, BOP, SRO) (TS)**

Time	Position	Applicant's Actions or Behavior

	BOP
	
	SRO
	
	SRO
	BOP
		Plant response:
		• LDST pressure will continue to increase.
		• 1SA-02/D-2, HP APPROACHING LDST OPERATING LIMITS, actuates
		Crew response:
		• BOP should determine that 1H-1 has failed open and direct the NLO to close 1H-26.
		• Refer to the ARG.
		  • Verify LDST pressure/level are within the acceptable operating region of the LDST PRESSURE vs. LEVEL enclosure in OP/0/A/1108/001 (Curves and General Information).
		  • **IF** necessary, vent LDST to GWD per OP/1/A/1104/002 (HPI System).
		• LDST PRESSURE vs. LEVEL enclosure in OP/0/A/1108/001 (Curves and General Information) directs the following:
		  • If LDST Pressure Vs. Level is above and to the left of Curve 1, then declare **BOTH** trains of HPI INOPERABLE.
		  • Immediately depressurize LDST below Curve 1.
		  • Refer to TS 3.0.3 for shutdown requirements.
		  • Make notifications as required by OMP 1-14 (Notifications).
		• Direct the ROs to vent LDST to GWD per OP/1/A/1104/002 (HPI System). Encl 4.16 (Lowering LDST Pressure)
		  • Close 1GWD-20 (LDST Vent Blk). (A-2-LDST Hatch Area)
		  • Open 1GWD-19 (LDST VENT).
		  • Throttle Open 1GWD-20 (LDST Vent Blk) until LDST pressure begins to slowly decrease and GWD system can maintain vent header. (A-2-LDST Hatch Area)
		  • **WHEN** desired LDST pressure obtained, Close 1GWD-19 (LDST VENT).
		  • Position 1GWD-20 (LDST Vent Blk) to ≈ 1/4 turn Open. (A-2-LDST Hatch Area)

		Event is complete when decision to vent the LDST is made or when directed by the lead examiner.

Op-Test No.: _____ Scenario No.: **5** Event No.: **3** Page 1 of 1

Event Description: **CRACS (Chiller trips) (TS, SRO)**

Time	Position	Applicant's Actions or Behavior
	BOP	**Plant response:** • 1SA-06/E-10, AH CHILLER COMP PNL A/B TROUBLE, actuates. • Refer to AP/1&2/A/1700/036 (Degraded Control Room Area Cooling)

	SRO/BOP	**Crew response:**
		• AP/1&2/A/1700/036
		  • Dispatch Operator to perform Encl 5.1 (Chiller Assessment and Restart).
		  • **IAAT** Control Room temperature exceeds 78°F, **THEN** initiate Encl 5.2 (Actions For High Control Room Temperature).
		  • **WHEN** status of all Chillers is known, **THEN** continue procedure.
		  • Refer to TS 3.7.16 (Control Room Area Cooling System) Condition B (Restore in 30 days)

		Event is complete when TS entry or when directed by the lead examiner.

Op-Test No.: _____ Scenario No.: **5** Event No.: **4** Page 1 of 3

Event Description: **1A CC Pump trips, 1B CC Pump Fails to Auto Start: (C; BOP, SRO)**

Time	Position	Applicant's Actions or Behavior
		Plant response: • 1SA-9/B-1, CC CRD RETURN FLOW LOW • 1SA-9/C-1, CC COMP COOLING RETURN FLOW LOW • 1SA-2/C-1, LETDOWN TEMPERATURE HIGH • 1HP-5 (Letdown Isolation) will close due to high letdown temperature • CC Total Flow Low • Component Cooling Pressure Low **Crew Response:**
	SRO BOP	• Refer to ARG 1SA-9/B-1 • Determine low flow is due to CC Pump failure AND Standby CC Pump did NOT start and perform the following: • Verify CC Surge Tank level > 18" • Start Standby CC Pump
		Note: The SRO may not initiate AP/20 if the standby pump is started per the ARG.
	SRO BOP	• Initiate AP/20 (Loss of Component Cooling) • **IAAT** ≥ two CRD stator temperatures ≥ 180°F, **THEN** trip RX. **(~ 4 minutes)** • Open 1CC-7 and 1CC-8 • Verify CC Surge Tank level ≥ 12". • Manually start the Standby CC Pump • Verify CC TOTAL FLOW > 575 gpm • If Letdown > 130 ^{0}F, THEN: • Close 1HP-5, • Initiate AP/032 (Loss of Letdown)

