

Draft Submittal
(Pink Paper)

SIMULATOR SCENARIOS

OCONEE JUNE 2006-301 EXAM

**05000269, 05000270, AND
05000287/2006301**

**JUNE 19 - 28, 2006 AND
JUNE 30, 2006 (WRITTEN)**

Facility: **Oconee**

Scenario No.: **1 R2**

Op-Test No.: **1**

Examiners: _____

Operators: _____

Initial Conditions:

- 100% Reactor Power EOL (SNAP 201)

Turnover:

- Unit 1 TD EFDW Pump OOS to repair oil leak, expected returned this shift
- AMSAC/DSS bypassed for I&E testing
- Keowee Unit 2 OOS for unplanned reasons
- Keowee Unit 1 aligned to underground, operability test complete
- ICS in manual to repair Tave setpoint control
- OP/1/A/1102/004 A Encl. 4.1 in progress
- Repair complete, after turnover place ICS in Automatic

| Event No. | Malfunction No. | Event Type* | Event Description |
|-----------|--------------------|----------------|--|
| 0a | Pre-Insert MSS330 | | TD EFDW Pump Fails to Start |
| 0b | Pre-Insert Updater | | AMSAC/DSS bypassed |
| 0c | Pre-Insert MEL180 | | Keowee Unit 2 Emergency Lockout |
| 0d | MPS330 | | RBS Pump Fails to Receive ES Signal |
| 1 | | N, OATC, SRO | Place ICS in AUTO |
| 2 | MPI011 MPS400 | TS, SRO | RCS WR Pressure Fails LOW (TS) Small RCS Leak |
| 3 | Override | N, BOP | QT level high, pump QT |
| 4 | MPI021 | C, BOP, SRO | Inadvertent ES Channels 1 and 2 actuation |
| 5 | MCS004 | I, OATC, SRO | Tave fails HIGH |
| 6 | Override | C, BOP, SRO TS | 50 gpm RCS leak (TS) |
| 7 | | R, OATC, SRO | Manual power reduction due to RCS leak |
| 8 | MPS400 | M, ALL | SBLOCA |
| 9 | MEL180 | M, ALL | LBLOCA 1A LPI Fails to re-start |
| | | | |

* (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: **Place ICS in AUTO: (N, OATC/SRO)**

| Time | Position | Applicant's Actions or Behavior |
|------|----------|---|
| | OATC/SRO | <p>Crew response: OP/1/A/1102/004 A Encl. 4.1 will direct the OATC to:</p> <ol style="list-style-type: none"> 1. Ensure RATE SET at 0.0. 2. Verify REACTOR MASTER in "AUTO". 3. Compare Tave setpoint to Tave using OAC 4. Verifies selected Tave is different from Tave Setpoint by more than + 0.3°F, on REACTOR MASTER and adjust Tave Setpoint to ≈ selected Tave. 5. Verify selected Tave is within + 0.3°F of Tave setpoint. 6. Place DIAMOND to "AUTO". 7. Ensure STM GENERATOR MASTER to "AUTO". 8. Place 1A/1B FDW MASTER to "MEAS VAR" and verify the following 1A/1B FDW MASTERS Measured Variable on the caret. 9. Place 1A/1B FDW MASTER to "POS" and simultaneously position 1A/1B FDW MASTERS to "AUTO". 10. IF desired adjust CTP as follows: <ul style="list-style-type: none"> • Ensure selected "HOLD". • Ensure desired setting selected ("% / MIN" or "% / HR") on "RATE SET" pushbutton. • Ensure desired rate selected on "RATE SET" thumbwheels. • Insert desired CTPD SET using "INCREASE/DECREASE" pushbuttons. • Ensure "HOLD" is NOT selected. • WHEN desired CTP is achieved return RATE SET (% / MIN / %HR) pushbutton to 0.0. |
| | | <p>When the ICS has been placed in AUTO, or when directed by the lead examiner this event is completed.</p> |

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

Event Description: **RCS WR Pressure Fails LOW, Small RCS Leak: (TS, SRO)**

| Time | Position | Applicant's Actions or Behavior |
|------|---|---|
| | <p>BOP</p> <p>SRO</p> <p>SRO</p> <p>BOP</p> | <p>Plant response:</p> <p>Statalarms:</p> <ul style="list-style-type: none"> • 1SA-7/A-1, ES HP INJECTION CHANNEL A • 1SA-7/A-2, ES LP INJECTION CHANNEL A • 1SA-2/D-4, RC PRESS EMERG LOW <p>Control Board indications:</p> <ul style="list-style-type: none"> • RB normal sump level slowly increasing <p>Crew response:</p> <ol style="list-style-type: none"> 1. Refer to ARG 1SA-7/A-1: <ul style="list-style-type: none"> • Check RCS pressure, determine that ES should NOT have actuated. Determine cause of bi-stable trip. 2. The SRO may enter AP/2 (Excessive RCS Leakage) if the increase in RB normal sump rate is observed. 3. The SRO/BOP should direct the BOP to refer to: <ul style="list-style-type: none"> • PT/1/A/0600/001 Step 12.2.1 <ul style="list-style-type: none"> ➤ Check other analog channels to see if any other channels tripped. ➤ Trip "A" analog channel by placing RC pressure bi-stable in "TEST OPERATE". Statalarm 1SA-7/A-5 (ES Analog Channel A on Test) will actuate. • Technical Specifications 3.3.5, ES Analog Instrumentation <ul style="list-style-type: none"> ➤ Condition "A" ➤ Place channel in trip within 1 hour |
| | | <p>When the SRO has referred to TS or when directed by the Lead Examiner the event is completed.</p> |

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

Event Description: **QT level high, pump QT: (N; BOP)**

| Time | Position | Applicant's Actions or Behavior |
|------|-----------------------|---|
| | <p>BOP</p> <p>BOP</p> | <p>Plant response: 1SA-6/A-7, Quench Tank Level High/Low QT level > 90"</p> <p>Crew response:</p> <ol style="list-style-type: none"> 1. Refer to the ARG <ul style="list-style-type: none"> • Adjust level as required per OP/1/A/1104/017 (QT Operation) • Determine cause of level variation 2. OP/1/A/1104/017, Enclosure 4.1 (Pumping QT) will: <ul style="list-style-type: none"> • Ensure open 1CS-5 (COMPONENT DRN PUMP SUCTION). • Establish constant communication with operator locally at 1CS-6 (Component Drn Pump Suction). • Ensure open 1CS-IV-0098 (IRV For 1CS CV0006). • Ensure open 1CS-6 (COMPONENT DRN PUMP SUCTION). • IF QT level will be maintained in normal operating band (90 ± 10 inches): • Start desired pump: <ul style="list-style-type: none"> • COMPONENT DRAIN PUMP. • QUENCH TANK DRAIN PUMP. • At desired level ensure selected pump stops. • Ensure QT level ≈ 80 inches. • Close 1CS-5 (COMPONENT DRN PUMP SUCTION). • Close 1CS-6 (COMPONENT DRN PUMP SUCTION). • Close 1CS-IV-0098 (IRV For 1CS CV0006). <p>Note: 1CS-5 is a containment isolation valve and currently on Unit 1 it's operation is erratic. To meet TS, when not pumping the QT, IA is removed from 1CS-6.</p> |
| | | <p>When the QT level has been reduced or when directed by the lead examiner this event is completed.</p> |

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

Event Description: **Inadvertent ES Channels 1 and 2 actuation: (C, BOP/SRO)**

| Time | Position | Applicant's Actions or Behavior |
|------|---|---|
| | <p>BOP</p> <p>ALL</p> <p>SRO</p> <p>BOP</p> | <p>Note: While SPOC is repairing the WR pressure signal and during the unit shutdown ES Channels 1 and 2 will actuate.</p> <p>Plant response:</p> <p>Statalarms:</p> <ul style="list-style-type: none"> • 1SA-1/A-10, ES CHANNEL 1 TRIP • 1SA-1/B-10, ES CHANNEL 2 TRIP • 1SA-7/A-1, ES HP INJECTION CHANNEL A • 1SA-7/B-1, ES HP INJECTION CHANNEL B • 1SA-7/C-1, ES HP INJECTION CHANNEL C • 1SA-16/D-6, RC SYSTEM APPROCHING SATUATION COND <p>Control Board indications:</p> <ol style="list-style-type: none"> 1. ES Channel 1 and 2 actuate 2. HPI Injection 3. Letdown isolated 4. Keowee emergency start <p>Crew response:</p> <ol style="list-style-type: none"> 1. Determine that ES actuation was not valid and inform the SRO. 2. Crew may perform Plant Transient Response. 3. The SRO should enter AP/42 (Inadvertent ES Actuation) 4. AP/1/A/1700/042 (Inadvertent ES Actuation) Actions: <ul style="list-style-type: none"> • Place HPI in MANUAL on RZ Modules • Throttle HPI • Secure the 1C HPI pump and close 1HP-26 • Close 1HP-24 and 1HP-25 • Direct the BOP to perform Encl. 5.1 (Side Board Action) • Direct the OATC to perform Encl. 5.2 (Letdown Restoration) |

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

Event Description: **Inadvertent ES Channels 1 and 2 actuation: (C, BOP/SRO)**

| Time | Position | Applicant's Actions or Behavior |
|------|----------|--|
| | SRO | <p>Crew response:</p> <p>7. AP/42 (Inadvertent ES Actuation) Actions (Continued)</p> <ul style="list-style-type: none"> • Verify ICS in AUTO • Initiate a power decrease to maintain control rods within the desired band by adjusting rate set as necessary and decrease CTP demand setpoint. • Notify Chemistry for RCS and LDST boron sample • Notify Rx Engineering to develop and maneuvering plan • Place LOAD SHED & STBY BKR 1 and 2 in MANUAL on the RZ Module • Dispatch an operator to perform Encl. 5.3 (SSF Restoration) • Notify SPOC to investigate and repair <p>Note: If PZR level > 375", then the crew will trip the reactor.</p> |
| | | <p>When plant is stable and letdown has been restored, or when directed by the lead examiner the event is completed.</p> |

