# SHIFT TURNOVER

**PLANT CONDITIONS:**

- Unit 2 is starting up at 5% reactor power
- The drywell is de-inerted

**INOPERABLE EQUIPMENT/LCOs:**

- None

**SCHEDULED EVOLUTIONS:**

- Continue the reactor startup using GP-2 beginning with Step 6.2.54 and Rod Group 12
- Secure Drywell Purge per step 6.2.43 of GP-2.
- Commence inerting the containment IAW SO 7B.1.A-2 "Containment Atmosphere Inerting"

**SURVEILLANCES DUE THIS SHIFT:**

- None

**ACTIVE CLEARANCES:**

- None

**GENERAL INFORMATION:**

After turnover the crew will resume power ascension. GP-2 is complete through step 6.2.54; begin with Step 6.3. A Reactivity Briefing was already completed and you are ready to begin withdrawing rods at the beginning of Rod Group 12, control rod 14-55.

## Operator Actions

| Op Test No.: | 1 | Scenario No.: | 1 | Event No.: | 1 | Page: | 1 of 13 |
|---|---|---|---|---|---|---|---|

**Event Description:** Power ascension with control rods

**Cause:** N/A

**Effects:** N/A

| Time | Position | Applicant's Actions Or Behavior |
|---|---|---|
| | CRS | Direct the URO to commence rod withdrawal in accordance with the Startup REMA and the Startup Sequence beginning with Rod Group 12, control rod 14-55. |
| | URO | Commence rod withdrawal beginning with Rod group 12, Rod 14-55.<br>Withdraw control rods by selecting the rod on the matrix and then using the Single Notch Withdrawal switch to withdraw control rods.<br>Monitor nuclear instrumentation and reactor power during control rod withdrawal. |
| | PRO | Monitor balance of plant conditions during rod withdrawal. |
| | NOTE: | The scenario will continue when the Lead Examiner is satisfied with the reactivity manipulation. |

## Operator Actions

**Op Test No.:** 1 **Scenario No.:** 1 **Event No.:** 2 **Page:** 2 of 13

**Event Description:** Control rod drifts out

**Cause:** Leaking directional control valve on HCU

**Effects:** Uncontrolled reactivity change

| Time | Position | Applicant's Actions Or Behavior |
|---|---|---|
| | URO/PRO | Acknowledge annunciator 211 (D-4) ROD DRIFT and inform CRS of alarm condition and that control rod 46-55 is drifting out. |
| | CRS | Enter ON-121 "Drifting Control Rod".<br>Direct an Equipment Operator go inspect HCU 46-55<br>Request Shift Manager to notify Reactor Engineering |
| | URO | Per ON-121 "Drifting Control Rod":<br>• Select control rod 46-55 on the select matrix<br>• Monitor changes in reactor power, level, pressure<br>• Insert control rod 46-55 to full in position using the Emergency-In control switch and HOLD at full in position for 30 seconds (perform this step for a total of 5 times since rod will continue to drift)<br>• Insert control rod 46-55 to full in position using the Emergency-In control switch and HOLD at full in position prior to each scram attempt using scram toggle switch for control rod 46-55 (total of 3 times)<br>• Release the Emergency-In control switch after each individual scram attempt using scram toggle switch for control rod 46-55.<br>• Insert control rod 46-55 to full in position using the Emergency-In control switch and HOLD at full in position until individual scram is completed prior to isolating the HCU per step 2.10 of ON-121.<br>• Release the Emergency-In control switch after the last individual scram attempt using scram toggle switch for control rod 46-55.<br>• Reset the ROD DRIFT alarm after the control rod is isolated. |