Op-Test No.: _____ Scenario No.: **5** Event No.: **4** Page 2 of 3

Event Description: **1A CC Pump trips, 1B CC Pump Fails to Auto Start: (C; BOP, SRO)**

Time	Position	Applicant's Actions or Behavior
	SRO	**Crew Response:** • If AP/20 (Loss of Component Cooling) not entered, Statalarm 1SA-2/C-1 will direct initiating AP/32 (Loss of Letdown) <u>AP/32</u> (Loss of Letdown)

	BOP	• Place 1HP-120 in HAND and reduce demand to zero.
		• Initiate makeup to LDST as required (Encl.5.5 or OP/1/A/1103/004.
		• Notify Chemistry of the following:
		  • Current RCS boron sample is needed for possible unit shutdown.
		  • Normal letdown line is isolated.
		• **IAAT** Pzr level ≥ 260”,
		AND letdown **CANNOT** be established,
		THEN initiate unit shutdown at ≈ 20%/min per AP/29 (Rapid Unit Shutdown).
		• **IAAT** Pzr level ≥ 375”,
		THEN trip Rx.
		• Verify CC system in operation.
		• Position the standby HPI pump switch to OFF.
		• Throttle 1HP-31 to establish 12 - 15 gpm SEAL INLET HDR FLOW.
		• Verify loss of letdown is due to L/D temperature high and then **GO TO** Step 4.30.
		• **WHEN** letdown can be re-established,
		THEN ensure proper operation of the CC System.
		• Close 1HP-6 and 1HP-7.
		• Open 1HP-1, 1HP-2, 1HP-3, 1HP-4

Op-Test No.: _____ Scenario No.: **5** Event No.: **4** Page 3 of 3

Event Description: **1A CC Pump trips, 1B CC Pump Fails to Auto Start: (C; BOP, SRO)**

Time	Position	Applicant's Actions or Behavior

	SRO
	BOP
		Crew Response:
		AP/32 (Continued)
		• Verify letdown temperature < 135°F (**it is not**)
		• Open 1HP-13.
		• Close the following:
		  • 1HP-8
		  • 1HP-9&11
		• Select LETDOWN HI TEMP INTLK BYP switch to BYPASS.
		• Open 1HP-5.
		NOTE: 1HP-5 will NOT open from the control room.
		• **GO TO** Step 4.12
		NOTE: Refer to event 6.

		This event is complete when Seal Flow is returned to normal (32 gpm) or when directed by the lead examiner.

Op-Test No.: _____ Scenario No.: **5** Event No.: **5** Page 1 of 1

Event Description: **PZR Spray Valve Fails OPEN: (C, OATC/SRO)**

Time	Position	Applicant's Actions or Behavior
	OATC/SRO	**Note: This event will occur during event 4.** **Plant response**: • RCS pressure will decrease • 1SA-2/D-3, RC PRESS HIGH/LOW **Crew response:** 1SA-2/D-3 • Ensure all pressurizer heaters are ON • Ensure pressurizer spray valve closed and/or pressurizer spray block valve closed **Note: If the block valve is not closed, the reactor will trip on variable low pressure and ES actuation will occur**. • Evaluate reducing or isolating letdown flow • Increase makeup flow as required **Note: The PZR spray valve will remain failed for the remainder of the scenario.**
		When RCS pressure decrease has been stopped, or when directed by the lead examiner this event is completed.