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

Event Description: **Tave fails HIGH: (I, OATC/SRO)**

| Time | Position | Applicant's Actions or Behavior |
|------|--|---|
| | <p>All</p> <p>OATC</p> <p>BOP</p> <p>OATC</p> <p>SRO</p> | <p>Plant response:</p> <ul style="list-style-type: none"> • 1SA-02/A-12, ICS Tracking, will actuate due to neutron and feedwater cross-limits. • Controlling Tave will indicate $\approx 596.4^\circ \text{ F}$. • Actual loop A & B Tave will decrease until operator stops transient. • RCS pressure and temperature will decrease. <p>Crew response:</p> <ol style="list-style-type: none"> 1. 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. Reactor will trip on variable low pressure with no operator action. 2. Announce Statalarm 3. Verbalize to the SRO reactor power level and direction of movement. 4. Verify no valid runback 5. Place the FDW Masters and Diamond in manual and stabilize the plant. Use control rods and FDW to stabilize the plant 6. The SRO should refer to AP/28, ICS Instrument Failures <ul style="list-style-type: none"> • Verify plant parameters stable • Transfer to Section 4A, RCS Temperature Failure • Ensure Diamond and FDW Master are in HAND. • Contact SPOC to repair controlling Tave. • Ensure PT/1/A0600/001 (Periodic Instrument Surveillance) requirements are met. <p>Note: The ICS will remain in manual for the remainder of the scenario.</p> |
| | | <p>When the SRO reaches the WHEN step (5) in Section 4A or when directed by the lead examiner this event is completed.</p> |

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

Event Description: 50 gpm RCS Leak: (C, BOP/SRO)

| Time | Position | Applicant's Actions or Behavior |
|------|-----------------------|--|
| | <p>SRO</p> <p>BOP</p> | <p>Plant response:</p> <p>Alarms:</p> <ul style="list-style-type: none"> • OAC RB Normal Sump Temp HI HI • 1SA-9/A-6 (RB NORMAL SUMP HIGH/LOW) • 1SA-8/B-9 (RM Process Monitor Radiation HIGH) <p>Control Board indications:</p> <ul style="list-style-type: none"> • PZR and LDST level decreasing • RC makeup flow increasing • RB normal sump level increasing rapidly <p>Crew response:</p> <p>1. The SRO should enter AP/2 (Excessive RCS Leakage), which will:</p> <ul style="list-style-type: none"> • Initiate makeup to LDST using Encl 5.5 (PZR and LDST Level Control) of U1 EOP • Close 1RC-4 • Place 1HP-14 in NORMAL • Announce AP entry using the PA system. • Initiate Encl 5.1 (Leak Rate Determination). • 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) • Notify the OSM to reference the Emergency Plan and OMP 1-14 (Notifications). • Notify the STA and RP. • Shut down using: <ul style="list-style-type: none"> • OP/1/A/1102/004 (OPS At Power) Enclosure 4.2 (Power Reduction) pg 10 • AP/29 (Rapid Unit Shutdown) pg 11 |
| | | <p>When the SRO has made the decision to shutdown, or when directed by the lead examiner the event is completed.</p> |

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

Event Description: **Power Reduction: (R, OATC, SRO)**

| Time | Position | Applicant's Actions or Behavior |
|------|-----------------------------------|---|
| | <p>SRO</p> <p>BOP</p> <p>OATC</p> | <p>2. The SRO will direct the shutdown per AP/29 (Rapid Unit Shutdown):</p> <ul style="list-style-type: none"> • Initiate Encl 5.1 (Support Actions During Rapid Unit Shutdown) <ul style="list-style-type: none"> • Stop 1A & 1B MSRH DRN PUMP • WHEN NI Power \leq 80%, Secure 1E1 & 1E2 HTR DRN PUMPs <p>Transfer electrical auxiliaries</p> <ul style="list-style-type: none"> • Place 1TA & 1TB AUTO/MAN transfer switch in 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 MFB1 AUTO/MAN transfer switches in MAN • Place MFB2 AUTO/MAN transfer switches in MAN • Close E1₁ MFB1 STARTUP FDR • Verify N1₁ MFB1 NORMAL FDR opens • Close E2₁ MFB2 STARTUP FDR • Verify N2₁ MFB2 NORMAL FDR opens <ul style="list-style-type: none"> • 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. (its not) • Initiate manual power reduction to desired power level. <ul style="list-style-type: none"> • The OATC will reduce reactor power with the ICS in manual. • Reduce FDW to reduce power • Insert control rods to control Tave. • Shutdown the 1B FDWP. • Close 1HP-16. |
| | | <p>When power has been reduce by at least 5% or when directed by the lead evaluator this event is completed.</p> |

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

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

| Time | Position | Applicant's Actions or Behavior |
|------|--------------------|--|
| | ALL | <p>Plant response: Control board indications:</p> <ul style="list-style-type: none"> • 1SA-2/D-3, RC PRESS HI/LOW • RCS Pressure and PZR level decreasing • ES 3-6 actuate • RCS subcooling margin will indicate 0°F <p>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 Note: ES Channels 1 & 2 will have to be manually actuated.</p> |
| | SRO OATC BOP | <ol style="list-style-type: none"> 1. The SRO will direct the OATC to perform IMAs and the BOP a symptom check. 2. The OATC will perform IMAs 3. The BOP will perform a symptom check and will have no symptoms to report. 4. The SRO will transfer to the Subsequent Actions Tab. |
| | SRO | <p>NOTE: As RCS pressure decreases and Pzr level decreases, the RCS will Saturate. SA tab</p> <ul style="list-style-type: none"> • Verify all control rods fully inserted. • Verify Main FDW in operation • Verify Main FDW operating properly • Verify TBVs controlling at ~ 1010 psig |
| | ALL OATC/BOP | <ol style="list-style-type: none"> 5. OATC/BOP should report symptoms and inform the SRO that the RCS has saturated and obtain SRO concurrence to perform: Rule 2, Loss of SCM <ul style="list-style-type: none"> • Verify that reactor power is < 1%. • Trip RCPs within 2 min of LOSCM (CT-1) • Notify SRO of RCP status. • Open 1HP-24/25 (1A/1B BWST Suction) • Start all available HPI pumps operating. • Open 1HP-26/27 (1A/1B HP Injection) open |

Op-Test No.: _____ Scenario No.: 1 Event No.: 8 Page 2 of 4

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

| Time | Position | Applicant's Actions or Behavior |
|------|----------|---|
| | OATC/BOP | <p>Rule 2 (cont)</p> <ul style="list-style-type: none"> • 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 THEN perform Steps 11 -13. (flow is acceptable) • Throttle "B" HPI flow to < 475 gpm. • IAAT either of the following exist: <ul style="list-style-type: none"> ➢ LPI FLOW TRAIN A plus LPI FLOW TRAIN B ≥ 3400 GPM (LPI flow will NOT be met) ➢ Only one LPI header operating, AND flow in that header is ≥ 2900 gpm. GO TO Step 15. <p>Conditions will not be met (RNO GO TO Step 23)</p> <ul style="list-style-type: none"> • Verify TBVs available • Select OFF on both Digital Channels on AFIS HEADER A&B • Start MD EFDWPs on all intact SGs • Establish 300 gpm to each SG (feed to LOSCM Setpoint) (CT-10) • Place TD EFDWP in Pull to Lock & Trip 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 <ul style="list-style-type: none"> • Verify any EFDW operating • Verify any SCM ≤ 0°F • Initiate Encl 5.9 <ul style="list-style-type: none"> ○ Monitor EFW parameters on OAC ○ Makeup to UST with Demin Water (1DW-4) |
| | | |

Op-Test No.: _____ Scenario No.: 1 Event No.: 8 Page 3 of 4

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

| Time | Position | Applicant's Actions or Behavior |
|------|----------|---|
| | OATC | <p>6. OATC will perform Enclosure 5.1 (ES actuation)</p> <ul style="list-style-type: none"> • 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. • Place LPI pumps in manual control and with SRO approval secure LPI pumps. (After ES Ch 3&4 Actuate) • Ensure A and B and 3A and 3B Outside Air Booster Fans are operating. (CT-27) • Secure makeup to the LDST. • Close 1LPSW-139 • Place 1LPSW-251 and 1LPSW-252 FAIL SWITCH in the FAIL OPEN position. • Open 1LPSW-4 and 1LPSW-5. • Dispatch an operator to perform Encl. 5.2 (Placing RB Hydrogen Analyzers In Service) • Dispatch an operator to establish ≈ 1000 cfm flow in each PRVS filter train. • Notify SRO to evaluate components NOT in ES position. • The operator must get SRO approval to exit this enclosure. |
| | | |

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

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

| Time | Position | Applicant's Actions or Behavior |
|------|----------|--|
| | SRO | <p>7. The SRO should refer to the Parallel Actions and transfer to the LOSCM tab.</p> <p>8. The LOSCM tab will:</p> <ul style="list-style-type: none"> • Refer to Parallel Actions and: <ul style="list-style-type: none"> ➤ Direct an RO to announce plant conditions. • Ensure Rule 2 (Loss of SCM) is in progress or complete. • Verify Station ASW feeding any SG. • IAAT either of the following exists: <ul style="list-style-type: none"> ➤ LPI FLOW TRAIN A plus LPI FLOW TRAIN B = 3400 gpm ➤ Only one LPI header in operation with header flow = 2900 gpm <p>THEN GO TO LOCA CD tab. (LPI Flow NOT met)</p> <ul style="list-style-type: none"> • Verify adequate HPI flow • Open 1AS-40 while closing 1MS-47 • Control steaming and feed rates on all intact SGs to maintain cooldown rates to $\leq 50^{\circ}\text{F} / 1/2 \text{ hr}$. Use TBVs or ADVs. • Close 1GWD-17, 1HP-1, 1HP-2, and 1RC-3 • Maintain SG pressure < RCS pressure utilizing either the 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. (greater than normal makeup capability) <p>RNO GO TO LOCA CD tab</p> |
| | | <p>After the SRO has verified adequate HPI flow in the LOSCM tab, or when directed by the lead examiner, this event is completed.</p> |

