

Draft Submittal

**OCONEE JUNE 2003 EXAM**  
**50-269/2003-301**

**JUNE 16 - 27, 2003**

1. Operating Test Simulator Scenarios

*& OUTLINES*

Facility: <u>Oconee</u>		Scenario No.: <u>1, Initial Submittal</u>		Op-Test No.: <u>1</u>	
Examiners: _____		Operators: _____			
Initial Conditions: _____		Request (IC-42) _____			
Turnover: _____		Work, expected returned this shift _____			
Event No.		Event Description			
0a	Pre-Insert MSS330		TD EFDW Pump Fails to Start		
0b	Pre-Insert Updater		SASS in manual		
0c	Pre-Insert Updater		AMSAC/DSS bypassed		
1		N, BOP, SRO	De-Lithiation with the deborating Demineralizer		
2	MPI121, 100	I, BOP, SRO	PZR LVL #1 Transmitter Fails HIGH		
3	MCR021 Override	C, OATC, SRO	Drop CR Group 2 Rod 6, (TS) Diamond blocked from AUTO operation		
4	MPS440 (40-80%)	C, BOP, SRO	1A <sub>1</sub> RCP High Vibration (secure RCP)		
5		R, OATC, SRO	Power Reduction		
6	MCR022	C, OATC, SRO	Second dropped control rod, requiring a manual reactor trip		
7	MEL090	M, ALL	ATWS CT-1 Lockout (Loss of Power)		
8	MEL180	M, ALL	Keowee Unit 1 Emergency Lockout (blackout, PRA)		

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

## Scenario #1 Overview (Initial Submittal)

**Initial Conditions:** Unit 1: 75% power - EOL, Unit 2: 100%, Unit 3: 100%

### Turnover:

- Unit 1 TD EFDW Pump OOS to repair oil leak, expected returned this shift
- SASS in manual for I&E testing
- AMSAC/DSS bypassed for I&E testing
- Keowee Unit 1 generating to the grid
- ICS Diamond in MANUAL for I&E test

### 1) De-Lithiation with the deborating Demineralizer: (N, BOP)

- a) Chemistry requests that the RCS be de-lithiated for 5 minutes with the Unit 1 Deborating Demineralizer. The BOP should use Enclosure 4.26 of OP/1103/004, Soluble Poison Control, to begin de-lithiation.

TIME = 10 minutes, TOTAL 10 min.

### 2) PZR Level #1 Transmitter Fails HIGH: (I, BOP)

- a) Crew will refer to the ARG for high PZR level. Crew should refer to PT/600/001 (Periodic Instrument Surveillance) and select a good level instrument.

TIME = 5 minutes, TOTAL 15 min.

### 3) Dropped Control Rod: (C, OATC) (TS)

- a) The crew should utilize the "Plant Transient Response" to stabilize the plant and recognize that a runback is not in progress.
- b) Perform actions per AP/15, Dropped Control Rods, including reducing reactor power to less than 60% within 2 hours.
- c) SRO should refer to TS.
- d) The crew may try to return the ICS to AUTO. However, the Diamond will be blocked from running back in AUTO requiring a manual power reduction. This will require that the crew diagnose the failure to automatically runback.
- e) Power reduction will be performed in manual however this will not count for the reactivity. The reactivity will occur later in the scenario.

TIME = 10 minutes, TOTAL 25 min.

### 4) 1A<sub>1</sub> RCP High Vibration: (C, BOP)

- a) During the power reduction the 1A<sub>1</sub> RCP will experience High Vibration. This will require entry into AP/16, Abnormal Reactor Coolant Pump Operation. RCP vibration will increase and the decision will be made to secure the 1A<sub>1</sub> RCP.

TIME = 5 minutes, TOTAL 30 min.

## Scenario #1 Overview (Initial Submittal)

### 5) Power Reduction: (R, OATC)

- a) After the RCP is secured the unit will be required to reduced to < 45% power because of the dropped CR and RCP combination. The CRSRO will direct the OATC with the help of the BOP to commence a power reduction with the ICS in manual.

TIME = 10 minutes, TOTAL 40 min.

### 6) Second dropped Control Rod (Manual Reactor Trip): (C, OATC)

- a) After the plant is stable a second control rod will drop. This will require a manual reactor trip.

TIME = 2 minutes, TOTAL 42 min.

### 7) CT-1 Lockout and an ATWS: (M, ALL; R, OATC)

- a) The reactor will not trip and an ATWS will occur requiring utilization of the Unanticipated Nuclear Power Production tab and RULE 1 from the EOP. Manually inserting control rods, deenergizing control rod drives, and initiating Emergency Boration will be required. When reactor power is less than 5% the turbine will be tripped. This will cause a loss of power due to CT-1 (startup transformer) lockout. Main Feeder Bus power will automatically be restored from Keowee via CT-4 and the Standby Bus. This will require entering AP/11 (Recovery From Loss of Power) to restore plant loads and secondary equipment required for the recovery of condenser vacuum. When NIs indicate less than 1% UNPP tab directs transfer back to Subsequent Actions tab.

TIME = 10 minutes, TOTAL 52 min.

### 8) Keowee Unit 2 Emergency Lockout, Unit Blackout: (M, ALL)

- a) Keowee Unit 2 Emergency Lockout will result in a Unit Blackout. This will cause the SRO to transfer to the Blackout tab of the EOP for guidance on manually restoring power to Unit 1's Main Feeder Busses from Central Switchyard via CT-5. After power is restored to the 4160 volt switchgear AP/11 will be restarted. The scenario will be completed after power has been restored to the Main Feeder Buses and AP/11 has been restarted.

TIME = 10 minutes, TOTAL 62 min.

Facility: **Oconee**Scenario No.: **2, Initial Submittal**

Op-Test No.: \_\_\_\_\_

Examiners: \_\_\_\_\_

Operators: \_\_\_\_\_

## Initial Conditions:

- 100% Reactor Power (IC-41)

## Turnover:

- AMSAC/DSS bypassed for I&E testing
- SASS in manual for I&E testing
- "A" Condensate Booster Pump OOS, breaker to be replaced
- Keowee Unit 2 OOS for unplanned reasons
- Keowee Unit 1 aligned to underground

Event No.	Malfunction No.	Event Type*	Event Description
0a	Pre-Insert		AMSAC/DSS bypassed
0b	Pre-Insert MNI082		NI-9 OOS
0c	Pre-Insert AOR		"A" AFIS circuit disabled "B" AFIS circuit disabled
0d	Pre-Insert MEL180		Keowee Unit 2 Emergency Lockout
0e	Pre-Insert		ES Channels 7 and 8 fail to automatically actuate
1a	Override	N, BOP, SRO	Low "A" CFT Pressure (N <sub>2</sub> makeup)
1b		C, BOP, SRO	1N-298 (N <sub>2</sub> Fill CFT 1A) fails OPEN
2	MPS090	C, OATC, SRO	1HP-120 (RC Volume Control) Fails closed
3	MCS004	I, OATC, SRO	Controlling Tave fails LOW
4	Override	C, BOP, SRO	Seismic event (PRA) 1A RBCU rupture (TS)
5	MPS020	C, ALL	1B SG Tube leak 5 gpm (TS)
6		R, OATC, SRO	Unit Shutdown
7	MPS020	M, ALL	1B SG Tube leak increases to 200 gpm
8	MSS360,50	M, ALL	1A Main Steam line break in RB

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

## Scenario #2 Overview (Initial Submittal)

**Initial Conditions:** Unit 1: 100% power - EOL, Unit 2: 100%, Unit 3: 100%

### Turnover:

- AMSAC/DSS bypassed for I&E testing
- SASS in manual for I&E testing
- "A" Condensate Booster Pump OOS, breaker to be replaced
- Keowee Unit 2 OOS for unplanned reasons
- Keowee Unit 1 aligned to underground

### 1) 1A CFT low pressure and 1N-298 (N<sub>2</sub> Fill CFT 1A) fails OPEN: (N, BOP; C, BOP)

- a) Crew will refer to ARG for low pressure and when directed by the SRO will use OP/1104/001 (Core Flooding System) to add Nitrogen to the 1A CFT. 1N-298 (N<sub>2</sub> Fill CFT 1A) fails OPEN and the BOP should direct the NEO to close the block valve to prevent over pressurizing the CFT.

TIME = 10 minutes

### 2) 1HP-120 (RC Volume Control) Fails CLOSED: (C, OATC)

- a) 1HP-120 (RC Volume Control) Fails CLOSED due to a ruptured diaphragm. This should be diagnosed and AP/14, Loss of Normal HPI Makeup and/or RCP Seal Injection, should be followed. The AP will give guidance on maintaining PZR level and instruct the crew to call SPOC to repair the valve. 1HP-120 (RC Volume Control) will remain broken for the remainder of the scenario.

TIME = 10 minutes, TOTAL 20 min.

**NOTE: Events 1 and 2 will occur at about the same time.**

### 3) Controlling Tave fails LOW: (I, OATC)

- a) The controlling Tave input to the ICS system will fail low. The crew should respond using "Plant Transient Response" process. ICS will be place in manual to stabilize the plant and will remain in manual for the remainder of the scenario.

TIME = 5 minutes, TOTAL 25 min.

### 4) Seismic event (PRA) and 1A RBCU rupture (TS): (C, BOP)

- a) A seismic event will occur which will cause the 1A RBCU to rupture. AP/005, Earthquake, will be entered. RBCU rupture should be diagnosed and subsequently isolated to prevent diluting the RB sump.

TIME = 5 minutes, TOTAL 30 min.

## Scenario #2 Overview (Initial Submittal)

### 5) 1B SG Tube leak (5 gpm): (C, ALL) (TS)

- a) The seismic event will also cause a tube leak in the 1B Steam Generator. This leak will initially be ~ 5 gpm. This leakage will require entry into AP/31, Primary to Secondary Leakage. After determining the leak is greater than TS limits, the SRO should initiate a unit shutdown.

TIME = 20 minutes, TOTAL 50 min.