Op-Test No.: _____ Scenario No.: **5** Event No.: **6** Page 1 of 1

Event Description: **1HP-5 fails CLOSED while restoring letdown: (C, BOP, SRO)**

Time	Position	Applicant's Actions or Behavior

	SRO
	BOP
		Crew response:
		AP/32
		• Verify 1HP-5 closed.
		• Close 1HP-6.
		• Close 1HP-7.
		• Dispatch an operator in continuous communication with Control Room to manually open 1HP-5 (LETDOWN ISOLATION)
		NOTE: 1HP-5 is a containment isolation valve (TS 3.6.3)
		• **WHEN** 1HP-5 is open, **THEN** ensure CC System in operation.
		• Verify letdown temperature < 135°F.
		NOTE: Letdown temperature will be greater than 135 F.
		• Open 1HP-13.
		• Close the following:
		  • 1HP-8
		  • 1HP-9&11
		Select LETDOWN HI TEMP INTLK BYP switch to BYPASS.
		• Throttle open 1HP-7 to establish ≈ 20 gpm.
		• **WHEN** letdown temperature < 130°F, **THEN** place LETDOWN HI TEMP INTLK BYP switch in NORMAL.
		• Open 1HP-6.
		• Adjust 1HP-7 to control desired letdown flow.
		• Re-establish normal makeup through 1HP-120.
		• Re-establish normal RCP seal injection flow.
		• Position the standby HPI pump switch to AUTO.

		When the standby HPIP is placed in AUTO or when directed by the lead examiner, this event is completed

Op-Test No.: _____ Scenario No.: **5** Event No.: **7** Page 1 of 1

Event Description: **1A SG outlet press fail HIGH (TBV fails OPEN)(I, OATC, SRO)**

Time	Position	Applicant's Actions or Behavior

	SRO/OATC	**Plant response:**
		• OAC alarm
		• 1A Turbine Bypass Valve fails open.
		• A Main Steam line pressure decreases
		• Reactor Coolant Temperature decreases causing reactor power to increase.
		
		Crew response
		• Crew will perform Low Power "Plant Transient Response".
		  • Place ICS Diamond Panel to MAN
		  • Place ICS Feedwater Loop Masters A&B to HAND
		  • Insert Control Rods to reduce power to below pre-transient level
		  • As steam pressure continues to decrease, the crew should trip the reactor due to low steam pressure.

		When the reactor is tripped or when directed by the lead examiner, this event is completed

Op-Test No.: _____ Scenario No.: **5** Event No.: **8** Page 1 of 5

Event Description: **Excessive Heat Transfer (M, ALL)**

Time	Position	Applicant's Actions or Behavior
		Plant response: 1. Reactor is manually tripped 2. Steam pressure continues to decrease 3. AFIS fails to initiate automatically **Crew response:**
	OATC/SRO	• Perform Immediate Manual Actions (IMAs) • Depress REACTOR TRIP pushbutton. • Verify reactor power < 5% FP and decreasing. • Depress turbine TRIP pushbutton. • Verify all turbine stop valves closed. • Verify RCP seal injection available.
	BOP	• Perform Symptom Check • Power Range NIs **NOT** < 5% • Power Range NIs **NOT** decreasing • Any SCM < 0°F • Loss of Main and Emergency FDW (including unsuccessful manual initiation of EFDW) • <u>Uncontrolled Main steam line(s) pressure decrease</u> • SGTR • CSAE Offgas alarms • Process monitor alarms (RIA-40, 59, 60) • Area monitor alarms (RIA-16/17) • The BOP will recognize indications of a steam line break and initiate <u>Rule 5</u> (Excessive Heat Transfer).
	BOP	<u>Rule 5</u> (**CT-17)** • On AFIS HEADER A, depress CH. 1 INIT. • On AFIS HEADER A, depress CH. 2 INIT. **NOTE: AFIS will not work** • Select OFF for 1A MD EFDWP. • Trip both Main FDWPTs. • Close 1FDW-315. • Place 1FDW-33 switch to CLOSE. • Place 1FDW-31 switch to CLOSE.

Op-Test No.: _____	Scenario No.: **5**	Event No.: **8**	Page 2 of 5
Event Description:	**Excessive Heat Transfer (M, ALL)**		

Position	Applicant's Actions or Behavior

BOP	**Crew response:**
	1. Rule 5 Continued.
	• Verify 1 TD EFDW PUMP operating.
	• Verify 1 TD EFDW PUMP is feeding affected SGs.
	• Perform the following:
	  • Stop 1 TD EFDW PUMP.
	  • Close the following on affected SGs:
	  • 1FDW-368
	• Start 1 TD EFDW PUMP.
	• **WHEN** overcooling is stopped, **THEN** adjust steaming of unaffected SG to maintain CETCs constant using either of the following:
	  • TBVs
	  • Dispatch two operators to perform Encl 5.24 (Operation of the ADVs).
	• **WHEN** all the following exist:
	  • Core SCM > 0 F
	  • Rx power ≤ 1%
	  • Pzr level
	  • With PTS - Pzr level increasing
	  • With **NO** PTS- Pzr level > 100″ [180″ acc]
	• **THEN** perform the following to stabilize RCS P/T:
	  • Throttle HPI.
	  • Reduce 1HP-120 setpoint to control at desired level.
	  • Adjust steaming of unaffected SG as necessary to maintain CETCs constant.
	• Ensure Rule 3 (Loss of Main or Emergency FDW) is in progress or complete.