Op-Test No.: _____ Scenario No.: 1 Event No.: 9 Page 1 of 2

Event Description: LBLOCA, 1A LPIP Fails to Start: (M, ALL)

| Time | Position | Applicant's Actions or Behavior |
|------|----------|--|
| | OATC | <p>Plant response:</p> <ul style="list-style-type: none"> • RCS pressure will decrease rapidly <p>Crew response:</p> <ol style="list-style-type: none"> 1. Enclosure 5.1 (ES actuation) will now meet IAAT steps. <ul style="list-style-type: none"> • (Step 3) IAAT additional ES actuation setpoints are exceeded, • THEN perform Steps 1 - 2. • Determine ES Channels 7 and 8 have actuated. • (Step 14) IAAT RCS pressure is < LPI pump shutoff head, THEN perform Steps 15 - 16. Open 1LP-17 and start 1A LPI PUMP. (will not start) Open 1LP-18 and start 1B LPI PUMP. • IAAT 1A LPI PUMP fails while operating, AND 1B LPI PUMP is operating, THEN close 1LP-17. • IAAT ES channels 7 & 8 have actuated, THEN verify all ES channel 7 & 8 components are in the ES position. <ul style="list-style-type: none"> ○ Determine that the RBS pump did not start. Manually start the RBS pump. • The SRO should determine that the IAAT step for LPI flow is now met and transfer to the LOCA CD tab. |
| | | |

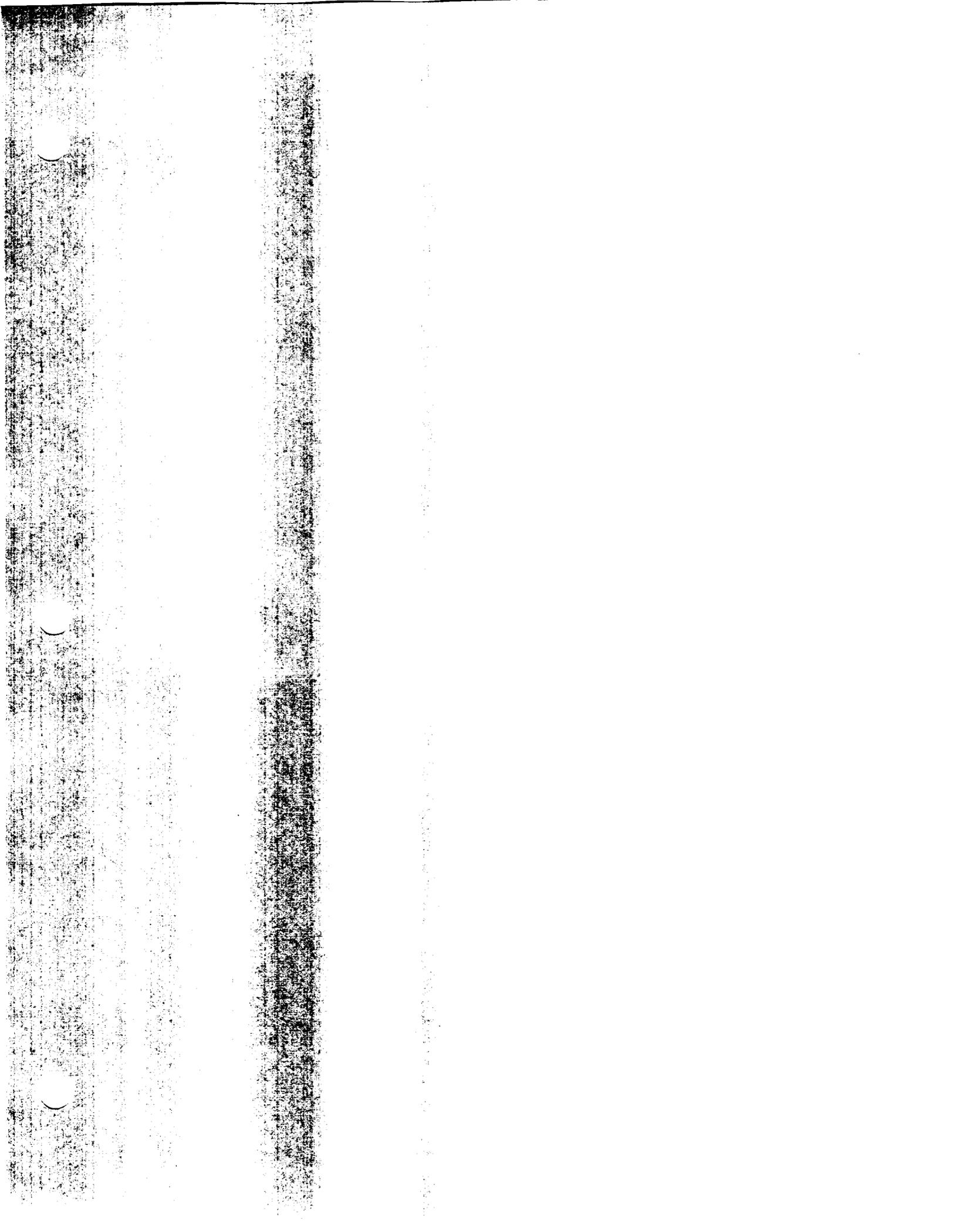
| Op-Test No.: _____ | | Scenario No.: 1 | Event No.: 9 | Page 1 of 2 |
|--|----------|--|--------------|-------------|
| Event Description: LBLOCA, 1A LPIP Fails to Start: (M, ALL) | | | | |
| Time | Position | Applicant's Actions or Behavior | | |
| | SRO | <p>Crew response:</p> <p>2. The LOCA CD tab will:</p> <ul style="list-style-type: none"> • IAAT BWST level \leq 19 feet transfer ECCS suction to the RBES. • Verify ES is actuated. • Ensure all RBCUs in low speed and open 1LPSW-18, 1LPSW-21, 1LPSW-24. • Initiate Encl. 5.35, Containment Isolation • Start all RB Aux fans • Dispatch an operator to close the breakers for 1CF-1/1CF-2 (1A/1B CFT OUTLET). • Close 1CF-1 and 1CF-2. • Dispatch an operator to perform Encl 5.28 (Local SG Isolation) to isolate both SGs. • Verify both of the following are closed: <ul style="list-style-type: none"> • 1MS-24 • 1MS-33 • Initiate Encl 5.25 (SG Isolation) to isolate both SGs. • Initiate Encl 5.36 (Equipment Alignment For Plant Shutdown). • WHEN CETCs are \leq 400°F, THEN continue in this procedure. | | |
| | | <p>After the SRO reached Step 19 of the LOCA CD tab, or when directed by the lead examiner, this event is completed.</p> | | |

CRITICAL TASKS

CT-1, Trip ALL RCPs

CT-10, Establish FW Flow and Feed SGs

CT-27, Implementation of Control Room Habitability Guidance



Facility: **Oconee** Scenario No.: **2 R1** Op-Test No.: **1**

Examiners: _____ Operators: _____

Initial Conditions:
 • 75% Reactor Power, startup in progress (SNAP 202)

Turnover:
 • AMSAC/DSS bypassed for I&E testing
 • NI-9 OOS, to be replaced next outage
 • 1B GWD Tank release in progress
 • 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 | | AMSAC/DSS bypassed |
| 0b | Pre-Insert MNI082 | | NI-9 OOS |
| 0c | Pre-Insert MEL180 | | Keowee Unit 2 Emergency Lockout |
| 0d | Pre-Insert | | PORV Fails to close after opening |
| 0e | Pre-Insert | | 1FDW-316 Fails closed in AUTO |
| 1 | | N, BOP, SRO | Operability test Keowee Unit 1 |
| 2 | MPS090 | C, OATC, SRO | 1HP-120 (RC Volume Control) fails closed |
| 3 | Override | I, BOP, SRO | 1RIA-37 and 38 fails to terminate GWR |
| 4 | MNI032 | C, OATC, SRO | PZR Spray Valve Fails OPEN |
| 5 | Override MSS340 | C, BOP, SRO <i>TS</i> | Seismic event (PRA) 1A RBCU rupture (TS) STAR Module failure |
| 6 | MPS020 | C, ALL <i>TS</i> | 1B SG Tube leak, 50 gpm (TS) |
| 7 | | R, OATC | Unit Shutdown |
| 8 | MSS360 | M, ALL | Both Main FDW Pumps Trip Main Turbine Trip ATWS |
| 9 | | | 1FDW-316 Fails Closed (Auto Only) |

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

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

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

| Time | Position | Applicant's Actions or Behavior |
|------|-----------------------|--|
| | <p>SRO</p> <p>BOP</p> | <p>Direct BOP to perform PT/620/009 (Keowee Hydro Operation) to operability test unit 1 Keowee underground.</p> <ol style="list-style-type: none"> 1. Verify various Statalarms NOT in alarm 2. Ensure the following: <ul style="list-style-type: none"> • 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. 3. Notify Keowee Operator to perform the following: <ul style="list-style-type: none"> • On CB2, verify all required PREREQ lights are lit. • Position MASTER TRANSFER switch for KHU-1 to "REMOTE". 4. Ensure UNIT 1 SYNC 230 KV selector in "MAN". <p>NOTE: Holding Unit 1 Local Master Switch for 5 seconds assures adequate starting relay actuation.</p> <ol style="list-style-type: none"> 5. Place AND hold UNIT 1 LOCAL MASTER switch to "START" position ≈ 5 seconds until KHU-1 starts. 6. Verify EXCITER STOP/START Red START light ON, Green STOP light OFF. 7. Perform the following: 8. After 60 seconds steady operation, record the following: 9. KHU-1 OUTPUT VOLTS _____ KV (Oconee Control Room Indication - 2AB3) 10. KHU-1 digital speed _____ RPM (KHU-1 Control Room Indication - CB-3) <p>Simulator Operator: Keowee RPMs = 128.</p> |
| | | |