**Op Test No.:** 1 **Scenario No.:** 1 **Event No.:** 2 **Page:** 3 of 13

**Event Description:** Control rod drifts out...(continued)

| Time | Position | Applicant's Actions Or Behavior |
|---|---|---|
| | PRO | Direct an Equipment Operator to inspect HCU 46-55 |
| | | Perform individual scram of control rod 46-55 by placing its associated scram toggle switch in the DOWN position on panel 20C016. After 15 seconds, return the toggle switch to the UP position. |
| | | Prior to isolating the HCU per step 2.10 of ON-121 perform individual scram of control rod 46-55 by placing its associated scram toggle switch in the DOWN position on panel 20C016 AND keep in the DOWN position until the HCU is isolated. |
| | | Direct an Equipment Operator to isolate HCU 46-55 using SO 3.7.E-2 "CRD Isolation During Reactor Operation (W/ Cooling Flow Maintained)" |
| | | When control rod 46-55 is isolated, place the scram toggle switch in the UP position. |
| | CRS | Direct isolating control rod 46-55 using SO 3.7.E-2 per ON-121 step 2.10. |
| | | Refer to Tech Spec 3.1.3.C. for one inoperable control rod. Fully insert within 3 hours and disarm within 4 hours. |

**Op Test No.:** 1 **Scenario No.:** 1 **Event No.:** 3 **Page:** 4 of 13

**Event Description:** Secure drywell purge

**Cause:** N/A

**Effects:** N/A

| Time | Position | Applicant's Actions Or Behavior |
|---|---|---|
| | CRS | Direct drywell purge secured per step 6.2.43 of GP-2. |
| | PRO | Secure drywell purge starting at step 4.19 of SO 7B.4.A-2 "Containment Atmosphere De-inerting and Purging Via SBGT System".<br>• Place the standby Drywell Purge Fan to OFF<br>• Stop the running Drywell Purge Fan<br>• Shutdown SBGT using SO 9A.2.B "SBGT System Shutdown Following Manual Start"<br>• Close AO-20459 and AO-20460 on panel 20C012.<br>• Verify HCS-00522-1 is OPEN on panel OBC452<br>• Close the following valves using SO 7B.7.A-2:<br>  ○ AO-2505<br>  ○ AO-2520<br>  ○ AO-2506<br>  ○ AO-2507<br>• Close SBGT valves AO-20469-1 and AO-20469-2 on the 20C012 panel. |

## Operator Actions

**Op Test No.:** 1 **Scenario No.:** 1 **Event No.:** 4 **Page:** 5 of 13

**Event Description:** Inadvertent RCIC initiation

**Cause:** Fault in RCIC initiation logic

**Effects:** RCIC initiates and injects into the RPV

| Time | Position | Applicant's Actions Or Behavior |
|---|---|---|
| | PRO | Recognize the RCIC System has inadvertently initiated. |
| | CRS | Direct securing the RCIC System. |
| | PRO | Secure RCIC by depressing the "TRIP" pushbutton on RCIC panel. |
| | CRS | Request troubleshooting/technical assistance through the Shift Manager.<br>Reference Tech. Spec. 3.5.3.A – verify HPCI operable immediately and restore RCIC to operable within 14 days.<br>Reference Tech. Spec. 3.3.5.2.B (RCIC Instrumentation) – declare RCIC inoperable within 1 hour. |