### 6) Unit Shutdown: (R, OATC)

- a) As a result of the previous instrument failure a unit shutdown will be conducted with the ICS in manual. Primary inventory will require manual control during the shutdown due to 1HP-120 (RC Volume Control) remaining in manual.

TIME = 5 minutes, TOTAL 55 min.

### 7) 1B SG Tube leak increases to 200 gpm (M, ALL)

During the shut down the SG tube leak will increase to 200 gpm requiring the SRO to transfer to the Steam Generator Tube Rupture tab of the EOP. The leak will be beyond the capacity of normal HPI makeup requiring the use of additional makeup and suction from the BWST.

TIME = 10 minutes, TOTAL 65 min.

### 8) 1A Main Steam line break in RB: (M, ALL)

- a) A main steam line break will occur in the 1A main steam line. This will require the use of RULE 5 (Main Steam Line Break) to isolate the leak and may require using RULE 2 (Loss of SCM). The CRSRO will transfer to the Excessive Heat Transfer tab of the EOP to ensure excessive heat transfer has been stopped and the plant stabilized. Transfer will then be made back to the Steam Generator Tube Rupture tab of the EOP. ES channels 7 and 8 will not automatically actuate on high RB pressure. It should be manually actuated while performing EOP Enclosure 5.1 (Es Actuation). Manual initiation of ES channels 7 and 8 will not completely actuate all required equipment. Additional action by the crew will be required. The scenario will be completed when the 1A main steam line has been isolated and a transfer to the Steam Generator Tube Rupture tab of the EOP has been made.

TIME = 15 minutes, TOTAL 80 min.

Facility: **Oconee**Scenario No.: **3, Initial Submittal**Op-Test No.: 1Examiners: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_Operators: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

## Initial Conditions:

- 25% Reactor Power, startup in progress

## Turnover:

- Unit 1 TD EFDW Pump OOS to repair oil leak
- NI-9 OOS, to be replaced next outage
- 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

Event No.	Malf. No.	Event Type*	Event Description
0a	Pre-Insert MSS330		TD EFDW Pump Fails to Start
0b	Pre-Insert Updater		SASS in manual
0c	Pre-Insert Updater		AMSAC DSS bypassed
0d	Pre-Insert MEL180		Keowee Unit 2 Emergency Lockout
1	MEL020 Override	N, BOP, SRO C, BOP, SRO	Operability test Unit 1 Keowee Unit 1 Gen Field Flashing Breaker fails to OPEN automatically
2	MPS460 Override	C, OATC, SRO	"A" HPI Pump sheared shaft and standby HPI pump fails to start
3	MNI032	I, OATC, SRO	Controlling NI fails LOW
4	MSS310	C, BOP, SRO	Loss of Instrument Air
5	MPI290	C, OATC, SRO	Main FDW Pump Trips Main Turbine Fails to trip (Lockout EHC Pumps)
6	MSS280,100 Override	M, ALL	"A" TBVs fail open 1MS-17 ("A" TBV Block) fails to close
7	MPS010	M, ALL	"A" SG Tube Rupture

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



### Scenario #3 Overview (Initial Submittal)

**Initial Conditions:** Unit 1: 25% power - EOL, Unit 2: 100%, Unit 3: 100%

**Turnover:**

- Unit 1 TD EFDW Pump OOS to repair oil leak, expected returned this shift
- NI-9 OOS, to be replaced next outage
- 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

**1) Operability test Keowee Unit 1 with failure of Gen Field Flashing Breaker: (N, BOP; C, BOP)**

- a) Keowee Unit 1 will be started from the control room as part of the operability test. During startup the Gen Field Flashing Breaker fails to open automatically. This should be recognized and the breaker should be opened manually. This does not make the Keowee unit inoperable.

TIME = 15 minutes

**2) "A" HPI Pump sheared shaft and the standby HPI pump fails to auto start: (C, OATC; C, OATC TS)**

- a) The 1A HPI Pump shaft will shear. This will cause low RCP seal injection flow and the standby HPI pump will not auto start. This will require entry into AP/014 (Loss of Normal M/U and/or RCP SI). The standby HPI will be started and RCP seal injection re-established.

TIME = 15 minutes, TOTAL 30 min.

**NOTE: Events 1 and 2 will occur at about the same time.**

**3) Controlling NI fails LOW: (I, OATC)**

- a) The crew should utilize the "Plant Transient Response" to stabilize the plant and recognize that the controlling NI has failed. The ICS will be placed in manual to stabilize the unit. The ICS will remain in manual for the remainder of the scenario.

TIME = 5 minutes, TOTAL 35 min.

**4) Loss of Instrument Air (C, BOP)**

- a) Instrument Air (IA) pressure will begin to decrease. The crew should implement AP/022 (Loss of IA). The Diesel Air Compressor will be started and an attempt will be made to locate and stop the loss of IA. After a leak is found and isolated IA pressure will return to normal.

TIME = 13 minutes, TOTAL 48 min.

### Scenario #3 Overview (Initial Submittal)

#### 5) Main FDW Pump trips and the turbine Fails to trip (C, BOP)

- a) The operating Main FDW pump will trip resulting in a reactor trip and entry into the EOP. The Main Turbine will not trip requiring the OATC to secure the EHC pumps during performance of the EOP Immediate Manual actions.

TIME = 2 minutes, TOTAL 50 min.

#### 6) "A" TBVs fails open and 1MS-17 ("A" TBV Block) fails to close: (C, OATC)

- a) After the reactor trip the "A" TBVs will fail open resulting in excessive heat transfer. 1MS-17 will not close from the control room to isolate the TBVs. RULE 5 (Main Steam Line Break) will be used to isolate the "A" SG and the SRO will transfer to the Excessive Heat Transfer tab of the EOP.

TIME = 10minutes, TOTAL 60 min.

#### 7) "A" SG Tube Rupture: (M, ALL)

- a) After the SG has been isolated a tube in the "A" SG will rupture requiring the SRO to transfer to the Steam Generator Tube Rupture tab of the EOP. After transfer is made to the Generator Tube Rupture tab of the EOP the scenario may be stopped.

TIME = 15 minutes, TOTAL 75 min.

Facility: **Oconee**Scenario No.: **SPARE, Initial Submittal**Op-Test No.: 1Examiners: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_Operators: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

## Initial Conditions:

- 50% Reactor Power, startup in progress (IC-45)

## Turnover:

- AMSAC/DSS bypassed for I&E testing
- NI-9 OOS, to be replaced next outage

Event No.	Malf. No.	Event Type*	Event Description
0a	Pre-Insert		AMSAC/DSS bypassed
0b	Pre-Insert MNI082		NI-9 OOS
0c	Pre-Insert		1HP-26 Failed CLOSED
0d	Pre-insert		1FDW-316 Failed OPEN
1	MPI171, 100 MPI500, 100	I, OATC, SRO	T <sub>n</sub> Fails HIGH (repair return to auto)
2	MPS290 Override	C, BOP, SRO	1A CC Pump trips (1B CC Pump fails to auto start)
3	MPS110	C, BOP, SRO	1HP-5 Fails closed
4	MPS405	C, BOP, SRO	Unidentified RCS leak in RB (20 gpm) (TS)
5	MCR040	C, OATC, SRO	Inability for CRD insertion in automatic during shutdown.
6		R, OATC, SRO	Manual CRD power decrease
7	MPS400.5	M, ALL	SBLOCA

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

## Scenario Spare Overview (Initial Submittal)

**Initial Conditions:** Unit 1: 50% power - EOL, Unit 2: 100%, Unit 3: 100%

### Turnover:

- AMSAC/DSS bypassed for I&E testing
- NI-9 OOS, to be replaced next outage

#### 1) **T<sub>hot</sub> fails HIGH: (I, OATC)**

- a) The crew should diagnose the failure and stabilize the plant by using the "Plant Transient Response" process.
- b) The Crew should take BOTH FDW Masters and the Diamond to Manual to mitigate the transient and attempt to stabilize the plant by removing header pressure error from feeding forward to the FDW and Rx Subsystems.
- c) The failure will be repaired and the ICS returned to auto.

TIME = 20 minutes

#### 2) **1A CC Pump trips: (C, BOP)**

- a) The crew should refer to ARG and to AP/020 (Loss of Component Cooling). The BOP should manually start the standby CC pump.
- b) The crew should initiate investigation and repair of 1A CC pump and why 1B CC pump failed to auto start.

TIME = 10 minutes, TOTAL 30 min.

#### 3) **1HP-5 Fails closed: (C, BOP)**

- a) Recognize that 1HP-5 closed due to high letdown temperature, and refer to the ARG for stat alarm 1SA-2/C-1, Letdown Temperature High.
- b) When the crew recognizes that 1HP-5 has failed closed, the CRSRO should refer to AP/032, Loss of Letdown.
- c) An operator should be dispatched to manually open 1HP-5.

TIME = 10 minutes, TOTAL 40 min.

#### 4) **Unidentified RCS leak in RB (20 gpm): (C, BOP) (TS)**

- a) Diagnose a leak in the RB by using RIAs and monitoring RCS inventory. Refer to AP/002 (Excessive RCS Leakage). Determine leak rate and location. SRO should refer to TS and determine that a unit shutdown is required.

TIME = 10 minutes, TOTAL 50 min.

## Scenario Spare Overview (Initial Submittal)

### 5) Inability for CRD insertion in automatic during shutdown: (C, OATC)

- a) When the unit shutdown is commenced the OATC should determine that the control rods are not inserting. The SRO should direct the OATC to place the control rods in manual and reduce reactor power.

TIME = 3 minutes, TOTAL 53 min.

### 6) Manual CRD power decrease (R, OATC)

- a) The OATC should reduce power with the control rods in manual.

TIME = 12 minutes, TOTAL 65 min.

### 7) Small Break LOCA : (M, ALL)

- a) Leak will develop into a SBLOCA requiring entry in to the EOP. This event is complicated by the failure of 1HP-26 and 1FDW-316. RULE 2 (Loss of SCM) will be implemented and the SRO will transfer to the Loss of Subcooling Margin tab of the EOP. After transfer is made to the LOCA CD tab of the EOP this scenario may be stopped.

TIME = 10 minutes, TOTAL 75 min.