Op-Test No.: _____ Scenario No.: 2 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 | <p>11. Verify CT4 energized by 13.8 KV Underground Power Path:</p> <p>12. IF both Standby Buses are NOT energized, perform the following:</p> <ul style="list-style-type: none"> • 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. <p>13. IF Standby Bus 1 NOT energized</p> <ul style="list-style-type: none"> • 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 <p>14. IF Standby Bus 2 NOT energized</p> <ul style="list-style-type: none"> • 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.: 2 | 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 | <p>15. IF SK breakers were cycled, perform the following as desired</p> <ul style="list-style-type: none"> • Ensure TS 3.8.1 Condition D has been exited • IF overhead Power Path is inoperable, ensure TS 3.8.1 has been exited <p>16. IF KHU-1 was started from Oconee Control Room, perform the following:</p> <div style="border: 1px solid black; padding: 5px; margin: 5px 0;"> <p>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.</p> </div> <p>17. Perform the following concurrently as required:</p> <ul style="list-style-type: none"> • Adjust load to zero (0) MWs with UNIT 1 SPEED CHANGER MOTOR. • Adjust MVARs to zero (0) with UNIT 1 AUTO VOLTAGE ADJUSTER. <p>18. Place UNIT 1 LOCAL MASTER switch to "STOP" AND hold in "STOP" position for ≈ five (5) seconds.</p> <div style="border: 1px solid black; padding: 5px; margin: 5px 0;"> <p>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.</p> </div> <p>19. Ensure UNIT 1 MASTER SELECTOR to "AUTO".</p> <p>20. Verify TURBINE 1 GATE POSITION indicator is at zero (0).</p> <p>21. Notify Keowee to place KHU-1 MASTER TRANSFER switch in "LOCAL".</p> <p>22. Ensure UNIT 1 SYNC 230 KV selector in "AUTO".</p> <p>23. Perform the following:</p> <ul style="list-style-type: none"> • 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.: 2 Event No.: 3 | | Page 1 of 1 |
|---|---------------------------|--|
| Event Description: 1RIA-37 and 38 Fail to Terminate GWR: (I, BOP/SRO) | | |
| Time | Position | Applicant's Actions or Behavior |
| | BOP SRO BOP | <p>Plant response:</p> <ul style="list-style-type: none"> • 1SA-9/A-4, GWD DISCH RADITION INHIBIT • 1SA-8/B-9, RM AREA MONITOR HIGH <p>Crew response:</p> <ol style="list-style-type: none"> 1. Refer to ARG for 1SA-9/A-4 <ul style="list-style-type: none"> • Verify automatic action has taken place (They have not) • Refer to OP/1-2/A/1104/018 (GWD Tank Release) • Refer to AP/1/A/1700/018 (Abnormal Release of Radioactivity) 2. Complete Encl. 4.9 of OP/1-2/A/1104/018 (GWD Tank Release) <ul style="list-style-type: none"> • 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) 3. Refer to AP/18, Abnormal Release of Radioactivity <ul style="list-style-type: none"> • IAAT RIA is in High alarm, THEN verify Automatic Systems Actions in Section 2 have occurred. <ul style="list-style-type: none"> • Initiate manual actions to fulfill the Automatic Functions listed in Section 2 for RIAs reaching High alarm setpoint. <ul style="list-style-type: none"> • Close 1GWD-5 |
| | | When the GWD release is terminated or when directed by the lead Examiner this event is completed. |

| Op-Test No.: _____ | | Scenario No.: 2 | Event No.: 5 | Page 1 of 2 |
|---|------------|--|--------------|-------------|
| Event Description: Seismic event (PRA) 1A RBCU rupture (C, BOP/SRO) (TS) Star Module Failure | | | | |
| Time | Position | Applicant's Actions or Behavior | | |
| | ALL SRO | <p>Cue: Call the Control Room (4911) as follows: "Officers on patrol have reported a seismic event but they have NOT seen any plant damage."</p> <p>Plant Response:</p> <ul style="list-style-type: none"> • 1SA2/A12 (ICS Tracking) • 1SA2/C12 (ICS H/A Station on MAN) • 1SA-9/B-9, LPSW RBCU A Cooler Rupture • Reactor Building Normal Sump level will increase <p>Crew Response:</p> <p>1. Crew should perform Plant Transient Response (PTR)</p> <ul style="list-style-type: none"> • Refer to AP/1/A/1700/0028 Verify entry due to component failure Verify plant Stable GO TO section 4M (ICS Star or Memory Module) <ul style="list-style-type: none"> ○ Notify SPOC ○ Ensure Reqs of PT/1/A/0600/001 are met | | |
| | BOP | <p>2. The BOP should refer to ARG for 1SA-9/B-9</p> <ul style="list-style-type: none"> • Verify alarm is valid by checking RBCU 1A Inlet Flow and RBCU 1A delta flow. • Verify 1LPSW-18 (RBCU 1A Outlet) open • Verify adequate LPSW flow is available; check LPSW pump operation • Monitor RBNS Level for any unexplained increase (Notify Chemistry to sample RBNS for boron to determine if a cooler rupture has occurred. • Diagnose a Cooler Rupture is indicated and Isolate the 1A RBCU Cooler. <ul style="list-style-type: none"> • Close 1LPSW-16 (1A RBCU INLET) • Close 1LPSW-18 (1A RBCU OUTLET) | | |

| Op-Test No.: _____ Scenario No.: 2 Event No.: 6 | | Page 1 of 1 |
|--|----------|---|
| Event Description: 1B SG Tube leak (50 gpm) (C, ALL) (TS) | | |
| Time | Position | Applicant's Actions or Behavior |
| | | <p>1B SG tube leak occurs following RBCU isolation and initiation of AP/5, Earthquake, or when directed by the lead evaluator.</p> <p>Plant response:</p> <ul style="list-style-type: none"> • 1SA-8/B-9, RM PROCESS MONITOR RADIATION HIGH • 1SA-8/D-10, RM CSAE EXHAUST RADIATION HIGH • 1SA-8/A-9, RM Area Monitor Radiation High • 1SA-8/E-10, N-16 RM Primary to Secondary Tube Leak • PZR level will decrease and RC makeup flow will increase. <p>Crew response:</p> <p>1. Refer to the ARG for 1SA-8/D-10, RM CSAE EXHAUST RADIATION HIGH</p> <ul style="list-style-type: none"> • Refer to AP/1/A/1700/031 • Refer to EP/1/A/1800/001 <p>Diagnose and take actions for a Tube leak in the 1B SG:</p> <p>NOTE: Crew should determine from 1RIA-60 or from leak rate determination in AP31, that the SGTR is > 25 gpm and transition to the EOP</p> <p>2. IF crew refers to AP/31 (Primary to Secondary Leakage)</p> <ul style="list-style-type: none"> • IAAT Rx power is > 15% AND both the following exist: RC makeup flow is > 70 gpm AND Pzr level is decreasing. THEN GO TO Unit 1 EOP. • Estimate SGTR leak rate: $LR = \frac{\quad}{M/U} - \frac{\quad}{L/D} + 26$ <p>3. WHEN crew refers to the SGTR tab of the EOP</p> <ul style="list-style-type: none"> • Verify Reactor tripped. (RNO) • Maintain PZR level \geq 220 inches using Enclosure 5.5 (Pzr and LDST Level Control). • Estimate SGTR Leak rate using 1RIA-60. (leak is \approx 50 gpm) • Determine ICS is NOT in AUTO and direct the OATC to initiate a manual power reduction to < 15%. |
| | BOP | |
| | BOP | |
| | SRO/OATC | |

| 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 | <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> | |
| | BOP | <ul style="list-style-type: none"> • Initiate Encl. 5.19 (Control of plant equip. during shutdown) <p>Transfer electrical auxiliaries</p> <ul style="list-style-type: none"> • Place 1TA AUTO/MAN transfer switch in MAN • Place 1TB AUTO/MAN transfer switch in MAN • Close 1TA SU 6.9 KV FDR • Close 1TB SU 6.9 KV FDR • Place MFB1 AUTO/MAN transfer switches in MAN • Place MFB2 AUTO/MAN transfer switches in MAN • Close E1₁ MFB1 STARTUP FDR • Close E2₁ MFB2 STARTUP FDR <p>Start A and B Outside Air Booster Fans and notify Unit 3 to start 3A and 3B Outside Air Booster Fans. (CT-27)</p> <ul style="list-style-type: none"> • Monitor RIAs to identify all SGs with a tube rupture: (RIA 16 and RIA 60) • Notify RP to survey both MS lines for radiation. <p>Note: A shutdown with the ICS in manual is required.</p> | |
| | | <p>When a unit shutdown of > 5% has occurred or when directed by the lead examiner this event is concluded.</p> | |

| Op-Test No.: _____ | Scenario No.: 2 | Event No.: 8 | Page 1 of 4 |
|---|-----------------|---|-------------|
| Event Description: Both Main FDW Pumps and Main Turbine Trip (M, ALL) ATWS | | | |
| Time | Position | Applicant's Actions or Behavior | |
| | OATC | <p>Event should be started after transfer of auxiliaries is complete to preclude a loss of power during the event.</p> <p>Plant response:</p> <ul style="list-style-type: none"> • Both Main FDW Pumps Trip • Turbine trip • Statalarm 1SA-01/A1, B1, C1, D1 (RP Channel A-D Trip) • PORV will open (will not reseal) • 1SA-18/A-1, PRESSURIZER RELIEF VALVE FLOW <p>Crew response:</p> <ol style="list-style-type: none"> 1. The OATC will perform IMAs. <ul style="list-style-type: none"> • Depress REACTOR TRIP pushbutton • Verify reactor power < 5% FP and decreasing • Perform Rule 1 (ATWS/ Unanticipated Nuclear Power Production) 2. Rule 1 will: (CT-24) <ul style="list-style-type: none"> • Insert control rods • Notify the SRO to GO TO UNPP tab • Open 1HP-24 and 1HP-25 • Ensure 1A or 1B HPI pump operating • Start 1C HPI Pump • Open 1HP-26 and 1HP-27 • Verify only two HPI pumps operating • Dispatch operator to OPEN CRD breakers <p>Note: CRD breakers will open in 4 minutes.</p> | |
| | BOP | <ol style="list-style-type: none"> 3. The BOP will perform a symptoms check. <ul style="list-style-type: none"> • Perform Rule 3 due to loss of Main FDW | |
| | SRO | <ol style="list-style-type: none"> 4. The SRO will GO TO UNPP tab | |