BOP/OATC	Rule 3 (Loss of Main or Emergency Feedwater)
	• **IAAT NO** SGs can be fed with FDW (Main/CBP/Emergency), **AND** any of the following exist:
	  • RCS pressure reaches 2300 psig **OR** NDT limit
	  • Pzr level reaches 375″ [340″ acc]
	THEN PERFORM Rule 4 (Initiation of HPI Forced Cooling).

Op-Test No.: _____ Scenario No.: **5** Event No.: **8** Page 3 of 5

Event Description: **Excessive Heat Transfer (M, ALL)**

Time	Position	Applicant's Actions or Behavior

	BOP/OATC	**Crew response:**
		Rule 3 Continued
		• Start EFDW pumps to feed all intact SGs.
		• Verify any EFDW pump operating.
		• Verify any SCM ≤ 0 ^{0}F.
		• **IAAT** Unit 1 EFDW is in operation, **THEN** initiate Encl 5.9 (Extended EFDW Operation).
		Encl. 5.9 (Extended EFDW Operation)
		• Monitor EFDW parameters on EFW graphic display.
		• Perform the following as required to maintain UST level > 7.5':
		  • Makeup with demin water.
		  • Place CST pumps in AUTO.
		• **IAAT** all the following exist:
		  • Rapid cooldown **NOT** in progress
		  • MD EFDWP operating for each available SG
		  • EFDW flow in each header < 600 gpm
		THEN place 1 TD EFDW PUMP switch in PULL TO LOCK.
		• Notify CR SRO to set priority based on the NOTE above and EOP activities.

	OATC/SRO	Transfer to Subsequent actions tab then to the Excessive Heat Transfer tab of the EOP
		• Verify any SG pressure < 550 psig.
		• Ensure Rule 5 (Main Steam Line Break) in progress or complete.
		• Place the following in HAND and decrease demand to zero on all affected SGs:
		  • 1FDW-32
		  • 1FDW-35
		• Close the following on all affected SGs:
		  • 1FDW-372
		  • 1MS-17
		  • 1MS-79
		  • 1MS-35
		  • 1MS-82
		  • 1FDW-368

Op-Test No.: _____	Scenario No.: **5**	Event No.: **8**	Page 4 of 5
Event Description:	**Excessive Heat Transfer (M, ALL)**		

Time	Position	Applicant's Actions or Behavior

	OATC/SRO
	
	OATC/SRO
		Crew response:
		Excessive Heat Transfer tab of the EOP (Continued)
		• Verify level in both SGs < 96% O.R.
		• **IAAT** core SCM is > 0□F,
		• **THEN** perform Steps 7 and 8.
		• Throttle HPI per Rule 6 (HPI).
		• Verify letdown in service.
		• Verify any SG has an intact secondary boundary (intact SG).
		• Open the following on all intact SGs:
		• 1FDW-382
		• 1FDW-369
		• Start MDEFDWP associated with all intact SGs:
		  • 1B MDEFDWP
		• Feed and steam all intact SGs to stabilize RCS P/T using either of the following:
		  • TBVs
		  • Dispatch two operators to perform Encl 5.24 (Operation of the ADVs).
		• Verify any of the following:
		  • HPI has operated in the injection mode while **NO** RCPs were operating
		  • A cooldown below 400□F at > 100 □F/hr has occurred
		• Verify both of the following are closed:
		  • 1MS-24
		  • 1MS-33
		• Open 1AS-8.
		• Close the following:
		  • 1SSH-1
		  • 1SSH-3
		  • 1SSH-9
		• Notify Chemistry to determine RCS boron concentration.
		• Notify the following to check for indications of SGTR:
		  • RP
		  • Secondary Chemistry
		• Minimize SCM using the following methods as necessary:
		  • De-energize all Pzr heaters
		  • Use Pzr spray
		  • Throttle HPI to maintain Pzr level > 100” [180” acc]
		  • Use PORV