Facility: **Oconee**Scenario No.: **1, IS R1**

Op-Test No.: \_\_\_\_\_

Examiners: \_\_\_\_\_

Operators: \_\_\_\_\_

## Initial Conditions:

- 75% Reactor Power EOL, per dispatcher request (IC-42)

## Turnover:

- Unit 1 TD EFDW Pump OOS to repair oil leak, expected returned this shift
- SASS in MANUAL for I&E testing
- AMSAC/DSS bypassed for I&E testing
- Keowee Unit 1 generating to the grid
- Diamond in MANUAL for I&E test
- Chemistry has requested that the RCS be De-Lithiation with the Normal deborating Demineralizer for 5 minutes. OP/1103/004 Encl. 4.26 completed up to step 2.7.

Event No.	Malfunction No.	Event Type*	Event Description
0a	Pre-Insert MSS330		TD EFDW Pump Fails to Start
0b	Pre-Insert Updater		SASS in manual
0c	Pre-Insert Updater		AMSAC/DSS bypassed
1		N, BOP, SRO	De-Lithiation with the Normal deborating Demin.
2	MPI121, 100	I, BOP, SRO	PZR LVL #1 Transmitter Fails HIGH
3	MCR021 Override	C, OATC, SRO	Drop CR Group 2 Rod 6, (TS) Diamond blocked from AUTO operation
4	MPS440 (40-80%)	C, BOP, SRO	1A <sub>1</sub> RCP High Vibration (secure RCP)
5	MPI281	I, OATC, SRO	$\Delta T_c$ fails HIGH when RCP secured
6	MCR022	C, OATC, SRO	Second dropped control rod, requiring a manual reactor trip
7	MEL090	M, ALL	ATWS CT-1 Lockout (Loss of Power)
8	MEL180	M, ALL	Keowee Unit 1 Emergency Lockout (blackout, PRA)

\* (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: **De-Lithiation with the deborating Demineralizer (N, BOP)**

Time	Position	Applicant's Actions or Behavior
	BOP	<p>Refer to OP/1/A/1103/004 (Soluble Poison Control) Enclosure 4.26 (Step 2.7) to begin de-lithiation.</p> <p>Perform OP/1/A/1103/004, Soluble Poison Control, Enclosure 4.26</p> <p>Place Deborating IX in service:</p> <ul style="list-style-type: none"> <li>• Review Limits and Precautions</li> <li>• Verify closed 1CS-32 &amp; 37 (SPARE DEBOR IX INLET &amp; OUTLET)</li> <li>• Close 1CS-26 (Letdown to RC Bleed)</li> <li>• Open 1CS-27 (Debor IX Inlet)</li> <li>• Open 1HP-16 (LDST Makeup Isolation)</li> <li>• Verify 1HP-15 (LDST Makeup Control) in MANUAL and open</li> <li>• Position 1HP-14 (LDST Bypass) to "BLEED"</li> <li>• Record letdown pressure (contact NEO, <b>Cue: 115 psig</b>)</li> <li>• Wait 5 minutes</li> </ul> <p>Restore system per OP/1/A/1103/004, Soluble Poison Control, Enclosure 4.26:</p> <ul style="list-style-type: none"> <li>• Place 1HP-14 (LDST Bypass) in "NORMAL"</li> <li>• Close 1HP-16 (LDST Makeup Isolation)</li> <li>• Reset 1HP-15 Moore Controller for Normal Operation(LDST Makeup Control)</li> <li>• Close 1CS-27 (Debor IX Inlet)</li> <li>• Open 1CS-26 (Letdown to RC Bleed)</li> <li>• Complete OP/1/A/1103/004, Soluble Poison Control, Enclosure 4.26</li> </ul>
		<b>When de-lithiation is complete or when directed by the lead evaluator this event is completed.</b>

Op-Test No.: \_\_\_\_\_ Scenario No.: 1 Event No.: 2

Page 1 of 1

Event Description: **PZR Level #1 Transmitter Fails HIGH: (I, BOP)**

Time	Position	Applicant's Actions or Behavior
	BOP	<p>Plant response:</p> <p>Statalarms</p> <ul style="list-style-type: none"> <li>• 1SA-2/C-3, RC Pressurizer Level High/Low</li> <li>• 1SA-2/C-4, RC Pressurizer Level Emerg. High/Low</li> </ul> <p>Front board (1UB1) indications:</p> <ul style="list-style-type: none"> <li>• PZR Level 1 indicates 400"</li> <li>• 1HP-120 (RC Volume Control) throttles closed</li> <li>• Makeup flow decreases to <math>\approx 0</math> gpm.</li> </ul> <p>Crew response:</p> <p>Refer to ARG:</p> <ul style="list-style-type: none"> <li>• Check alternate PZR level indications (1UB1 and OAC) and determine that PZR level 1 has failed high.</li> <li>• Check for proper Makeup/Letdown flows and adjust to restore proper level.</li> </ul>
	SRO/BOP	<ul style="list-style-type: none"> <li>• SRO should direct the BOP to take actions to restore normal PZR level.</li> </ul>
	SRO/BOP	<ul style="list-style-type: none"> <li>• 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.</li> </ul>
		<b>When an alternate PZR level channel has been selected or when directed by the lead evaluator this event is completed.</b>



Op-Test No.: _____		Scenario No.: 1	Event No.: 3	Page 1 of 2
Event Description: <b>Dropped Control Rod: (C, OATC/SRO) (TS)</b> <b>When directed by the Lead Examiner Group 2, rod #6 drops into the core.</b>				
Time	Position	Applicant's Actions or Behavior		
		Plant response: Statalarms <ul style="list-style-type: none"> <li>• 1SA-2/B-10, CRD Position Error</li> </ul> Position Indicating Panel <ul style="list-style-type: none"> <li>• API indication of dropped rod on individual meter</li> <li>• In limit (zero %) green light on respective dropped rod.</li> <li>• Loss of respective dropped rod out limit (100%) red light.</li> <li>• Amber 7" asymmetric lights on the dropped rod and the entire group.</li> </ul> Diamond Panel indications <ul style="list-style-type: none"> <li>• 9" asymmetric lamp.</li> <li>• Group In Limit (green) lamp on respective group.</li> </ul>		
	OATC	Crew will use "Plant Transient Response" process to stabilize the plant.  Acknowledge and verbalize to the SRO the most important Statalarm received for the failure.  Verbalize to the SRO reactor power level and direction of movement.		
	BOP	Recognize that a valid runback should be occurring but is not because the ICS is in manual.  Refer to ARG for 1SA-2/B-10, CRD Position Error <ul style="list-style-type: none"> <li>• Inform SRO entry into AP/015, Dropped Control Rods is required.</li> </ul>		
	SRO	The SRO should use the OAC to monitor unit status.  Enter AP/1/A/1700/15, Dropped Control Rods		

Op-Test No.: \_\_\_\_\_ Scenario No.: 1 Event No.: 3

Page 2 of 2

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

Time	Position	Applicant's Actions or Behavior
	SRO	Direct actions per AP/015, Dropped Control Rods.
	OATC	<ol style="list-style-type: none"> <li>1. Verify <math>\leq</math> one dropped control rod or misaligned <math>&gt; 9"</math> (6%) from group average.</li> <li>2. Verify Reactor is critical</li> <li>3. Verify runback to 55% FP in progress. <ul style="list-style-type: none"> <li>• OATC should determine that a runback is <b>not</b> in progress due to ICS in manual and initiate a manual runback as directed by the SRO.</li> </ul> </li> </ol>
	BOP	<ol style="list-style-type: none"> <li>4. Initiate Enclosure 5.1 (Control of Plant Equipment During Shutdown) <ul style="list-style-type: none"> <li>• Notify WCC SRO to make notifications</li> <li>• Ensure 1A and 1B MSRH DRN PUMP stopped</li> <li>• Place 1FDW-53 and 1FDW-65 (MFDWP Recircs) in MANUAL and closed</li> <li>• Place 1HD-37 and 1HD-52 in DUMP.</li> <li>• Start the 1A and 1B MFDW Pump's Seal Injection and Aux oil pumps.</li> </ul> </li> </ol>
	SRO	<ol style="list-style-type: none"> <li>5. Notify I&amp;E (SPOC) to perform the following: <ul style="list-style-type: none"> <li>• Investigate cause of dropped rod</li> <li>• Prepare to reduce RPS Flux/Flow-Imbalance and RPS High Flux setpoints.</li> </ul> </li> <li>6. Within 1 hour verify <math>&gt; 1\%</math> SDM with the allowance for inoperable control rod(s) by performing PT/1/A/1103/15, Reactivity Balance Calculations.</li> <li>7. Refer to TS 3.2.3 Quadrant Power Tilt (QPT) <ul style="list-style-type: none"> <li>• Verify QPT within COLR limit</li> </ul> </li> <li>8. Within 2 hours, ensure reactor power is less than 60% of the allowable power per the RCP combination.</li> </ol> <p><b>Note: The crew may elect to place the Diamond in Auto to let the unit runback. However going to Auto is blocked by a malfunction of the auto/manual pushbutton.</b></p>
	OATC	<ol style="list-style-type: none"> <li>9. Begin reducing reactor power to less than 60% with the ICS in manual.</li> </ol>
		<b>When power is being reduced with the ICS in manual this event is completed.</b>