| Op-Test No.: _____ | Scenario No.: 2 | Event No.: 8 | Page 2 of 4 |
|---|-----------------|--|-------------|
| Event Description: Both Main FDW Pumps and Main Trip (M, ALL) ATWS | | | |
| Time | Position | Applicant's Actions or Behavior | |
| | ALL | <p>5. The crew should determine that the PORV is open with RCS pressure below the setpoint and CLOSE 1RC-4 (PORV BLOCK VALVE). (crew may refer to ARG 1SA-18/A-1 for guidance)</p> <p>NOTE: If no action is taken for the PORV failing open, RCS pressure will decrease resulting in:</p> <p style="padding-left: 20px;">RCS pressure ES-1/2 setpoint (1600 psig). The crew will initiate Encl 5.1</p> <p style="padding-left: 20px;">RCS saturating (Performance of Rule 2)</p> <p>See following page for actions</p> | |
| | SRO/BOP | <p>6. The UNPP tab will:</p> <ul style="list-style-type: none"> • Ensure Rule 1 is in progress or complete • Verify Main FDW available • Trip the turbine-generator • Start all available EFDW pumps • Verify any NI > 1% FP • Open 1 RC-4 and 1HP-5 • Maximize letdown • Verify Main FDW available (its not) • Verify overcooling in progress (its not) • Secure makeup to LDST • WHEN all wide range NIs are ≤ 1% FP AND decreasing THEN continue • Transfer to the SGTR tab per the Parallel Actions page | |
| | | | |

| Op-Test No.: _____ | Scenario No.: 2 | Event No.: 8 | Page 4 of 4 |
|---|-----------------|--|-------------|
| Event Description: Both Main FDW Pumps and Main Turbine Trip (M, ALL) ATWS | | | |
| Time | Position | Applicant's Actions or Behavior | |
| | SRO OATC/BOP | <ul style="list-style-type: none"> • Notify SRO of HPI pump status • Select OFF for both AFIS headers • Verify/Start EFDWPs to feed all intact SGs • Establish 300 gpm to each SG • Feed SGs to LOSCM setpt per Rule 7 • Ensure Rule 3 in progress or complete <p>LOSCM:</p> <ul style="list-style-type: none"> • Ensure Rule 2 in progress or complete • Verify NO RCPs and adequate HPI flow in both HPI headers • Open 1AS-40 while closing 1MS-47 • Control steaming and feed rates on all intact SGs to maintain cooldown rate with Tech Spec limits <ul style="list-style-type: none"> ○ < 50 °F/1/2 Hr • Verify HPI forced cooling in progress (RNO) Close 1RC-4 <p>At this point SCM should recover, the crew would progress through the rest of the LOSCM tab and transfer to the Subsequent Actions tab.</p> | |
| | | <p>When the SRO transfers to the SGTR tab or when directed by the lead examiner this event and scenario is completed.</p> | |

CRITICAL TASKS

1. CT-24, Shutdown Reactor - ATWS
2. CT-11, Control SG pressure to Maintain RC Temperature Constant.



June, 2006

| Facility: Oconee | | Scenario No.: 3 R0 | | Op-Test No.: 1 | |
|--|----------------------|---------------------------|--|-----------------------|--|
| Examiners: _____ | | | Operators: _____ | | |
| _____ | | | _____ | | |
| _____ | | | _____ | | |
| Initial Conditions: | | | | | |
| <ul style="list-style-type: none"> 45% Reactor Power (SNAP 203) | | | | | |
| Turnover: | | | | | |
| <ul style="list-style-type: none"> Startup in progress after adding oil to 1B1 RCP SASS in MANUAL for I&E troubleshooting 1A Main FDW pump operating After turnover, the crew should start 1B1 RCP | | | | | |
| Event No. | Malfunction No. | Event Type* | Event Description | | |
| 0a | Pre-Insert | | SASS in manual | | |
| 0b | Pre-Insert MSS330 | | TD EFDW Pump Fails to start | | |
| 0c | Pre-Insert MPI290 | | Block All Turbine Trips Except Manual | | |
| 0d | Pre-Insert | | 1C HPI Pump Fails to Start | | |
| 1 | Override Z3424D1 | N, BOP, SRO | Start 1B1 RCP AC Oil Lift pump will not develop adequate discharge pressure | | |
| 2 | MPI 281 | I, OATC, SRO | ΔT_c Fails High | | |
| 3 | | TS, SRO | Loss of Oil on the 1B MDEFDW Pump (TS) | | |
| 4 | MSS570 | C, BOP, SRO | Vacuum leak | | |
| 5 | MPS290 Override | C, BOP, SRO | 1A CC Pump trips (1B CC Pump fails to auto start) | | |
| 6 | MSS200 | TS, SRO | UST leak (TS) | | |
| 7 | | R, OATC, SRO | Manual unit shutdown due to UST level | | |
| 8 | MSS010 | C, OATC, SRO | 1A Main FDW pump trips Main Turbine Fails to trip (Lockout EHC Pumps) | | |
| 9 | MPS260 | M, ALL | Loss of EFDW - CBP feed | | |
| 10 | Override | M, ALL | CBPs trip -Loss of ALL FDW - HPI Forced Cooling | | |
| | | | | | |

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

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| Op-Test No.: _____ | Scenario No.: 3 | Event No.: 1 | Page 1 of 1 |
|--|-----------------|--|-------------|
| Event Description: Start 1B1 RCP: (N; BOP, SRO) | | | |
| Time | Position | Applicant's Actions or Behavior | |
| | BOP | <p>Crew response: The BOP should use the in progress procedure OP/1/A/1103/006 (RCP Operation) Enclosure 4.1 (RCP Start) at step 1.12 to start the 1B1 RCP.</p> <ul style="list-style-type: none"> • Open 1LPSW-9&10 (1B1 RC PUMP MTR CLR IN & OUT) and verify both valves open by using the OAC indications. • Review Limit and Precautions <p>Note:</p> <ul style="list-style-type: none"> • No more than two RCP(s) may be operated when RCS is < 250 °F. • Either AC or DC Oil Lift Pump may be used • AC Oil Lift Pump may take > 2 minutes to develop adequate discharge pressure • AC and DC Oil Lift Pumps will automatically trip after 3 minutes • Oil Lift Pump may NOT start unless switch has been placed to "OFF" after last start <ul style="list-style-type: none"> • Announce "Starting 1B1 RCP" via plant page. • Start AC Oil Lift Pump on 1B1 RCP. <p>Note: The AC Oil Lift Pump will not develop adequate discharge press to clear the Low Press indication prior to tripping off. The operator will have to determine that the AC Oil Lift Pumped tripped and start the DC Oil Lift Pump.</p> <ul style="list-style-type: none"> • When AC Oil Lift Pump automatically trips after 3 minutes, start DC Oil Lift Pump. • Monitor the status of DC Oil Lift Pump low discharge pressure on the OAC and when it clears, start 1B1 RCP. • After RCP is at full speed, ensure Oil Lift Pump stopped. • Position any Oil Lift Pump switch(s) that were operated to "OFF". • Use the OAC to monitor RCP parameters for proper operation. | |
| | | When the 1B1 RCP has been started or when directed by the Lead Examiner this event is completed. | |

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| Op-Test No.: _____ | | Scenario No.: 3 | Event No.: 3 | Page 1 of 1 |
|--|----------|--|--------------|-------------|
| Event Description: Loss of Oil on the 1B MDEFDW Pump; (TS, SRO) | | | | |
| Time | Position | Applicant's Actions or Behavior | | |
| | SRO | <p>Note: An NEO will call the control room and state the following: "The 1B MDEFDW pump has an oil leak and no oil is visible in the bubbler."</p> <p>Crew response:</p> <p>The SRO should determine that the 1B MDEFDW pump is inoperable and refer to TS 3.7.5 (Emergency Feedwater System)</p> <p>TS 3.7.5 Condition A with a 7 day completion time is in affect.</p> <p>Notify SPOC to investigate and repair. May place the 1B MDEFDW pump is OFF and/or direct that the breaker for the 1B MDEFDW pump should be opened.</p> | | |
| | | <p>When the TS has been referenced and when directed by the Lead Examiner the event is completed.</p> | | |

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| Op-Test No.: _____ | Scenario No.: 3 | Event No.: 4 | Page 1 of 1 |
|--|-----------------------|---|-------------|
| Event Description: Vacuum Leak: (C; BOP, SRO) | | | |
| Time | Position | Applicant's Actions or Behavior | |
| | BOP SRO BOP | <p>Plant response:</p> <ul style="list-style-type: none"> • 1SA-03/A-6, COND VACUUM LOW • OAC alarm, Main Condenser Vacuum LOW <p>Crew response:</p> <p>Refer to the ARG and AP/27, Loss of Condenser Vacuum.</p> <p>Refer to AP/27:</p> <ol style="list-style-type: none"> 1. IAAT condenser vacuum is ≤ 22" Hg, THEN trip RX. 2. Dispatch operators to perform Encl. 5.1 (Main Vacuum Pump Alignment) and look for vacuum leaks. 3. Start all Main Vacuum Pumps. <p>Simulator Operator: Open V-22, 24, 26, 28, and 30</p> <ol style="list-style-type: none"> 4. Ensure 1V-186 is closed. 5. Ensure Stm to Stm Air Eject A, B, C > 255 psig. 6. Verify Stm Seal Hdr Press > 1.5 psig. 7. Start 1D CCW pump. 8. Verify Condensate flow ≥ 2300 gpm. 9. WHEN condenser vacuum is stable, AND Encl 5.1 (Main Vacuum Pump Alignment) is complete, THEN EXIT this procedure. | |
| | | When vacuum has been recovered or when directed by the lead Examiner, the event is complete. | |