## Operator Actions

**Op Test No.:** 1 **Scenario No.:** 1 **Event No.:** 5 **Page:** 6 of 13

**Event Description:** CRD flow control valve failure

**Cause:** In-service CRD System flow control valve controller fails.

Annunciator 211 (G-4) CRD CHARGING WATER HEADER HIGH PRESSURE

**Effects:** Loss of CRD System regulating function

| Time | Position | Applicant's Actions Or Behavior |
|---|---|---|
| | URO | Recognize and acknowledge annunciator 211 (G-4) CRD CHARGING WATER HEADER HIGH PRESSURE. Report condition to Control Room Supervisor.<br>Recognize failure of in-service 'A' CRD flow control valve (valve closed). |
| | CRS | Enter ON-107 "Loss of CRD Regulating Function".<br>Direct performance of SO 3.6.D-2 "CRD Hydraulic System Flow Control Valve Swapping". |
| | URO | Dispatch Equipment Operator to 'B' CRD flow control station to perform step 4.1.1 of SO 3.6.D-2.<br>Place CRD flow controller FC-2-3-301 in MANUAL and adjust flow to zero.<br>Direct Equipment Operator at 'B' CRD flow control station to perform step 4.1.3 of SO 3.6.D-2 (instrument air and flow control selector switch to 'B').<br>Open flow control valve AO-2-3-19B using FC-2-3-301 to establish 55 to 65gpm system flow.<br>Place FC-2-3-301 in AUTOMATIC.<br>Direct Equipment Operator at 'B' CRD flow control station to perform step 4.1.5 of SO 3.6.D-2 (isolate AO-2-3-19A). |

## Operator Actions

**Op Test No.:** 1 **Scenario No.:** 1 **Event No.:** 6 **Page:** 7 of 13

**Event Description:** Small recirc system leak in the drywell

**Cause:** Small recirc leak results in drywell temperature and pressure rising but not fully depressurizing the RPV.

**Effects:** "Drywell Hi-Lo Press" alarms (210 F-2, 225 A-4)

High Drywell Pressure Scram Signal, Isolations, Diesel and HPCI auto starts.

Rising drywell pressure indicated. Manual scram at 1.2 psig or auto scram at 2 psig with isolations, HPCI and diesel starts.

| Time | Position | Applicant's Actions Or Behavior |
|---|---|---|
| | URO/PRO | Recognize Drywell High Pressure alarms.<br>Recognize Drywell pressure is going up and announce entry into OT-101 for High Drywell Pressure.<br>Trend the Drywell pressure increase. |
| | CRS | Enter/direct actions in accordance with OT-101, High Drywell Pressure:<br>Verify Drywell Inerting is not in progress.<br>Direct placing additional drywell cooling in service.<br>Direct actions to monitor components e.g., RRP seals.<br>Direct crew to isolate and restore systems IAW OT-101 to stop the source of the leak. OT-101 systems include: RWCU, HPCI and RCIC (i.e. close HPCI MO-15 steam supply valve, close RCIC MO-15 steam supply valve...). |
| | PRO | Perform OT-101 actions as directed:<br>Monitor drywell pressure and plant parameters.<br>If directed, verify that inerting is not in progress.<br>If directed, place additional drywell cooling in service.<br>Monitor components for abnormal indications as directed by the CRS.<br>Isolate plant systems to include RWCU, HPCI, and RCIC as directed by the CRS IAW OT-101 (i.e. close HPCI MO-15 steam supply valve, close RCIC MO-15 steam supply valve...). |
| | CRS | Direct a GP-4 Manual Scram when drywell pressure reaches 1.2 psig. |

## Operator Actions

**Op Test No.:** 1 **Scenario No.:** 1 **Event No.:** 6 **Page:** 8 of 13

**Event Description:** Small recirc system leak in the drywell...(continued)

| Time | Position | Applicant's Actions Or Behavior |
|---|---|---|
| | URO | Perform GP-4 Manual Scram actions:<br>Place the Mode Switch to Shutdown.<br>Verify Rods inserting.<br>Manually control the Reactor Feed Water System to control reactor level.<br>Press Emergency Stop for the 'C' RFP.<br>Shut MO-2149C, the 'C' RFP discharge valve.<br>Open MO-8090 the Startup Level Controller isolation.<br>Verify APRMs are downscale and report to the CRS.<br>Verify all control rods inserted and report to the CRS.<br>Perform GP-8.B "PCIS Isolations - Groups 2&3". |
| | PRO | Perform scram actions.<br>Verify all isolations.<br>Restore Instrument Nitrogen to the DW when directed by the CRS. |
| | CRS | Enter and execute T-100 "Scram":<br>• Direct level restored and maintained +5 to +35 inches.<br>• Direct restoration of drywell instrument nitrogen IAW GP-8.E "Primary Containment Isolation Bypass". |