Op-Test No.: \_\_\_\_\_ Scenario No.: 1 Event No.: 4 Page 1 of 1

Event Description: **1A<sub>1</sub> RCP High Vibration: (C, BOP/SRO)**

Time	Position	Applicant's Actions or Behavior
	BOP	Statalarm 1SA-9/D-2 (RC PUMP VIBRATION HIGH) will alarm.
	SRO	<ol style="list-style-type: none"> <li>1. The BOP should refer to the ARG</li> <li>2. Verify RCP vibration conditions by using RCP OAC Display Group RCP</li> <li>3. Refer to AP/016, Abnormal Reactor Coolant Pump Operation. <ul style="list-style-type: none"> <li>• Determine RCP immediate trip criteria are not met by referring to Enclosure 5.1 (RCP Immediate Trip Criteria).</li> <li>• Since immediate trip criteria is not met then notify the OSM and request an evaluation of the RCP vibration condition by the RCP Component Engineer.</li> </ul> </li> </ol>
	BOP	Statalarm 1SA-9/E2 (RCP VIBRATION EMERG HIGH) will actuate.
	SRO	<ol style="list-style-type: none"> <li>1. The BOP should determine that the immediate trip criteria are now met based on Enclosure 5.1 (RCP Immediate Trip Criteria) and inform the SRO.</li> <li>2. The SRO should direct the BOP to: <ul style="list-style-type: none"> <li>• Verify Reactor power <math>\leq 70\%</math></li> <li>• Verify four RCPs operating</li> <li>• Trip the 1A1 RCP.</li> </ul> </li> <li>3. Trip the 1A1 RCP.</li> </ol>
	BOP	
		<b>When crew has tripped the RCP this event is completed.</b>

Op-Test No.: \_\_\_\_\_

Scenario No.: 1

Event No.: 5

Page 1 of 1

Event Description:  $\Delta T_c$  fails HIGH: (I, OATC)

Time	Position	Applicant's Actions or Behavior
	OATC	<p>When the 1A<sub>1</sub> RCP is secured <math>\Delta T_c</math> fails HIGH</p> <ul style="list-style-type: none"> <li>• Statalarm 1SA-02/B-5 (RC Cold Leg Diff. Temperature High) will actuate.</li> <li>• FDW flow will ratio based on the failure</li> <li>• "A" FDW flow will increase causing "A" loop Tc to decrease.</li> <li>• "B" FDW flow will decrease causing "B" loop Tc to increase.</li> <li>• This will cause actual <math>\Delta T_c</math> to increase</li> </ul> <p>Diagnose the <math>\Delta T_c</math> failure by observing the <math>\Delta T_c</math> meter on 1UB1. It should return to zero but is staying a + 3.5 degrees.</p> <p>Take the Feedwater Masters to MANUAL and re-ratio feedwater using the loop Tc meters to return actual <math>\Delta T_c</math> to near zero.</p>
	SRO	May refer to AP/28 (ICS Instrument Failures)
		<b>When the OATC has re-ratioed FDW and returned Tc to near zero or when directed by the lead examiner this event is completed.</b>

Op-Test No.: \_\_\_\_\_ Scenario No.: 1 Event No.: 6 Page 1 of 1

Event Description: **Second dropped Control Rod (Manual Reactor Trip): (M, OATC/SRO)**

Time	Position	Applicant's Actions or Behavior
	OATC	<p>After reactor power has been reduced and when directed by the lead examiner a second control rod will drop.</p> <p>Plant response:</p> <p>Statalarm</p> <ul style="list-style-type: none"> <li>• 1SA-2/D-10 (CRD Continuous Boron Dilute Permit) actuates CRD PI Panel</li> <li>• API indication of dropped rod on individual meter</li> <li>• In limit (zero %) green light on respective dropped rod.</li> <li>• Amber 7" asymmetric lights on the dropped rod and the entire group.</li> </ul> <p>Crew response:</p> <ul style="list-style-type: none"> <li>• The OATC should determine that a second control rod has dropped into the core by observing the CRD PI Panel and <b>MANUALLY TRIP THE REACTOR</b>. OATC will attempt to trip the reactor by depressing the reactor trip pushbutton.</li> </ul> <p><b>Note: The reactor will NOT trip when the button is depressed.</b></p>
	SRO	<ul style="list-style-type: none"> <li>• SRO should ENSURE that a manual reactor trip is performed.</li> <li>• SRO enters EOP IMAs</li> </ul>
		<b>After the reactor pushbutton has been depressed this event is completed.</b>

Op-Test No.: \_\_\_\_\_ Scenario No.: 1 Event No.: 7

Page 1 of 4

Event Description: **CT-1 Lockout and an ATWS: (C, ALL)**

**When the manual reactor trip push button is depressed, the reactor will not trip and an ATWS will occur. When reactor power is less than 5% the turbine will be tripped and CT-1 (startup transformer) will lockout, which will result in a loss of power. Power will be restored from Keowee Unit 1 in approximately 35 seconds via the underground path and CT-4.**

Time	Position	Applicant's Actions or Behavior
	OATC	<p>Recognize that the Reactor should have tripped and begin performing Immediate Manual Actions.</p> <ul style="list-style-type: none"> <li>Depress REACTOR TRIP pushbutton</li> <li>Verify reactor power &lt; 5% FP and decreasing</li> </ul> <p>The OATC should recognize that Power Range NIs are not &lt; 5% FP and perform Rule 1. <b>(CT-24)</b></p> <ul style="list-style-type: none"> <li>Verify that at least one Power Range NI is <math>\geq 5\%</math> FP.</li> <li>Initiate manual control rod insertion to the IN LIMIT.</li> <li>Open 1HP-24 &amp; 1HP-25 (1A and 1B BWST Suction)</li> <li>Ensure 1A or 1B HPIP is operating.</li> <li>Start 1C HPIP.</li> <li>Open 1HP-26 &amp; 1HP-27 (1A and 1B HP Injection)</li> <li>Dispatch operators to the Cable Room and to the 600V Load Centers 1X9 and 2X1 to de-energize the CRD System.</li> <li>Notify the Procedure Director to <b>GO TO UNPP</b> tab.</li> </ul>
	BOP	Adjust FDW to match reactor power and maintain Tave near setpoint.

Op-Test No.: \_\_\_\_\_ Scenario No.: 1 Event No.: 7

Page 2 of 4

Event Description: **CT-1 Lockout and an ATWS: (C, ALL)**

**When the manual reactor trip push button is depressed, the reactor will not trip and an ATWS will occur. When reactor power is less than 5% the turbine will be tripped and CT-1 (startup transformer) will lockout, which will result in a loss of power. Power will be restored from Keowee Unit 1 in approximately 35 seconds via the underground path and CT-4.**

Time	Position	Applicant's Actions or Behavior
	SRO	<p>Transfer to the UNPP tab from IMAs and direct the following actions:</p> <ul style="list-style-type: none"> <li>• Announce plant conditions</li> <li>• Ensure Rule 1 is in progress or complete.</li> <li>• Verify Main FDW available.</li> <li>• <b>IAAT</b> <u>all</u> power range NIs are &lt;5% FP, <b>THEN</b> ensure the turbine-generator is tripped.</li> </ul> <p><b>Note: This action will result in a unit loss of power for <math>\approx</math> 35 seconds due to CT-1 lockout.</b></p> <ul style="list-style-type: none"> <li>• Verify <u>all</u> wide range NIs <math>\geq</math>1% FP.</li> <li>• Maximize letdown.</li> <li>• Verify Main FDW available.</li> <li>• Adjust Main FDW flow as necessary to control RCS temperature.</li> <li>• Verify overcooling <b>NOT</b> in progress.</li> <li>• Ensure makeup to the LDST is secured.</li> <li>• <b>WHEN</b> <u>all</u> NIs are &lt;1% FP, <b>AND</b> decreasing, <b>THEN</b> continue in this tab.</li> </ul> <p><b>Note: Due to sequence of events all steps may not be completed.</b></p>

Op-Test No.: \_\_\_\_\_ Scenario No.: 1 Event No.: 7

Page 3 of 4

Event Description: **CT-1 Lockout and an ATWS: (C, ALL)**

**When the manual reactor trip push button is depressed, the reactor will not trip and an ATWS will occur. When reactor power is less than 5% the turbine will trip and CT-1 (startup transformer) will lockout, which will result in a loss of power. Power will be restored from Keowee Unit 1 in approximately 35 seconds via the underground path and CT-4.**

Time	Position	Applicant's Actions or Behavior
	BOP	<p>Perform symptoms check and when asked report no other symptoms.</p> <p>When power is regained on the Main Feeder Buses perform AP/11, Recovery from Loss of Power.</p> <ul style="list-style-type: none"> <li>▪ <b>IAAT Pzr level &gt; 80" [180" acc], THEN ensure Pzr heaters in AUTO</b></li> <li>▪ Verify load shed is complete as indicated by LOAD SHED COMPLETE on <u>any</u> ES Module (Channel 1 or 2).</li> <li>▪ Dispatch an operator to perform Encl 5.2 (Restoring Loads Outside the Control Room).</li> <li>▪ Dispatch an operator to perform Encl 5.4 (Actions to Restore ESV System to Normal Operation).</li> <li>▪ Verify condenser vacuum maintained.</li> <li>▪ Verify IA header pressures <math>\geq 90</math> psig:</li> </ul>
	OATC	<p>Determine the Main Feedwater Pumps have tripped as a result of the loss of power and perform RULE 3 (Loss of Main or Emergency FDW).</p> <ul style="list-style-type: none"> <li>▪ Ensure any EFDWP operating</li> <li>▪ Initiate Enclosure 5.9 (Extended EFDW Operation)</li> <li>▪ Throttle Motor Driven EFDW as necessary to prevent overcooling.</li> </ul>



Op-Test No.: \_\_\_\_\_ Scenario No.: 1 Event No.: 7

Page 4 of 4

Event Description: **CT-1 Lockout and an ATWS: (C, ALL)**

**When the manual reactor trip push button is depressed, the reactor will not trip and an ATWS will occur. When reactor power is less than 5% the turbine will trip and CT-1 (startup transformer) will lockout, which will result in a loss of power. Power will be restored from Keowee Unit 1 in approximately 35 seconds via the underground path and CT-4.**