Op-Test No.: _____

Scenario No.: 3

Event No.: 5

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

| Time | Position | Applicant's Actions or Behavior |
|------|----------|---|
| | BOP | <p>Plant response:</p> <ul style="list-style-type: none"> • 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 <p>Crew Response:</p> <ul style="list-style-type: none"> • 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: <ul style="list-style-type: none"> • Verify CC Surge Tank level > 18" • Start Standby CC Pump <p>Note: The SRO may not initiate AP/20 if the standby pump is started per the ARG.</p> |
| | SRO | <ul style="list-style-type: none"> • Initiate AP/20 (Loss of Component Cooling) <ul style="list-style-type: none"> • IAAT \geq two CRD stator temperatures \geq 180°F, THEN trip RX. |
| | BOP | <ul style="list-style-type: none"> • Open 1CC-7 and 1CC-8 • Verify CC Surge Tank level \geq 12". • Manually start the Standby CC Pump • Verify CC TOTAL FLOW > 575 gpm • If Letdown > 130 °F, THEN: <ul style="list-style-type: none"> • Close 1HP-5, • Initiate AP/032 (Loss of Letdown) |

Op-Test No.: _____ Scenario No.: 3

Event No.: 6

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 |
|------|--|--|
| | <p>SRO</p> <p>BOP/ OATC</p> <p>BOP</p> | <p>Crew Response:</p> <ul style="list-style-type: none"> • If AP/20 (Loss of Component Cooling) not entered, Statalarm 1SA-2/C-1 will direct initiating AP/32 (Loss of Letdown) • AP/32 (Loss of Letdown) will: <ul style="list-style-type: none"> • 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: <ul style="list-style-type: none"> ➢ Current RCS boron sample is needed for possible unit shutdown. ➢ Normal letdown line is isolated. • IAAT Pzr level $\geq 260''$, AND letdown CANNOT be established, THEN initiate unit shutdown at $\approx 20\%/min$ per AP/29 (Rapid Unit Shutdown). • IAAT Pzr level $\geq 375''$, 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 the following: <ul style="list-style-type: none"> ➢ 1HP-1 ➢ 1HP-2 ➢ 1HP-3 ➢ 1HP-4 |

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| Op-Test No.: _____ | Scenario No.: 3 | Event No.: 6 | 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/ OATC BOP | <p>Crew Response:</p> <ul style="list-style-type: none"> • Verify letdown temperature < 135°F (it is not) • Open 1HP-13. • Close the following: <ul style="list-style-type: none"> ➤ 1HP-8 ➤ 1HP-9&11 • Select LETDOWN HI TEMP INTLK BYP switch to BYPASS. • Open 1HP-5. • 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 (70 gpm) letdown flow. • Re-establish normal makeup through 1HP-120. • Re-establish normal RCP seal injection flow. • Position the standby HPI pump switch to AUTO. | |
| | | <p>This event is complete when Seal Flow is returned to normal (32 gpm) or when directed by the lead examiner.</p> | |

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| Op-Test No.: _____ | | Scenario No.: 3 | Event No.: 6 | Page 1 of 1 |
|--------------------|----------|---|--------------|-------------|
| Event Description: | | UST Leak: (TS, SRO) | | |
| Time | Position | Applicant's Actions or Behavior | | |
| | BOP | <p>Plant response:</p> <ul style="list-style-type: none"> • OAC Alarm - Turbine Sump Pumps A and B ON • 2SA-18/B-11, TURBINE BSMT WATER LEVEL ALERT • 1SA-06/A-11, UPPER SURGE TANK LEVEL LOW <p>Crew response:</p> <ul style="list-style-type: none"> • Refer to ARGs • 2SA-18/B-11 <ul style="list-style-type: none"> • Investigate and correct reason for water in TB Basement <p>Note: An NLO will notify the CR that water is leaking out of the UST and cannot be isolated.</p> | | |
| | SRO | <ul style="list-style-type: none"> • 1SA-06/A-11 (comes in later, 6' in UST) • Open DW-4 (#1 UST Makeup Control) • Check hotwell level to determine if hotwell level control valves have malfunctioned • Check CST lineup to verify CST pumps lined up to UST. • Check system for leaks if it appears that water is being lost. <ul style="list-style-type: none"> • The SRO should determine that TS 3.7.6 (UST and HW) is not met. • Condition A and the Required Action is to be in MODE 3 in 12 hours. • SRO should determine a unit shutdown is required. • Direct unit shutdown per AP/29 (Rapid Unit Shutdown) <p>Simulator operator: If candidate elects to use OP for Unit Shutdown, as the OSM, direct use of AP-29 for shutdown of the unit.</p> | | |
| | | <p>Event is complete when a unit shutdown is directed by the SRO or when directed by the Lead Examiner.</p> | | |

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| Op-Test No.: _____ | | Scenario No.: 3 | Event No.: 7 | Page 1 of 1 |
|--------------------|----------|--|--------------|-------------|
| Event Description: | | Manual unit shutdown due to UST level: (R; OATC, SRO) | | |
| Time | Position | Applicant's Actions or Behavior | | |
| | SRO | Crew response: AP/29 (Rapid Unit Shutdown) | | |
| | BOP | <ul style="list-style-type: none"> • Initiate Encl 5.1 (Support Actions During Rapid Unit Shutdown). • Verify Turbine-Generator shutdown is required. • Transfer 6.9 KV electrical auxiliaries by placing 1TA/1TB transfer switches to MAN, Closing 1TA/1TB SU 6.9 KV FDR and verifying 1TA/1TB NORMAL 6.9 KV FDR opens. • Transfer 4 KV electrical auxiliaries by placing MFB1/MFB2 transfer switches to MAN, Closing E1 (Startup FDR) and verifying N1 (Normal FDR) opens. Closing E2 (Startup FDR) and verifying N2 (Normal FDR) opens • Notify CR SRO that unit auxiliaries have been transferred. • 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. (its not) | | |
| | OATC | <ul style="list-style-type: none"> • Initiate manual power reduction to desired power level. <ul style="list-style-type: none"> • Reduce reactor power in manual by inserting control rods with the Diamond, controlling FDW flow with the FDW Masters. • Close 1HP-16 • Position 1HP-14 to BLEED • Open 1HP-24 & 1HP-25 • Close 1HP-7 • Maintain Pzr Level 220" to 250" | | |
| | | Event is complete when reactor power has been reduced 5% or when directed by the Lead Examiner. | | |

Op-Test No.: _____ Scenario No.: **3** Event No.: **8** Page 1 of 2

Event Description: **1A Main FDW pump trip:
Main Turbine Fails to trip (Lockout EHC Pumps) (C, OATC, SRO)**

| Time | Position | Applicant's Actions or Behavior |
|------|----------|--|
| | SRO | <p>Plant response:</p> <ul style="list-style-type: none"> • 1A Main FDW pump trips resulting in a reactor trip. • The Main Turbine should trip but does not. This will result in a reduction of steam pressure in both SGs until actions are taken to trip the turbine. The will result in RCS overcooling until the turbine is tripped. <p>Crew response:</p> <ul style="list-style-type: none"> • SRO will enter the EOP. |
| | OATC | <ul style="list-style-type: none"> • OATC will perform Immediate Manual Actions <ul style="list-style-type: none"> • Depress REACTOR TRIP pushbutton • Verify reactor power < 5% FP and decreasing • Depress turbine TRIP pushbutton. • Verify all turbine stop valves closed |
| | BOP | <p>Note: The OATC should diagnose that the turbine did not trip and then perform the RNO step which will stop and lock out both EHC pumps. This will cause the turbine to trip. (CT-18)</p> <ul style="list-style-type: none"> • Verify RCP seal injection available. • BOP will perform a symptom check and with SRO concurrence perform RULE 3 (Loss of Main or Emergency FDW) for the loss of Main FDW. <ul style="list-style-type: none"> • The 1A MD EFDW pump will be the only pump feeding a SG. • Encl. 5.9 will be performed per Rule 3: <ul style="list-style-type: none"> • Place 1FDW-316 in MANUAL and Close • Locally open 1FDW-313 and 1FDW-314 • Throttle open 1FDW-316. |
| | SRO | <ul style="list-style-type: none"> • The SRO will transfer to Subsequent Actions. |
| | | <p>Event is complete plant is stable and Subsequent Actions are in progress or when directed by the lead examiner.</p> |

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| Op-Test No.: _____ | | Scenario No.: 3 | Event No.: 8 | Page 2 of 2 |
|--------------------|---------------------|--|--------------|-------------|
| Event Description: | | 1A Main FDW pump trip: Main Turbine Fails to trip (Lockout EHC Pumps) (C, OATC, SRO) | | |
| Time | Position | Applicant's Actions or Behavior | | |
| | SRO BOP/ OATC | <p>Crew response:</p> <ul style="list-style-type: none"> • Subsequent Actions: <ul style="list-style-type: none"> • Verify all control rods fully inserted • Verify Main FDW in operation (RNO) Ensure Rule 3 in progress • Verify TBVs maintaining ~ 1010 psig • Verify 1RIA-40 operable with OFF GAS BLOWER operating • Dispatch an operator with Encl 5.29 (MSRV Locations) to ensure all MSRVs have reseated • Verify ES required (RNO) Initiate Encl. 5.5 • Open PCB 20 & 21 • Open Generator & Exciter Field Breaker • Verify Aux Bldg & Turb Bldg Instrument Air pressure > 90 psig • Verify ICS/NNI power available • Verify all 4160 v switchgear energized • Verify both SGs > 550 psig • Ensure Rule 3 in progress and SG levels approaching setpt • Verify any RCP operating | | |
| | | Event is complete plant is stable and Subsequent Actions are in progress or when directed by the lead examiner. | | |

Op-Test No.: _____ Scenario No.: 3 Event No.: 9

Event Description: **LOSS of EFDW - CBP Feed: (M, ALL)**
When directed by the lead examiner, trip the 1A MD EFDW Pump.