		When transfer to FCD tab or when directed by the lead examiner this event is completed

Op-Test No.: _____ Scenario No.: **5** Event No.: **8** Page 5 of 5

Event Description: **Excessive Heat Transfer (M, ALL)**

Time	Position	Applicant's Actions or Behavior

	OATC/SRO	**Crew response:**
		Excessive Heat Transfer tab of the EOP (Continued)
		• Verify any RCP operating.
		• Maintain RCP NPSH.
		  • OAC
		  • Encl 5.18 (P/T Curves)
		  • Initiate Encl 5.16 (SG Tube-to-Shell ΔT Control).
		• Verify all SCMs > 0^0F.
		• Verify required RCS makeup flow within normal makeup capability.
		• Verify either of the following:
		  • Any SG isolated
		  • Any SG has an unisolable steam leak
		• **GO TO** FCD tab.

		When transfer to Forced Cooldown tab or when directed by the lead examiner, this event is completed

Op-Test No.: _____ Scenario No.: **5** Event No.: **9** Page 1 of 4 Event Description**: LBLOCA (M, All) ES Ch 4 fails to initiate**		
Time	Position	Applicant's Actions or Behavior

	OATC/BOP	**Plant Response:**
		RCS pressure decreases rapidly
		Core and Loop Subcooling Margin indicate '0' or '-0' (flashing)
		ES 1-8 (except Ch 4 which has failed) initiate.
		Crew response
		NOTE: SRO may direct either RO to manually initiate ES channel 4 at any point in the procedures or either RO may initiate (OMP 1-18 memory item). (CT-4)
		SRO may direct the ROs to perform a symptom check:
		• Perform Symptom Check
		  • Power Range NIs **NOT** < 5%
		  • Power Range NIs **NOT** decreasing
		  • Any SCM < 0°F
		  • Loss of Main and Emergency FDW (including unsuccessful manual initiation of EFDW)
		  • Uncontrolled Main steam line(s) pressure decrease
		  • SGTR
		  • CSAE Offgas alarms
		  • Process monitor alarms (RIA-40, 59, 60)
		  • Area monitor alarms (RIA-16/17)
		• RO should recognize LOSCM and perform Rule 2.
		  • **IAAT** all the following exist:
		  • Any SCM ≤ 0□F
		  • Rx power ≤ 1%
		  • **AND** either of the following exists:
		  • ≤ 2 minutes elapsed since loss of SCM
		  • RCP motor amps stable **AND** ≈ normal
		  • **THEN** perform Steps 2 and 3.
		  • Stop all RCPs.
		  • Notify CR SRO of RCP status.
		  • Open the following:
		  • 1HP-24
		  • 1HP-25
		  • Start all available HPI pumps.
		  • Open the following:
		  • 1HP-26
		  • 1HP-27

Op-Test No.: _____ Scenario No.: **5** Event No.: **9** Page 2 of 4

Event Description**: LBLOCA (M, All) ES Ch 4 fails to initiate**

Time	Position	Applicant's Actions or Behavior

	OATC/BOP	**Crew response**
		Rule 2 (Continued)
		• Verify at least two HPI pumps are operating using two diverse indications.
		• **IAAT** ≥ 2 HPI pumps operating, **AND** HPI flow in any header is in the Unacceptable Region of Figure 1 **THEN** perform Steps 11 - 13.
		• **IAAT** the following limits are exceeded, (**CT-5)**
		  • 1 HPI pump/hdr 475 gpm (incl. seal injection for A hdr)
		  • 1A & 1B HPI pumps operating with 1HP-409 open Total flow of 950 gpm (incl. seal injection)
		• **THEN** throttle HPI to maximize flow ≤ flow limit.
		• Notify CR SRO of HPI status.
		• **IAAT** either of the following exists:
		  • LPI FLOW TRAIN A plus LPI FLOW TRAIN B ≥ 3400 gpm
		  • Only one LPI header in operation with header flow ≥ 2900 gpm
		THEN GO TO Step 15.
		• Perform the following:
		  • Place 1FDW-315 in MANUAL and close.
		  • Place 1FDW-316 in MANUAL and close.
		• Notify crew that performance of Rule 3 is **NOT** required due to LB LOCA.
		• **WHEN** directed by CR SRO, **THEN EXIT** this rule.