## Operator Actions

**Op Test No.:** 1 **Scenario No.:** 1 **Event No.:** 7 **Page:** 9 of 13

**Event Description:** Seven rods stick full out during the scram

**Cause:** Rods are mechanically stuck in the full out position

**Effects:** ATWS actions must be completed for the stuck control rods. This will require injection to be terminated and prevented prior to completing a RPV Blowdown.

| Time | Position | Applicant's Actions Or Behavior |
|---|---|---|
| CT | URO | Recognize by reporting that NOT all control rods inserted on the scram. |
| | CRS | Enter the RC/Q-RODS section of T-101 "RPV Control" due to the ATWS.<br>Direct manual insertion of control rods using:<br>• T-220, Driving Control Rods During a Scram.<br>• T-216, Control Rod Insertion by Manual Scram or Individual Scram Test Switches, OR<br>• T-246, Maximizing CRD Flow to the Reactor Vessel<br>NOTE: T-220 is typically directed first because it is the most expedient method to insert a few control rods that failed to scram |
| | URO | Attempt insertion of the control rods by the method specified by the CRS. For T-220:<br>• Place the CRD Flow Control in MANUAL and open the Flow Control Valve Fully OR Direct an Operator to close HV-2-3-56, the Charging Wtr Hdr Blk Vv to Hydraulic Control Units.<br>• Request permission and by pass the Rod Worth Minimizer.<br>• Attempt to insert the rods using the Emergency In/Notch Override Switch.<br>• Report to the CRS the inability to insert the control rods. |
| | PRO | Note that the PRO will be required to perform T-240, Termination and Prevention of Injection into the RPV, later in the scenario as a result of the ATWS condition. |

**Op Test No.:** 1 **Scenario No.:** 1 **Event No.:** 8 **Page:** 10 of 13

**Event Description:** Drywell spray valve failures – prevents drywell spray

**Cause:** Failure of drywell spray valves to open on both loops of RHR system

**Effects:** 2 psig isolations, HPCI auto start, emergency diesel starts

Drywell pressure continues to rise above 2 psig and requires the crew to perform an Emergency Blowdown when drywell temperature cannot be maintained below 281°F

| Time | Position | Applicant's Actions Or Behavior |
|---|---|---|
| | URO/PRO | Recognize and respond to 2 psig drywell pressure and announce entry into T-101 and T-102:<br>Recognize and verify Group II/III isolations.<br>Recognize and verify Diesel Generator starts and has cooling water.<br>Recognize and report the HPCI auto start if it has not been previously identified by the CRS.<br>Trend and report containment parameters. |
| | CRS | Recognize and respond to 2 psig drywell pressure and announce entry into T-101 and T-102:<br>Reenter T-101, "RPV Control", and enter T-102, "Primary Containment Control".<br>Verify adequate level and may direct either a HPCI shutdown or isolation. |
| | PRO | Perform an isolation or shutdown of HPCI as directed by the CRS.<br>For isolation, depress the HPCI isolation pushbutton and verify that HPCI shuts down and the HPCI Steam Line Isolation Valves close.<br>For a HPCI shutdown, trip HPCI, verify that the HPCI aux oil pump starts as required, and place the HPCI Aux Oil Pump in Pull to Lock when HPCI stops rotating. |
| | CRS | Direct T-102 actions:<br>Direct Torus sprays IAW T-204 using 'B' Loop RHR<br>Direct T-223 actions to restore drywell ventilation.<br>Trend containment parameters, specifically drywell pressure and bulk average temperature. |