| Time | Position | Applicant's Actions or Behavior |
|------|----------|---|
| | SRO | <p>Plant response:</p> <p>Control board indications:</p> <ul style="list-style-type: none"> • Loss of EFDW flow as indicated on Total EFDW flow gauge • 1A MD EFDW pump will indicate tripped (red light off) <p>Crew response:</p> <ul style="list-style-type: none"> • SRO will transfer to LOHT tab: <ul style="list-style-type: none"> • Ensure Rule 3 in progress • IAAT NO SGs can be fed with FDW (Main/CBP/Emergency), AND any of the following exists: <ul style="list-style-type: none"> • RCS pressure reaches 2300 psig OR NDT limit • Pzr level reaches 375" [340" acc] • THEN GO TO Step 4. • Stop 1 RCP in each loop • WHEN any of the following exists: (SRO will wait at this step) <ul style="list-style-type: none"> • Unit 1 EFDW available • EFDW aligned from another unit • Main FDW pump available AND reset • THEN GO TO Step 53. |
| | BOP | <ul style="list-style-type: none"> • Re-perform Rule 3, Loss of Main or Emergency FDW • IAAT NO SGs can be fed with FDW (Main/CBP/Emergency), AND any of the following exist: <ul style="list-style-type: none"> • 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. (none will operate) • Verify any EFDW pump operating. (none) • Place the following in MANUAL and close 1FDW-315 and 1FDW-316 • Verify Any CBP operating and TBVs available on an intact SG. |

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| Op-Test No.: _____ | | Scenario No.: 3 | Event No.: 9 | Page 2 of 2 |
|---|----------|--|--------------|-------------|
| Event Description: LOSS of EFDW - CBP Feed: (M, ALL) | | | | |
| Time | Position | Applicant's Actions or Behavior | | |
| | BOP | <p>Crew response:</p> <ul style="list-style-type: none"> • Select OFF for both digital channels on AFIS HEADER A and AFIS HEADER B. • Place Startup Block valve control switch for 1FDW-33 and 1FDW-42 in OPEN: • Verify Rule 4 (Initiation of HPI Forced Cooling) in progress. (NO) • Simultaneously position Startup Control (1FDW-35 and 1FDW-44) valves 10 - 20% open on all intact SGs: • Close the following 1FDW-32, 1FDW-41, 1FDW-31, and 1FDW-40. • Lower SG pressure in available SGs to ≈ 500 psig. • Control FDW flow to stabilize RCS P/T by throttling the following as necessary Startup Control valves and TBVs. (CT-11) • Notify CR SRO that CBP feed is in progress. • Place the 1FDW-38 and 1FDW-47 switches to OPEN. • Place the following 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-313/314 (2A/2B EFDW LINE DISCH TO 2A S/G X-CONN) • Dispatch another operator to open 1FDW-313/314 (1A/1B EFDW LINE DISCH TO 1A S/G X-CONN) • WHEN either of the following exists: <ul style="list-style-type: none"> ○ Alternate unit EFW cross connects are open ○ 1 TD EFDW PUMP is operating • THEN continue. | | |
| | | When CBP feed established or when directed by the lead Examiner, this event is completed | | |

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| Op-Test No.: _____ | | Scenario No.: 3 | Event No.: 10 | Page 1 of 2 |
|--|----------|--|---------------|-------------|
| Event Description: CBPs Trip - Loss of ALL FDW - HPI Forced Cooling: (M, ALL) | | | | |
| Time | Position | Applicant's Actions or Behavior | | |
| | BOP | <p>Plant response:</p> <ul style="list-style-type: none"> • Startup flow gauge goes to zero <p>Crew response:</p> <ul style="list-style-type: none"> • Re-perform Rule 3, Loss of Main or Emergency FDW • IAAT NO SGs can be fed with FDW (Main/CBP/Emergency), AND any of the following exist: <ul style="list-style-type: none"> • 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. • Verify any EFDW pump operating. • Place the following in MANUAL and close 1FDW-315 and 1FDW-316 • Verify 1 TD EFDW PUMP is available for manual start. • Verify cross-tie with Unit 2 is desired. • Dispatch an operator to open 2FDW-313/314 (2A/2B EFDW LINE DISCH TO 2A S/G X-CONN) • Dispatch another operator to open 1FDW-313/314 (1A/1B EFDW LINE DISCH TO 1A S/G X-CONN) • WHEN either of the following exists: <ul style="list-style-type: none"> • Alternate unit EFW cross connects are open • Unit 1 TD EFDW PUMP is operating • THEN continue. | | |
| | | | | |

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Op-Test No.: _____

Scenario No.: 3

Event No.: 10

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Event Description:

CBPs Trip - Loss of ALL FDW - HPI Forced Cooling: (M, ALL)

| Time | Position | Applicant's Actions or Behavior |
|------|----------|---|
| | SRO | <p>Crew response:</p> <ul style="list-style-type: none"> • IAAT NO SGs can be fed with FDW (Main/CBP/Emergency), AND any of the following exist: <ul style="list-style-type: none"> • RCS pressure reaches 2300 psig OR NDT limit • Pzr level reaches 375" [340" acc] • THEN PERFORM Rule 4 (Initiation of HPI Forced Cooling). |
| | OATC | <ul style="list-style-type: none"> • Rule 4 (Initiation of HPI Forced Cooling). (CT-14) <ul style="list-style-type: none"> • Verify any HPI pump can be operated. • Open the following 1HP-24 and 1HP-25 • Start all available HPI pumps. (1C HPI pump will NOT start) • Open the following 1HP-26 and 1HP-27 • Open 1RC-4. • Verify flow exists in any HPI header. • Open PORV. • Verify at least two HPI pumps operating. • Verify flow in both HPI headers is in the acceptable region of Figure 1 (Required HPI Flow Per Header). • Determine 1B HPI header flow is unacceptable and open 1HP-409. • Verify flow exists in any HPI header. • Ensure PORV open. • Stop all but one RCP. • De-energize all Pzr heaters. • Close 1HP-5. • EXIT this rule. |
| | SRO | <ul style="list-style-type: none"> • LOHT Tab : (after performance of Rule 4) <ul style="list-style-type: none"> • Verify > two HPIPs operating & acceptable flow exists in both hdrs • Verify PORV & 1RC-4 are open • GO TO HPI CD Tab |
| | | <p>Event and exam is complete when the SRO has transferred to HPI Cooldown tab or when directed by the Lead Examiner.</p> |

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CRITICAL TASKS

1. CT-18, Turbine Trip
2. CT-11, Control SG Pressure to Maintain RCS Temperature Constant
3. CT-14, Initiate HPI Forced Cooling



June, 2006

Facility: **Oconee** Scenario No.: **4 R2** Op-Test No.: **1**

Examiners: _____ Operators: _____

Initial Conditions:

- 3% on Wide Range (SNAP 204)

Turnover:

- Unit Startup in progress
- SASS is in manual for I&E testing
- 1SA8/A11 (CF Tank A Press HIGH/LOW) has just actuated
- Continue startup

| Event No. | Malfunction No. | Event Type* | Event Description |
|-----------|--------------------|--------------------|---|
| 0a | Pre-Insert | | 1HP-26 (1A HP INJECTION) Failed closed |
| 0b | Pre-Insert | | SASS in MANUAL |
| 1 | Override | N, BOP, SRO | Pressurize "A" CFT with N ₂ 1N-298 (N ₂ Fill CFT 1A), fails open |
| 2 | MPS120 Override | C, OATC, SRO TS | 1A HPI Pump sheared shaft and standby HPI pump fails to start (TS) |
| 3 | Override | C, BOP, SRO | 1HP-31 Fails open |
| 4 | Override | C, BOP, SRO TS | "A" LPSW pump suction valve closes and Standby pump does not auto start (TS) |
| 5 | MPI121 | I, OATC, SRO | PZR Level # 1 Fails LOW |
| 6 | MCR061 | C, OATC, SRO | Continuous Regulating Rod Withdrawal |
| 7 | MSS280 Override | M, ALL | "1A" TBVs fail open 1MS-17 ("A" TBV Block) fails to close |
| 8 | MPS010 | M, ALL | "1A" SG Tube Rupture |
| | | | |
| | | | |
| | | | |

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

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

Event Description: **“1A” HPI Pump sheared shaft and the standby HPI pump fails to auto start: (C; OATC, SRO) TS**

| Time | Position | Applicant's Actions or Behavior |
|------|------------------------------------|--|
| | <p>OATC</p> <p>SRO</p> <p>OATC</p> | <p>Plant response:</p> <p>Statalarms:</p> <ul style="list-style-type: none"> • 1SA-2/B-2 (HP RCP Seal Injection Flow High/Low) • 1SA-2/C-2 (HP Injection Pump Disch. Header Pressure High/Low) <p>Board indications:</p> <ul style="list-style-type: none"> • RC Makeup Flow = 0 gpm • 1A HPI Pump amps low • PZR level will begin to decrease and LDST level will begin to increase. <p>Crew response:</p> <ol style="list-style-type: none"> 1. Refer to ARG for above Statalarms 2. SRO should initiate AP/014 (Loss of Normal HPI Makeup and/or RCP Seal Injection) <ul style="list-style-type: none"> • 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) • Open the following: <ul style="list-style-type: none"> ➤ 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. |

| Op-Test No.: _____ | Scenario No.: 4 | Event No.: 2 | Page 2 of 2 |
|---|-----------------|---|-------------|
| Event Description: "1A" HPI Pump sheared shaft and the standby HPI pump fails to auto start: (C; OATC, SRO) TS | | | |
| 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"> • Condition "A" • Required Action: Restore HPI pump to OPERABLE status • Completion Time: 72 hours <p>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.</p> | |
| | | Event is complete when normal makeup and letdown is established or when directed by the lead examiner. | |

| Time | Position | Applicant's Actions or Behavior |
|--|----------|--|
| Op-Test No.: _____ Scenario No.: 4 Event No.: 3 Page 1 of 1 Event Description: 1HP-31 Fails open: (C; BOP, SRO) | | |
| | BOP | Plant response: 1SA2/B-2 (HP RCP Seal Inlet Header Flow High/Low) (42 gpm) Crew response: Refer to Alarm Response Guide: <ul style="list-style-type: none"> • Verify high seal flow conditions with individual RCP seal indications • Adjust 1HP-31 (RCP Seal Flow Control) per OP/1/A/1104/002 (HPI system) • IF flow CANNOT be reduced in above manner, 1HP-31 may have failed open/mid-position. Take manual control of 1HP-31 and throttle to maintain 32 gpm. |
| | | When flow is reduced manually to ~ 32 gpm or when directed by the lead examiner this event is completed. |