Time	Position	Applicant's Actions or Behavior
	SRO	<p>When the turbine is tripped and power is lost:</p> <p>Two possible paths</p> <ol style="list-style-type: none"> <li>GO TO the "Blackout" tab per parallel actions page <ul style="list-style-type: none"> <li>In the blackout tab, the crew will: verify power restored, initiate AP/11(Recovery from Loss of Power) and transfer to Subsequent Actions.</li> </ul> <p><b>OR</b></p> </li> <li>If power is restored prior to transferring to blackout tab, SRO will complete UNPP tab. <ul style="list-style-type: none"> <li>When power is regained to the 4160-switchgear use a "Parallel Actions" transfer from the yellow page to initiate AP/11(Recovery from Loss of Power).</li> <li>Determine that reactor power is <math>\leq 1\%</math>.</li> <li>Direct an RO to throttle HPI per Rule 6 and adjust Letdown if needed.</li> </ul> </li> <li>Transfer to Subsequent Actions <ul style="list-style-type: none"> <li>Verify all control rods are inserted</li> <li>Verify Main FDW is not operating and ensure SG level are approaching 240" XSUR.</li> <li>Verify all 4160V switchgear (1TC, 1TD, 1TE) energized.</li> </ul> </li> </ol>
		<p><b>This event is completed when power is regained to 4160V switchgear, reactor is shutdown, EOP Subsequent Actions are in progress, and when directed by the lead examiner.</b></p>

Op-Test No.: \_\_\_\_\_ Scenario No.: 1 Event No.: 8

Page 1 of 2

Event Description: **Keowee Unit 1 Emergency Lockout, Unit Blackout: (M, ALL)****Note: When directed by the lead examiner Keowee Unit 1 Emergency Lockout will occur.**

Time	Position	Applicant's Actions or Behavior
	SRO	<p>Keowee Unit 1 Emergency Lockout will result in a Unit Blackout.</p> <ol style="list-style-type: none"> <li>Determine that CC and HPI are lost and initiate AP/25 (SSF Emergency Operating Procedure) <ul style="list-style-type: none"> <li>The SRO will make a "Parallel Actions" transfer to the Blackout tab.</li> <li>Close 1HP-31 (RCP Seal Flow Control) and 1HP-21 (RCP Seal Return).</li> <li>Determine SGs are not being feed and dispatch operators to the Atmospheric Dump Valves.</li> </ul> </li> </ol> <p><b>Note: Since the TD EFDW Pump is OOS no source of FDW is available to the SGs until power is restored from CT- 5.</b></p> <ul style="list-style-type: none"> <li>Notify SSF operators that feeding with SSF ASW is required.</li> <li>Initiate Enclosure 5.38 (Restoration of Power)</li> </ul>
	BOP	<p>Perform Enclosure 5.38 (Restoration of Power) (CT-8)</p> <ol style="list-style-type: none"> <li>Verify MFB1 and MFB2 de-energized</li> <li>Determine CT-1 has no voltage</li> <li>Verify both Standby Buses de-energized</li> <li>Verify all Keowee Units operating</li> </ol> <p><b>Note: Keowee 1 emergency locked out, Keowee 2 operating.</b></p> <ol style="list-style-type: none"> <li>Notify Keowee operator to give Oconee Control for Keowee 2</li> <li>Close ACB-4 (Unit 2 EMER FDR)</li> <li>Verify CT-4 voltage 4160</li> <li>Place CT-4 Bus 1 and 2 AUTO/MAN switches in MANUAL</li> <li>Place STBY BUS 1 and 2 SYNCHRONIZING switch in ON.</li> </ol>

Op-Test No.: \_\_\_\_\_ Scenario No.: 1 Event No.: 8

Page 2 of 2

Event Description: **Keowee Unit 1 Emergency Lockout, Unit Blackout: (M, ALL)**

Time	Position	Applicant's Actions or Behavior
	BOP	10. Close SK1 and SK2 11. Place STBY BUS 1 and 2 SYNCHRONIZING switch in OFF. 12. Verify Standby Bus #1 energized. 13. Notify SRO Standby Bus #1 is energized. 14. Place the following switches in MANUAL: <ul style="list-style-type: none"> <li>• MFB1 AUTO/MAN</li> <li>• MFB2 AUTO/MAN</li> <li>• STANDBY 1 AUTO/MAN</li> <li>• STANDBY 2 AUTO/MAN</li> </ul> 15. Ensure the following breakers open: <ul style="list-style-type: none"> <li>• N1 and N2</li> <li>• E1 and E2</li> </ul> 16. Close S1 and S2 <b>Note: This will power the Main Feeder Buses.</b> 17. Verify any of the following energized: <ul style="list-style-type: none"> <li>• 1TC, 1TD, 1TE</li> </ul> 18. Notify SRO of status of 4160V SWGR 19. Use RULE 3 to establish EFDW flow to SGs.
		<b>This event and the exam are complete when plant is in a safe configuration i.e. EFW is restored.</b>

Facility: **Oconee**Scenario No.: **2, Initial Submittal R1** Op-Test No.: \_\_\_\_\_

Examiners: \_\_\_\_\_

Operators: \_\_\_\_\_

## Initial Conditions:

- 100% Reactor Power (IC-41)

## Turnover:

- AMSAC/DSS bypassed for I&E testing
- SASS in manual for I&E testing
- "A" Condensate Booster Pump OOS, breaker to be replaced
- Keowee Unit 2 OOS for unplanned reasons
- Keowee Unit 1 aligned to underground

Event No.	Malfunction No.	Event Type*	Event Description
0a	Pre-Insert		AMSAC/DSS bypassed
0b	Pre-Insert MNI082		NI-9 OOS
0c	Pre-Insert AOR		"A" AFIS circuit disabled "B" AFIS circuit disabled
0d	Pre-Insert MEL180		Keowee Unit 2 Emergency Lockout
0e	Pre-Insert		ES Channels 7 and 8 fail to automatically actuate
1a	Override	N, BOP, SRO	Low "A" CFT Pressure (N <sub>2</sub> makeup)
1b	Override	C, BOP, SRO	1N-298 (N <sub>2</sub> Fill CFT 1A) fails OPEN
2	MPS090	C, OATC, SRO	1HP-120 (RC Volume Control) Fails closed
3	MCS004	I, OATC, SRO	Controlling Tave fails HIGH
4	Override	C, BOP, SRO	Seismic event (PRA) 1A RBCU rupture (TS)
5	MPS020	C, ALL	1B SG Tube leak 5 gpm (TS)
6	MPS020	C, ALL	1B SG Tube leak increases to 100 gpm
7		R, OATC, SRO	Unit Shutdown
8	MSS360,50	M, ALL	1A Main Steam line break in RB

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

Op-Test No.: \_\_\_\_\_ Scenario No.: 2 Event No.: 1a

Page 1 of 1

Event Description: **Low "A" CFT pressure (N2 makeup) (N, BOP/SRO)**

Time	Position	Applicant's Actions or Behavior
	BOP	<p>Plant response: 1SA-08/A-11, CF TANK "A" PRESS HIGH/LOW will actuate.</p> <p>Crew response:</p> <ol style="list-style-type: none"> <li>1. The crew should refer to the ARG.</li> <li>2. Refer to OP/1104/001, Enclosure 4.7 (Pressure Makeup To CFTs Using Nitrogen) to adjust CFT pressure. <ul style="list-style-type: none"> <li>• Direct an NEO to open 1N-137 (CFTs Supply) <ul style="list-style-type: none"> <li>➤ <b>Cue: Time compression used to open 1N-137</b></li> </ul> </li> <li>• Open 1N-298 (N2 Fill CFT 1A)</li> <li>• Monitor 1A CFT pressure</li> <li>• WHEN pressurization of 1A CFT is complete, close 1N-298.</li> </ul> </li> </ol> <p><i>OK</i> <i>LOCAL</i> <i>cue</i> <i>Wt?</i></p>
		When 1N-298 (N2 Fill CFT 1A) is taken to CLOSE or when directed by the lead examiner this event is completed.

Op-Test No.: \_\_\_\_\_ Scenario No.:   2   Event No.:   1b  

Page 1 of 1

Event Description: **1N-298 (N2 Fill CFT 1A) fails OPEN (C, BOP/SRO)**

Time	Position	Applicant's Actions or Behavior
	BOP	<p>Plant response:</p> <ol style="list-style-type: none"><li>Determine 1N-298 has failed to close:<ul style="list-style-type: none"><li>Red "open" light lit</li><li>CFT pressure continues to increase</li></ul></li><li>Inform the SRO.</li><li>Direct the NEO to close 1N-137 (CFTs Supply).</li></ol> <p><b>Note: If 1N-137 is not closed the CFT pressure will continue to increase, possibly outside of TS limits.</b></p> <ol style="list-style-type: none"><li>Verify 1A CFT pressure is stable.</li></ol>
		<b>When CFT pressurization is stopped or when directed by the lead examiner this event is completed.</b>

Op-Test No.: \_\_\_\_\_ Scenario No.: 2 Event No.: 2 Page 1 of 1

Event Description: **1HP-120 (RC Volume Control) Fails closed (C, OATC/SRO)**

Time	Position	Applicant's Actions or Behavior
	OATC	<p>1HP-120 fails closed during CFT pressurization. This will allow OATC diagnoses of failure.</p> <p>1. Diagnose 1HP-120 (RC Volume Control) failed closed:</p> <ul style="list-style-type: none"> <li>• RCS makeup flow goes to zero.</li> <li>• PZR level begins to decrease.</li> <li>• LDST level begins to increase.</li> <li>• Valve position demand for 1HP-120 begins to increase to the 100% demand value and valve position indication will indicate closed (green light).</li> </ul> <p>2. Refer to AP/14 (Loss of Normal Makeup and/or RCP Seal Injection).</p> <ul style="list-style-type: none"> <li>• Determine Seal Injection is not lost</li> <li>• Determine loss of suction to HPI pumps has not occurred and <b>GO TO</b> Step 4.6.</li> <li>• Verify any HPI pump operating.</li> <li>• Verify RCP seal injection flow exists.</li> <li>• Verify RCP seal injection or HPI makeup line leak is not indicated and <b>GO TO</b> Step 4.10.</li> <li>• Verify all RCPs seal return temperatures are &lt; 240°F.</li> <li>• Verify 1HP-120 has failed and <b>GO TO</b> Step 4.183.</li> <li>• Perform the following as necessary to maintain PZR level &gt; 200": <ul style="list-style-type: none"> <li>▪ Close 1HP-6 (Letdown Orifice Stop)</li> <li>▪ Throttle 1HP-7 (Letdown Control)</li> <li>▪ Throttle 1HP-26 (1A HP Injection)</li> <li>• Ensure 1HP-120 to HAND and close</li> </ul> </li> <li>3. Contact SPOC to repair 1HP-120.</li> </ul> <p>Note: 1HP-120 will remain failed for the duration of the scenario.</p>
	SRO	<p>When PZR level is being controlled manually or when directed by the lead examiner this event is completed.</p>