	SRO/BOP/ OATC	SRO will transfer to the LOSCM tab.
		• Ensure Rule 2 (Loss of SCM) is in progress or complete.
		• Verify LOSCM caused by excessive heat transfer.
		• **IAAT** either of the following exists:
		  • LPI FLOW TRAIN A plus LPI FLOW TRAIN B ≥ 3400 gpm
		  • Only one LPI header in operation with header flow ≥ 2900 gpm
		THEN GO TO LOCA CD tab.
		SRO will transfer to the LOCA CD tab.

		When transfer to Forced Cooldown tab or when directed by the lead examiner, this event is completed

Op-Test No.: _____ Scenario No.: **5** Event No.: **9** Page 3 of 4

Event Description**: LBLOCA (M, All) ES Ch 4 fails to initiate**

Time	Position	Applicant's Actions or Behavior

	SRO/OATC/ BOP	**Crew response**
		The SRO may <u>transfer to the ICC tab</u> if indicated superheat (Core SCM = '-0' and flashing).
		<u>Inadequate Core Cooing</u> (ICC) tab
		• Ensure full HPI and control per Rule 6 (HPI)
		• **IAAT** RCS pressure is ≤ 550 psig, **OR** RB pressure is ≥ 3 psig, **THEN** perform Steps 4 - 8.
		• Open the following:
		  • 1LP-21
		  • 1LP-17
		• Start 1A LPI Pump.
		• Open the following:
		  • 1LP-22
		  • 1LP-18
		• Start 1B LPI Pump.
		• Verify two LPI pumps operating.
		• **IAAT** all the following exist:
		  • LPI required
		  • ECCS pump suction aligned to BWST
		  • 1A LPI Pump unavailable
		  • 1B LPI Pump unavailable
		  • 1C LPI Pump available **AND** off.
		THEN open 1LP-9, 1LP-10, 1LP-6, 1LP-7, 1LP-17, 1LP-18, 1LP-21, 1LP-22 and start 1C LPI Pump.
		• Open the following:
		  • 1CF-1
		  • 1CF-2
		• **IAAT** core SCM is ≥ 0 F, **THEN GO TO** LOCA CD tab.

		When transfer to LOCA Cooldown tab or when directed by the lead examiner, this event is completed

Op-Test No.: _____ Scenario No.: **5** Event No.: **9** Page 4 of 4

Event Description**: LBLOCA (M, All) ES Ch 4 fails to initiate**

Time	Position	Applicant's Actions or Behavior

	SRO
	
	OATC/BOP
		Crew response
		The SRO will direct the OATC or the BOP to perform Encl. 5.1 ES Actuation
		<u>Encl 5.1</u>
		• Verify all ES digital channels associated with actuation setpoints have actuated.
		• Place HPI in manual control.
		• Open the following:
		  • 1CC-7
		  • 1CC-8
		  • 1LPSW-15
		  • 1LPSW-6
		• Ensure 1A or 1B CC PUMP is operating.
		• Place the following in manual control:
		  • 1A LPI PUMP
		  • 1LP-17
		  • 1B LPI PUMP
		  • 1LP-18
		• Start A and B OUTSIDE AIR BOOSTER FANs
		• Notify Unit 3 to start 3A and 3B OUTSIDE AIR BOOSTER FANs
		• Verify the following are open:
		  • 1CF-1
		  • 1CF-2
		• Verify 1HP-410 closed.
		• Secure makeup to the LDST.
		• Close 1LPSW-139.
		• Place the following in FAIL OPEN:
		  • 1LPSW-251 FAIL SWITCH
		  • 1LPSW-252 FAIL SWITCH
		• Open the following:
		  • 1LPSW-4
		  • 1LPSW-5
		• Dispatch an operator to perform Encl 5.2 (Placing RB Hydrogen Analyzers In Service).
		• Select DECAY HEAT LOW FLOW ALARM SELECT switch to ON.

		When transfer to LOCA Cooldown tab or when directed by the lead examiner, this event is completed

CRITICAL TASKS

1. CT-5, Control HPI
2. CT-17, Isolate Overcooling
3. CT-4, Initiate LPI