| Op-Test No.: _____ | | Scenario No.: 4 | Event No.: 4 | Page 1 of 1 |
|--------------------|----------|--|--------------|-------------|
| Event Description: | | "A" LPSW pump suction valve closes and standby pump does not auto start: (C, BOP, SRO) (TS) | | |
| Time | Position | Applicant's Actions or Behavior | | |
| | BOP | <p>Plant response:</p> <p>Statalarms:</p> <ul style="list-style-type: none"> 1SA-9/A-9 (LPSW Header A/B Press Low) <p>Control board indications:</p> <ul style="list-style-type: none"> LPSW-2 ("A" LPSW Pump Suction) indicates closed (also an OAC alarm) "A" LPSW pump amps are cycling LPSW Header A/B Pressure Low <p>Crew response:</p> <ol style="list-style-type: none"> Refer to ARG for 1SA-9/A-9 (LPSW Header A/B Press Low) Refer to AP/24 (Loss of LPSW) <ul style="list-style-type: none"> Open LPSW pump suction valves. <p>Note: LPSW-2 ("A" LPSW pump suction) will indicate closed. The team may dispatch an NEO to open LPSW-2. The valve will not be able to be opened locally.</p> | | |
| | SRO | <ul style="list-style-type: none"> Verify LPSW pumps are cavitating <ul style="list-style-type: none"> ➤ Pump amps erratic ➤ LPSW header pressure fluctuating Place the Unit 1/2 STANDBY LPSW PUMP AUTO START CIRCUIT in DISABLE. Stop the affected pump. Stop "A" LPSW pump. Ensure all available (NOT previously cavitating) LPSW pumps operating. Start "C" LPSW pump. Verify normal LPSW System operation is restored. 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. The SRO should refer to TS: <ul style="list-style-type: none"> ➤ 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. | | |
| | BOP | <ul style="list-style-type: none"> Verify LPSW pumps are cavitating <ul style="list-style-type: none"> ➤ Pump amps erratic ➤ LPSW header pressure fluctuating Place the Unit 1/2 STANDBY LPSW PUMP AUTO START CIRCUIT in DISABLE. Stop the affected pump. Stop "A" LPSW pump. Ensure all available (NOT previously cavitating) LPSW pumps operating. Start "C" LPSW pump. Verify normal LPSW System operation is restored. 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. The SRO should refer to TS: <ul style="list-style-type: none"> ➤ 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. | | |
| | SRO | <ul style="list-style-type: none"> Verify LPSW pumps are cavitating <ul style="list-style-type: none"> ➤ Pump amps erratic ➤ LPSW header pressure fluctuating Place the Unit 1/2 STANDBY LPSW PUMP AUTO START CIRCUIT in DISABLE. Stop the affected pump. Stop "A" LPSW pump. Ensure all available (NOT previously cavitating) LPSW pumps operating. Start "C" LPSW pump. Verify normal LPSW System operation is restored. 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. The SRO should refer to TS: <ul style="list-style-type: none"> ➤ 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.: 5 | Page 1 of 1 |
|--|----------|--|-------------|
| Event Description: PZR Level #1 Fails LOW: (I, OATC, SRO) | | | |
| NOTE: Event 5 will be initiated concurrent with Event 4. | | | |
| Time | Position | Applicant's Actions or Behavior | |
| | BOP | <p>Plant response:</p> <p>Statalarms</p> <ul style="list-style-type: none"> • 1SA-2/C-3 (RC Pressurizer Level High/Low) • 1SA-2/C-4 (RC Pressurizer Level Emerg. High/Low) <p>Front board (1UB1) indications:</p> <ol style="list-style-type: none"> 1. PZR Level 1 indicates 0" 2. 1HP-120 (RC Volume Control) throttles open 3. Makeup flow increases towards≈ 160 gpm. 4. All Pzr heaters de-energize <p>Crew response:</p> <p>Refer to ARG:</p> <ul style="list-style-type: none"> • Check alternate PZR level indications (1UB1 and OAC) and determine that PZR level 1 has failed low. • Check for proper Makeup/Letdown flows and adjust to restore proper level as required. <ul style="list-style-type: none"> ○ SRO may direct the BOP to take manual control of 1HP-120 to reduce Pzr level to normal (~ 220") • Refer to AP/1/A/1700/014 (Loss of Normal HPI Makeup and/or RCP Seal Injection) • Refer to TS 3.4.9 (Pressurizer) • Refer to TS 3.3.8 (Post Accident Monitoring (PAM) Instrumentation) | |
| | SRO/BOP | <ul style="list-style-type: none"> • Refer to PT/600/001 (Periodic Instrument Surveillance) <ul style="list-style-type: none"> ○ SRO should refer to PT/600/001 (Periodic Instrument Surveillance) SASS Manual Operation: <ul style="list-style-type: none"> ▪ 12.6.2: if MISMATCH light is on, a mismatch has occurred. ▪ 12.6.3 Initiate a Work Request to repair faulty signal. ○ Have the BOP select an alternate PZR level channel on 1UB1. | |
| | SRO/BOP | <ul style="list-style-type: none"> • Refer to PT/600/001 (Periodic Instrument Surveillance) <ul style="list-style-type: none"> ○ SRO should refer to PT/600/001 (Periodic Instrument Surveillance) SASS Manual Operation: <ul style="list-style-type: none"> ▪ 12.6.2: if MISMATCH light is on, a mismatch has occurred. ▪ 12.6.3 Initiate a Work Request to repair faulty signal. ○ 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.: 4 | | Event No.: 6 | Page 1 of 1 |
|--|-------------------------|---|-------------|
| Event Description: Continuous Regulating Rod Withdrawal: (C, OATC, SRO) | | | |
| Time | Position | Applicant's Actions or Behavior | |
| | OATC/ BOP SRO | <p>Plant response:</p> <ul style="list-style-type: none"> • Control Rod out Light Lit on Diamond Panel • NI power increasing • Gp 6 Out Limit Light on Diamond Panel • Gp 6 Individual 100% lights lit on PI panel <p>Crew response:</p> <ul style="list-style-type: none"> • Perform low power PTR. • Place Diamond Panel in Manual. <ul style="list-style-type: none"> ○ Crew may elect to take FDW Masters to Manual as well. • Insert CRDs to reduce power. • Stabilize Reactor Power < Pre-Transient Level. • The crew should decide to insert CRDs to 50% on Group 1. | |
| | | <p>When the decision is made to insert CRDs to GP1 at 50%, or when directed by the lead examiner this event is completed.</p> | |

| Time | Position | Applicant's Actions or Behavior |
|---|-------------------------|--|
| Op-Test No.: _____ Scenario No.: 4 Event No.: 8 Page 1 of 2 Event Description: 1A SG Tube Rupture: (M, ALL) | | |
| | SRO OATC/ BOP | <p>Plant response:</p> <ul style="list-style-type: none"> • 1SA8/A-9 (RM AREA MONITOR RADIATION HIGH) • Pzr level decreasing. • Tave decreasing. • 1SA8/B-9 (RM PROCESS MONITOR RADIATION HIGH) • 1SA8/D-10 (RM CSAE EXHAUST RADIATION HIGH) <p>Crew response:</p> <ul style="list-style-type: none"> • SRO direct symptom check. <ul style="list-style-type: none"> ○ Team determines that a SGTR exists. ○ SRO remains in EHT Tab as it is the higher priority tab. • RO utilizes Encl. 5.5 (PZR and LDST Level Control) to maintain Pzr inventory. • EHT tab: • Notify RP & Secondary Chemistry to check for indications of SGTR. • IAAT all the following exist: <ul style="list-style-type: none"> ○ ES bypass permit satisfied ○ All SCMs > 0°F ○ RCS pressure controllable THEN bypass ES as necessary. • Verify any SG is dry. • Minimize SCM using the following methods as necessary: (CT-7) <ul style="list-style-type: none"> ○ De-energize all Pzr heaters ○ Pzr Spray ○ Throttle HPI to maintain Pzr level > 100" [180 ACC] ○ PORV • Verify any RCP operating. • Maintain RCP NPSH (using OAC or Encl 5.18 P/T Curves) • Initiate Encl 5.16 (SG Tube-to-Shell ΔT Control) • Verify all SCMs > 0°F • Verify indications of SGTR exist • GO TO SGTR tab. |
| | | |

| Time | Position | Applicant's Actions or Behavior |
|------|----------|--|
| | ALL | <ul style="list-style-type: none"> • Verify Rx tripped • Maintain Pzr level 140" – 180" using Encl 5.5 • Start A & B Outside Air Booster Fans (CT-27) • Notify U-3 to start 3A & 3B Outside Air Booster Fans • Monitor RIA 16 & 17 to identify all SGs with a tube rupture • Dispatch operator to open TB Sump Pump Bkrs • Notify RP to survey both MS lines for radiation • Secure any unnecessary offsite release paths • Verify Main FDW or EFDW controlling properly • Open 1HP-24 & 1HP-25 (1A/1B BWST Suction) • Secure makeup to LDST • Maintain both SG pressures < 950 psig using TBVs • IAAT all the following exist: <ul style="list-style-type: none"> ○ All SCMs > 0°F ○ ES bypass permit satisfied ○ RCS pressure controllable THEN bypass ES as necessary. • Minimize core SCM using the following methods: <ul style="list-style-type: none"> ○ De-energize all Pzr heaters ○ Use Pzr Spray ○ Maintain Pzr level 140-180" • Verify any RCP operating (Maintain RCP NPSH) • IAAT RCS de-pressurization methods are inadequate in minimizing core SCM then: <ul style="list-style-type: none"> ○ Verify Pzr spray nozzle $\Delta T \geq 410$ °F ○ Close 1LWD-1&2 ○ Cycle PORV as necessary |
| | | <p>When transition is made to SGTR tab or when directed by the lead examiner this event is completed.</p> |

CRITICAL TASKS

1. CT-11, Control SG Pressure to Maintain RC Temperature Constant
2. CT-07, Minimize SCM
3. CT-17, Isolate Overcooling SGs
4. CT-27, Implementation of Control Room Habitability Guidance