Op-Test No.: \_\_\_\_\_ Scenario No.: 2 Event No.: 3

Page 1 of 1

Event Description: **Controlling Tave fails HIGH (I, OATC/SRO)****When directed by the lead examiner controlling Tave will fail high.**

Time	Position	Applicant's Actions or Behavior
	OATC	<p>Plant response:</p> <ol style="list-style-type: none"> <li>1SA-02/A-12, ICS Tracking, will actuate due to neutron and feedwater cross-limits.</li> <li>Controlling Tave will indicate <math>\approx 596.4^{\circ}\text{F}</math>.</li> <li>Actual loop A &amp; B Tave will decrease until operator stops transient.</li> <li>RCS pressure and temperature will decrease.</li> </ol> <p>Crew response:</p> <ol style="list-style-type: none"> <li>When the ICS TRACKING alarm is received, the candidates should utilize the "Plant Transient Response" process to stabilize the plant and recognize that the controlling Tave has failed. RX will trip on variable low pressure with no operator action.</li> <li>Verbalize to the SRO reactor power level and direction of movement.</li> <li>Place the FDW Masters in manual and stabilize the plant. Use control rods and FDW to stabilize the plant</li> <li>The SRO should: <ul style="list-style-type: none"> <li>Refer to AP/28, ICS Instrument Failures</li> <li>Contact SPOC to repair controlling Tave.</li> </ul> </li> </ol> <p><b>Note: The ICS will remain in manual for the remainder of the scenario.</b></p>
	SRO	
		<b>When the plant is stable or when directed by the lead examiner this event is completed.</b>



Op-Test No.: \_\_\_\_\_ Scenario No.: 2 Event No.: 4

Page 1 of 1

Event Description: **Seismic event (PRA)**  
**1A RBCU rupture (C, BOP/SRO) (TS)**

Time	Position	Applicant's Actions or Behavior
	BOP	<ol style="list-style-type: none"> <li>1SA-9/B-9, LPSW RBCU A Cooler Rupture will actuate and RB normal sump level will increase. <ul style="list-style-type: none"> <li>The BOP should refer to ARG for 1SA-9/B-9</li> <li>Verify alarm is valid by checking RBCU 1A Inlet Flow and RBCU 1A delta flow.</li> <li>Verify 1LPSW-18 (RBCU 1A Outlet) open</li> <li>Verify adequate LPSW flow is available; check LPSW pump operation</li> <li>Monitor RBNS Level for any unexplained increase (Notify Chemistry to sample RBNS for boron to determine if a cooler rupture has occurred).</li> <li>Diagnose a Cooler Rupture is indicated and Isolate the 1A RBCU Cooler.</li> </ul> </li> </ol>
	SRO	<ol style="list-style-type: none"> <li>The SRO should determine that isolation of LPSW to a RBCU places the Unit in Tech Spec 3.6.5 Condition B (7 day completion Time).</li> </ol> <p><b>Note: The control room will receive a phone call from security that indicates that a tremor has been felt but no damage has been noted.</b></p>
	SRO	<ol style="list-style-type: none"> <li>The SRO may refer to AP/05, Earthquake. <ul style="list-style-type: none"> <li>Dispatch operators to perform plant inspections</li> </ul> <p><b>Note: No damage will be reported.</b></p> <ul style="list-style-type: none"> <li>*Notify SPOC to develop the Strong Motion Accelerometer tape.</li> <li>*Verify NO fuel handling activities in progress.</li> </ul> <p><b>* These items may not be completed depending on how soon the next event is started.</b></p> <p><b>Note: Team may decide at this time to begin a unit shutdown. Refer to event 6.</b></p> </li> </ol>
		<p><b>When the RBCU has been isolated, or at the direction of the Lead Examiner this event is completed.</b></p>

Op-Test No.: \_\_\_\_\_ Scenario No.: 2 Event No.: 5

Page 1 of 2

Event Description: **1B SG Tube leak (5 gpm) (C, ALL) (TS)**  
**1B SG tube leak occurs following RBCU isolation or when directed by the lead evaluator.**

Time	Position	Applicant's Actions or Behavior
	ALL BOP  SRO BOP SRO  BOP SRO	<p>Plant response:</p> <ol style="list-style-type: none"> <li>The following alarms actuate: <ul style="list-style-type: none"> <li>1SA-8/B-9, RM PROCESS MONITOR RADIATION HIGH</li> <li>1SA-8/D-10, RM CSAE EXHAUST RADIATION HIGH</li> </ul> </li> <li>PZR level will decrease.</li> </ol> <p>Crew response:</p> <ol style="list-style-type: none"> <li>Diagnose and take actions for a Tube leak in the 1B SG:</li> <li>Refer to the ARG for the following alarms: <ul style="list-style-type: none"> <li>1SA-8/B-9, RM PROCESS MONITOR RADIATION HIGH</li> <li>1SA-8/D-10, RM CSAE EXHAUST RADIATION HIGH</li> </ul> </li> <li>Refer to AP/31 (Primary to Secondary Leakage) <ul style="list-style-type: none"> <li>Monitor primary parameters; PZR Level and LDST level to determine that gross leakage exist and transfer to step 4.71.</li> <li>Determine OTSG tube leak size is initially less than 25 gpm. Greater than 25 will require entering the EOP.</li> <li>Log RIA readings (a rough log is adequate)</li> <li>Initiate a Unit shutdown to met requirements of Encl. 5.1 (Unit Shutdown Requirements). (Per Enclosure 5.1 reduce power &lt; 50% in 1 hour). <ul style="list-style-type: none"> <li>➤ Initiate a unit shutdown using OP/1/A/1102/004 (Operation At Power)</li> </ul> </li> </ul> </li> </ol> <p><b>Note: A shutdown with the ICS in manual is required.</b></p>
		<b>When the SRO has directed a manual Unit shutdown or when directed by the Lead Examiner the event is completed.</b>

Op-Test No.: \_\_\_\_\_ Scenario No.: 2 Event No.: 6

Page 1 of 1

Event Description: **1B SG Tube leak ( 100 gpm) (C, ALL) (TS)**

Time	Position	Applicant's Actions or Behavior
	SRO	1. Primary inventory should be monitored and when the leak rate is determined to be > 25 gpm transfer to the SGTR tab of the EOP.
	BOP	2. EOP SGTR tab will perform the following: <ul style="list-style-type: none"> <li>Determine that the Reactor is not tripped.</li> <li>Maintain PZR level <math>\geq</math> 220 inches using Enclosure 5.5 (PZR and LDST Level Control). <ul style="list-style-type: none"> <li>Open HP-24 and 25 (1A and 1B BWST Suction)</li> <li>Close 1HP-5</li> </ul> </li> <li>Monitor RIA-16 ("A" MS Header) and 17 ("B" MS Header) to identify all SGs with tube ruptures.</li> </ul>
	SRO	<p><i>why is B a CT?</i></p> <p><i>OK</i> (CT-27) <i>to make sure CR is not the only</i></p> <p>Start the Outside Air Booster Fans on both Units 1 and 3.</p> <p>Open and white Tag TB Sump pump breakers.</p>
		3. The SRO should direct the OATC to begin a unit shutdown at a rate between 9.9% per hour and 20% per minute (MAXIMUM RUNBACK).
		When the SRO has entered the EOP SGTR tab or when directed by the Lead Examiner the event and scenario is completed.

*SGTR*  
*OK*  
*LeCA*

Op-Test No.: \_\_\_\_\_ Scenario No.: 2 Event No.: 7

Page 1 of 1

Event Description: **Unit Shutdown (R, OATC)**

Time	Position	Applicant's Actions or Behavior
	OATC/SRO	<p>The OATC will use the FDW Masters and the Diamond to reduce power while monitoring Reactor Power, Tave, and other plant parameters.</p> <p>If the reactor trips automatically the team must return to IMAs.</p>
		<p>The BOP will utilize Enclosure 5.19 (Control of Plant Equipment During Shutdown for SGTR).</p> <ol style="list-style-type: none"> <li>1. Notify WCC SRO to make notifications</li> <li>2. Stop 1A and 1B MSRH Drain Pump</li> <li>3. Place 1FDW-53 and 1FDW-65 in manual and closed. (Located on 1VB3)</li> <li>4. Place 1HD-37 and 1HD-52 in DUMP.</li> <li>5. Start the both FDWP's Seal Injection and Auxiliary Oil Pumps.</li> <li>6. When Reactor power is <math>\leq 80\%</math>, stop 1E1 and 1E2 Heater Drain Pumps.</li> <li>7. Transfer electrical auxiliaries <ul style="list-style-type: none"> <li>• Place 1TA AUTO/MAN transfer switch in MAN</li> <li>• Place 1TB AUTO/MAN transfer switch in MAN</li> <li>• Close 1TA SU 6.9 KV FDR</li> <li>• Close 1TB SU 6.9 KV FDR</li> <li>• Place MFB1 AUTO/MAN transfer switches in MAN</li> <li>• Place MFB2 AUTO/MAN transfer switches in MAN</li> <li>• Close E1<sub>1</sub> MFB1 STARTUP FDR</li> </ul> </li> <li>4. Close E2<sub>1</sub> MFB2 STARTUP FDR</li> </ol> <p><b>Note: the team may manually trip the reactor if PZR level cannot be maintained with full HPI. This may occur because of the tube leak and RCS cooldown.</b></p> <p><b>Note: If the reactor is manually tripped activate event 8.</b></p>
		<p><b>When a unit shutdown of <math>&gt; 5\%</math> has occurred or when directed by the lead examiner this event is concluded.</b></p>

Op-Test No.: \_\_\_\_\_ Scenario No.: 2 Event No.: 8

Page 1 of 2

Event Description: **1A Main Steam line break in RB (M, ALL)****1A main steam line break will occur following event 7 as directed by the lead examiner.**

Time	Position	Applicant's Actions or Behavior
	ALL	Plant response: <ol style="list-style-type: none"> <li>1. Statalarm 1SA-02/A-9, MS Press High/Low, actuates</li> <li>2. "A" and "B" main steam (MS) pressure decreases</li> <li>3. Reactor trips. <ul style="list-style-type: none"> <li>• "B" MS line pressure stops decreasing</li> <li>• "A" MS line pressure continues to decrease</li> <li>• RCS may saturate</li> </ul> </li> </ol> Crew response: <ol style="list-style-type: none"> <li>1. The OATC will perform and verify IMAs. <ul style="list-style-type: none"> <li>• Depress REACTOR TRIP pushbutton</li> <li>• Verify reactor power &lt; 5% FP and decreasing</li> <li>• Depress TURBINE TRIP pushbutton</li> <li>• Verify all turbine stop valves closed</li> <li>• Verify RCP seal injection available</li> </ul> </li> <li>2. The BOP will perform a symptoms check.</li> <li>3. The Crew should respond to the MSLB in the "1A" SG</li> <li>4. The BOP will perform Rule #5 (Main Steam Line Break) after receiving concurrence from the SRO. (<b>CT-17</b>) <ul style="list-style-type: none"> <li>• Stop 1A MDEFDW Pump</li> <li>• Initiate both trains of MSLB isolation</li> <li>• Ensure both Main FDW pumps tripped</li> <li>• Steam 1B SG to maintain CETCs constant</li> </ul> </li> <li>5. If SCM = 0°F then the OATC will perform Rule #2 (Loss of SCM) after receiving concurrence from the SRO. (<b>CT-1, CT-2</b>) <ul style="list-style-type: none"> <li>• Trip ALL RCPs within 2 minutes</li> <li>• Ensure open 1HP-24 and 1HP-25</li> <li>• Ensure ALL HPI pumps operating</li> <li>• Ensure open 1HP-26 and 1HP-27</li> <li>• Verify required HPI flow per header</li> </ul> </li> </ol>
	SRO	
	OATC	
	BOP	
	OATC	

Op-Test No.: \_\_\_\_\_ Scenario No.: 2 Event No.: 8

Page 2 of 2

Event Description: **1A Main Steam line break in RB (M, ALL)**

Time	Position	Applicant's Actions or Behavior
	BOP	<ul style="list-style-type: none"> <li>• Verify TBVs available</li> <li>• Feed all intact SGs</li> <li>• Control EFDW as required to raise level to intact SGs to proper setpoint per RULE 7 (SG Feed Control)</li> <li>• Trip both Main FDWPs</li> <li>• Place FDW block valve switches (1FDW-33, 31, 42, 40) in CLOSE:</li> </ul>
	BOP	<ul style="list-style-type: none"> <li>• Maintain SG pressure &lt; RCS pressure</li> </ul>
	SRO	<p>6. The SRO will "Parallel Action" to transfer to the Excessive Heat Transfer (EHT) tab and direct the Crew's actions as follows:</p> <p>7. Enclosure 5.1 (ES Actuation) will be performed.</p>
	BOP	<ul style="list-style-type: none"> <li>• Diagnose that ES Channels 7 and 8 have not actuated.</li> <li>• Depress the ES Channels 7 and 8 trip pushbutton on 1UB1.</li> </ul> <p>8. Excessive Heat Transfer (EHT) tab will:</p> <ul style="list-style-type: none"> <li>• Verify excessive heat transfer stopped</li> <li>• Throttle HPI to stabilize RCS pressure and maintain PZR level &gt; 80" (180" acc)</li> <li>• Feed and steam all intact SGs to stabilize RCS P/T. (CT-11)</li> <li>• Minimize SCM using the following methods as necessary: (CT-7) <ul style="list-style-type: none"> <li>➢ De-energizing all PZR heaters</li> <li>➢ Using PZR spray</li> <li>➢ Throttling HPI</li> </ul> </li> <li>• Initiate Enclose 5.16 (SG Tube-to-Shell <math>\Delta</math> T Control)</li> <li>• GO TO Steam Generator Tube Rupture (SGTR) tab.</li> </ul>
		<p><b>When the SRO has transferred to the SGTR tab or when directed by the Lead Examiner the event and scenario is completed.</b></p>

Facility: **Oconee**Scenario No.: **3, Initial Submittal**

Op-Test No.: \_\_\_\_\_

Examiners: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_Operators: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

## Initial Conditions:

- 25% Reactor Power (IC-45), startup in progress

## Turnover:

- Unit 1 TD EFDW Pump OOS to repair oil leak
- NI-9 OOS, to be replaced next outage
- 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.

Event No.	Malf. No.	Event Type*	Event Description
0a	Pre-Insert MSS330		TD EFDW Pump Fails to Start
0b	Pre-Insert Updater		SASS in manual
0c	Pre-Insert Updater		AMSAC DSS bypassed
0d	Pre-Insert MEL180		Keowee Unit 2 Emergency Lockout
1	MEL020 Override	N, BOP, SRO C, BOP, SRO	Operability test Unit 1 Keowee Unit 1 Gen Field Flashing Breaker fails to OPEN automatically
2	MPS460 Override	C, OATC, SRO	"A" HPI Pump sheared shaft and standby HPI pump fails to start (TS)
3	MNI032	I, OATC, SRO	Controlling NI fails LOW
4	MSS310	C, BOP, SRO	Loss of Instrument Air
5	MPI290	C, OATC, SRO	Main FDW Pump Trips Main Turbine Fails to trip (Lockout EHC Pumps)
6	MSS280,100 Override	M, ALL	"A" TBVs fail open 1MS-17 ("A" TBV Block) fails to close
7	MPS010	M, ALL	"A" SG Tube Rupture

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

Op-Test No.: \_\_\_\_\_ Scenario No.:   3   Event No.:   1  

Page 1 of 1

Event Description: **Operability test Keowee Unit 1 (N, BOP/SRO)**  
**Keowee Unit 1 Gen Field Flashing Breaker fails to OPEN**  
**automatically (C, 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	Use OP/1106/019 (Keowee Hydro At Oconee) to perform an "Automatic Startup" of Keowee Unit 1
		Initial Conditions
		<ol style="list-style-type: none"> <li>1. Verify applicable Statalarms and breaker positions</li> <li>2. Notify Keowee operator to give Oconee control of Keowee # 1.</li> <li>3. Review Limits and Precautions</li> </ol>
		Procedure
		<ol style="list-style-type: none"> <li>1. Place UNIT 1 LOCAL MASTER switch to "START" AND hold until Keowee Unit starts.</li> <li>2. Verify the following: <ul style="list-style-type: none"> <li>• GEN 1 FIELD BREAKER closes</li> <li>• GEN 1 SUPPLY BREAKER closes</li> <li>• GEN 1 FIELD FLASHING BREAKER closes</li> </ul> </li> <li>3. Ensure GEN 1 FIELD FLASHING BREAKER trips. <ul style="list-style-type: none"> <li>• Candidate should diagnose that the breaker did not open automatically and should open the breaker manually and initiate a work request or contact SPOC.</li> </ul> </li> </ol>
	SRO	<b>SRO</b> should direct the BOP to continue with the startup.
		<b>Note: GEN FIELD FLASHING BREAKER automatically trips ≤ 45 seconds after receiving close signal. Failure of breaker to trip automatically does NOT make the KHU inoperable. Startup procedure may continue.</b>
	BOP	<ol style="list-style-type: none"> <li>4. Determines KHU #1 is operable when test complete</li> <li>5. Verify ACB-1, Keowee 1 Generator Breaker, closed.</li> <li>6. Verify Unit 1 EMER FDR ACB 3 closed</li> <li>7. Verify ≈ 4.16 KV on CT4 Volts (2AB3)</li> <li>8. Close SK1 and SK2 (CT4 STBY BUS 1/2 FEEDER)</li> <li>9. Shutdown Keowee #1.</li> </ol>
		<b>Event is complete when operability test is complete or when directed by the lead examiner.</b>



Event Description: **"A" HPI Pump sheared shaft and the standby HPI pump fails to auto start: (C, OATC)**

Time	Position	Applicant's Actions or Behavior
		<p>Plant response:</p> <p>Statalarms:</p> <ul style="list-style-type: none"> <li>• 1SA-2/B-2 (HP RCP Seal Injection Flow High/Low)</li> <li>• 1SA-2/C-2 (HP Injection Pump Disch. Header Pressure High/Low)</li> </ul> <p>Board indications:</p> <ul style="list-style-type: none"> <li>• RC Makeup Flow = 0 gpm</li> <li>• 1A HPI Pump = 0 amps</li> <li>• PZR level will begin to decrease and LDST level will begin to increase.</li> </ul> <p>Crew response:</p> <ol style="list-style-type: none"> <li>1. Refer to ARG for above Statalarms</li> <li>2. SRO should refer to AP/014 (Loss of Normal Makeup and/or RCP Seal Injection) <ul style="list-style-type: none"> <li>• Verify no HPI pump operating</li> <li>• Close 1HP-5 (Letdown Isolation)</li> <li>• Ensure 1HP-120 (RC Volume Control) in HAND and closed</li> <li>• Place 1HP-31 (RCP Seal Flow Control) in HAND and closed</li> <li>• Start standby HPI pump (1B HPI pump)</li> <li>• Slowly open 1HP-31 in small increments until <math>\approx 8</math> gpm/RCP is achieved.</li> <li>• Re-establish normal makeup through 1HP120.</li> <li>• Reduce 1HP-7 demand to 0%.</li> <li>• Close 1HP-6</li> <li>• Ensure the following open: <ul style="list-style-type: none"> <li>➤ 1HP-1</li> <li>➤ 1HP-2</li> <li>➤ 1HP-3</li> <li>➤ 1HP-4</li> </ul> </li> <li>• Open 1HP-5</li> <li>• Throttle open 1HP-7 for <math>\approx 20</math> gpm letdown flow.</li> <li>• Open 1HP-6</li> <li>• Adjust 1HP-7 for desired letdown flow.</li> <li>• Place 1HP-31 in auto.</li> </ul> </li> </ol>
	OATC	
	SRO	
	OATC	

Event Description: **"A" HPI Pump sheared shaft and the standby HPI pump fails to auto start: (C, OATC)**

Time	Position	Applicant's Actions or Behavior
	SRO	<p>3. Refer to Tech Spec 3.5.2 High Pressure Injection</p> <ul style="list-style-type: none"><li>• Condition "A"</li><li>• Required Action: Restore HPI pump to OPERABLE status</li><li>• Completion Time: 72 hours</li></ul> <p><b>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.</b></p>
		<b>Event is complete when normal makeup and letdown is established or when directed by the lead examiner.</b>

Op-Test No.: \_\_\_\_\_ Scenario No.:   3   Event No.:   3  

Page 1 of 1

Event Description: **Controlling NI fails LOW: (I, OATC) (TS)**

Time	Position	Applicant's Actions or Behavior
	OATC	<p>Plant response:</p> <ul style="list-style-type: none"><li>• Statalarm 1SA-2/A-12 (ICS Tracking)</li><li>• Diamond will transfer to MANUAL, because indicated reactor power is &lt; 1.5%.</li><li>• Tave will increase and actual reactor power will decrease.</li></ul> <p>Crew response:</p> <ol style="list-style-type: none"><li>1. Crew should use "Plant Transient Response" to stabilize the plant by placing both FDW Masters in MANUAL.</li><li>2. Adjust CR and FDW as required to stabilize the plant.</li></ol> <p><b>Note: ICS will remain in MANUAL for the remainder of the scenario.</b></p>
		<b>Event is complete when plant is stable or when directed by the lead examiner.</b>

Event Description: **Loss of Instrument Air (C, BOP)**

Time	Position	Applicant's Actions or Behavior
	BOP	<p>Plant response:</p> <ul style="list-style-type: none"> <li>• Statalarm 1SA-4/C-5 (Aux Bldg Air HDR PR Low) activates</li> <li>• IA pressure decreasing on Aux and Turb Building gauges located on 1UB2.</li> </ul> <p>Crew response:</p> <ol style="list-style-type: none"> <li>1. Refer to ARG for 1SA-4/C-5. <ul style="list-style-type: none"> <li>• Send NEO to start all backup IA compressors.</li> <li>• Send operators to check for IA line ruptures or open valves.</li> <li>• Refer to AP/22 (Loss of Instrument Air)</li> <li>• Start Primary IA Compressor</li> <li>• Using paging system, request that plant personnel stop using service and IA.</li> </ul> </li> </ol>
	SRO BOP	<ol style="list-style-type: none"> <li>2. AP/22 (Loss of Instrument Air) <ul style="list-style-type: none"> <li>• Direct Unit 2 to dispatch an operator to start the Diesel Air Compressor.</li> <li>• IAAT Feedwater flow cannot be controlled, trip Reactor and all Main FDW pumps.</li> <li>• IAAT two or more CRD temperatures are &gt; 180°F, trip Reactor.</li> <li>• Using paging system, request that plant personnel stop using service and IA.</li> <li>• IAAT Aux IA press ≤ 88 psig dispatch operator to verify Unit 1 Aux IA Compressor is operating.</li> <li>• IAAT IA header pressure is &lt; 80 psig and letdown is desired:</li> <li>• Place 1HP-14 (LDST Bypass) to NORMAL</li> <li>• Open 1HP-13 (Purification IX Bypass)</li> <li>• Verify Letdown Filter available</li> <li>• Open 1HP-17 (1A Letdown Filter Inlet)</li> <li>• Open 1HP-6 (Letdown Orifice Stop)</li> <li>• Adjust 1HP-7 to obtain desired letdown flow.</li> </ul> </li> </ol> <p><b>Note: If reactor trips, continue to next event.</b></p> <p><b>Note: IA leak will be repaired after letdown is aligned.</b></p>
		<b>Event is complete when AP/22 actions are being performed or when directed by the lead examiner.</b>

Event Description: **Main FDW Pump trips and the turbine Fails to trip (C, OATC)**

Time	Position	Applicant's Actions or Behavior
	SRO	<p>Plant response:</p> <ul style="list-style-type: none"><li>• 1A Main FDW pump trips resulting in a reactor trip.</li><li>• The Main Turbine should trip but does not. This will result in a reduction steam pressure in both SG until actions are taken to trip the turbine. The will result in RCS overcooling until tripped.</li></ul> <p>Crew response:</p> <ol style="list-style-type: none"><li>1. SRO will enter the EOP.</li><li>2. OATC will perform Immediate Manual Actions and when determine that the turbine did not trip he should stop both EHC pumps, which will cause the turbine to trip.</li><li>3. BOP will perform a symptom check.</li></ol>
	OATC	
	BOP	
		<b>Event is complete when EHC pumps have been tripped or when directed by the lead examiner.</b>

Event Description: **"A" TBVs fails open and 1MS-17 ("A" TBV Block) fails to close:  
(M, OATC)**

Time	Position	Applicant's Actions or Behavior
		<p><b>Note: The "A" TBVs will fail open at the same time as the turbine trip.</b></p> <p>Plant response:</p> <ul style="list-style-type: none"><li>• The "A" TBVs will indicate full open. The "B" TBVs will be throttled.</li><li>• The RCS will begin to slowly cool off</li><li>• "A" Main Steam line will begin to depressurize</li></ul> <p>Crew response:</p> <ol style="list-style-type: none"><li>1. The crew may diagnose the TBVs failed open and with SRO guidance try to control SG pressure by taking the TBVs to manual. (This will not work)</li><li>2. After trying to control pressure with the TBVs in manual, the SRO may direct them to close 1MS-17 ("A" TBV Block) but it will not close.</li><li>3. An RO should initiate Rule 5 (Main Steam Line Break). <b>(CT-17)</b><ul style="list-style-type: none"><li>• Select OFF on the A MDEFDWP.</li><li>• Ensure both Min FDWPTs are tripped</li><li>• Close 1FDW-315</li><li>• Close 1FDW-33 and 1FDW-31.</li><li>• Adjust 1B SG to maintain CETCs constant.</li><li>• Ensure Rule 3 (Loss Of Main or Emergency FDW) in progress.</li><li>• Ensure Rule 8 (Pressurized Thermal Shock (PTS)) is in progress or complete.</li><li>• When notified by the SRO, exit rule.</li></ul></li></ol>

Event Description: **"A" TBVs fails open and 1MS-17 ("A" TBV Block) fails to close:  
(M, OATC)**

Time	Position	Applicant's Actions or Behavior
		<p>4. The SRO should make a "Parallel Actions" transfer to the Excessive Heat Transfer tab.</p> <p>5. Excessive Heat Transfer tab will:</p> <ul style="list-style-type: none"><li>• If any SG pressure &lt; 550 psig ensure Rule 5 (Main Steam Line Break) in progress or complete.</li><li>• Verify excessive heat transfer stopped.</li><li>• Verify level in both SGs &lt; 96% O.R.</li><li>• Throttle HPI to stabilize RCS pressure and maintain Pzr level &gt; 100".</li><li>• Verify letdown in service.</li><li>• Verify B SG has an intact secondary boundary (intact SG).</li><li>• Ensure open 1FDW-382 and 1FDW369.</li><li>• Ensure 1B MDEFDWP operating.</li><li>• Feed and Steam B SG to stabilize RCS P/T. (CT-11)</li></ul>
		<b>Event is complete when Rule 5 is complete and Excessive Heat Transfer tab is in progress or when directed by the lead examiner.</b>

Event Description: **"A" SG Tube Rupture: (M, ALL)**

Time	Position	Applicant's Actions or Behavior
		<p>Plant response:</p> <p>Statalarms:</p> <p>1SA-8/A-9 (RM Area Monitor Radiation High)</p> <p>1SA-8/B-9 (RM Process Monitor Radiation High)</p> <p>1SA-8/D-10 (RM CSAE Exhaust Radiation High)</p> <p>Board indications:</p> <p>PRZ level and RCS pressure will decrease.</p> <p>Crew response:</p> <p>SRO should remain in Excessive Heat Transfer Tab and perform the following:</p> <ol style="list-style-type: none"><li>1. Verify initiating Rule 8 (Pressurized Thermal Shock PTS)) is not required.</li><li>2. Verify aux steam header being supplied from another unit.</li><li>3. Open AS-8</li><li>4. Close 1SSH-1, 1SSH-3, and 1SSH-9.</li><li>5. Notify Chemistry to determine RCS Boron concentration.</li><li>6. Notify RP and Secondary Chemistry to check for indications of a SGTR.</li><li>7. <b>IAAT</b> the following conditions exist:<ul style="list-style-type: none"><li>• ES Bypass Permit satisfied</li><li>• All SCMs &gt; 0°F</li><li>• RCS pressure controllable</li></ul><b>THEN</b> Bypass ES as required</li><li>8. While maintaining RCP NPSH and P<sub>zr</sub> level minimize SCM using the following methods as necessary:<ul style="list-style-type: none"><li>• De-energizing all P<sub>zr</sub> heaters</li><li>• Using P<sub>zr</sub> spray</li><li>• Throttling HPI</li><li>• Using PORV</li></ul></li></ol>



Event Description: **"A" SG Tube Rupture: (M, ALL)**

Time	Position	Applicant's Actions or Behavior
		<p>9. Initiate Encl. 5.16 (SG Tube-to-Shell <math>\Delta T</math> Control)</p> <ul style="list-style-type: none"><li>• <b>IAAT</b> any SG tube-to-Shell <math>\Delta T</math> approaches either limit <b>THEN</b> take appropriate action.</li></ul> <p>10. <b>GO TO</b> SGTR tab.</p> <p>SGTR tab will:</p> <ol style="list-style-type: none"><li>1. Verify Reactor is tripped and Initiate Encl. 5.5 (Pzr and LDST Level Control)</li><li>2. Start A and B Outside Air Booster Fans on Unit 1&amp;2 and Unit 3. (<b>CT-27</b>)</li><li>3. Dispatch operator to open TBS pump breakers.</li></ol>
		<b>Event is complete when TBS pump breakers have been opened or when directed by the lead examiner.</b>