**Op Test No.:** 1 **Scenario No.:** 1 **Event No.:** 8 **Page:** 11 of 13

**Event Description:** Drywell spray valve failures – prevents drywell spray...(continued)

| Time | Position | Applicant's Actions Or Behavior |
|---|---|---|
| | PRO | Perform Torus Sprays IAW T-204, Initiation of Torus Sprays using RHR:<br>Open the MO-39B, Torus Hdr. Valve.<br>Open the MO-89D HPSW Outlet Valve.<br>Place the S18B switch in Manual Override.<br>Momentarily place the S17B switch in "MAN".<br>Start the "D" HPSW Pump.<br>Start the "D" RHR Pump. |
| | URO/PRO | Recognize and report containment parameters:<br>Bulk Drywell temperature at 145°F and entry into T-102. |
| | CRS | Re-enter T-102 on Bulk Average temperature 145°F.<br>Continue T-101 Actions:<br>Direct RPV level controlled +5 to +35 inches.<br>May direct closing MSIVs to slow down RPV cooldown rate. |
| | URO | Maintain RPV level using additional feedwater that is required to keep up with the recirc leak. |
| | URO/PRO | Trend and report containment parameters. |
| | CRS | Direct URO/PRO to perform T-223, Drywell Cooler Fan Bypass, to bypass and restore drywell ventilation. |
| | URO/PRO | Perform T-223:<br>Direct EO to place drywell fans in slow.<br>Verify T-223 requirements. |

**Op Test No.:** 1 **Scenario No.:** 1 **Event No.:** 8 **Page:** 12 of 13

**Event Description:** Drywell spray valve failures – prevents drywell spray...(continued)

| Time | Position | Applicant's Actions Or Behavior |
|---|---|---|
| | CRS | When torus pressure cannot be maintained below 9 psig, and when drywell pressure and temperature plot within the safe region of the Drywell Spray Initiation Limit Curve, direct drywell fans shut down and drywell sprays initiated IAW T-204, "Initiation of DW Sprays Using RHR." |
| | PRO | Spray the drywell in accordance with T-204, "Initiation of Drywell Sprays Using RHR."<br>Recognize and report inability to spray the drywell using either RHR loop. |
| | CRS | When drywell temperature cannot be restored and maintained below 281°F (drywell sprays and fans have not controlled drywell temperature) direct:<br>T-240, Terminate and Prevent Injection into the RPV (due to the 5 rod ATWS). |
| CT | | T-112, Emergency Blowdown. |
| | URO/PRO | When directed, perform T-240 to Terminate and Prevent Injection into the RPV.<br>Verify that HPCI is not injecting.<br>Shutdown any running Reactor Feedwater Pumps by depressing the trip pushbuttons.<br>Contact the floor operator and direct the isolation of Stayfull from RHR and Core Spray.<br>NOTE: this step should be directed but actual isolation does not need to be completed prior to the blowdown. |
| CT | PRO | When directed, perform an Emergency Blowdown by opening all five ADS valves. |
| | URO | Control reactor level as directed following the blowdown.<br>(Note that level will swell high during the actual blowdown.) |

**TERMINATION CRITERIA:**

The scenario may be terminated when 5 SRVS are open, the RPV is depressurized, and RPV level is under control.

**POST SCENARIO EMERGENCY CLASSIFICATION:**

Classification is an Alert IAW EAL FA1.

# SHIFT TURNOVER

**PLANT CONDITIONS:**

- Unit 2 at 41% power with a shutdown in progress IAW GP-3 "Normal Plant Shutdown"

**INOPERABLE EQUIPMENT/LCOs:**

- None

**SCHEDULED EVOLUTIONS:**

- Continue with plant shutdown IAW GP-3-2 "Normal Plant Shutdown"

**SURVEILLANCES DUE THIS SHIFT:**

- None

**ACTIVE CLEARANCES:**

- None

**GENERAL INFORMATION:**

- GP-3-2 is complete through step 6.18
- Control rods have been inserted IAW GP-3-2 and NF-AB-720-F-1
- Fifth stage feedwater heaters are out of service

## Operator Actions

| Op Test No.: | 1 | Scenario No.: | 2 | Event No.: | 1 | Page: | 1 of 14 |
|---|---|---|---|---|---|---|---|

**Event Description:** Lower reactor power with reactor recirculation flow

**Cause:** N/A

**Effects:** N/A

| Time | Position | Applicant's Actions Or Behavior |
|---|---|---|
| | CRS | Direct URO to continue power reduction to 35% IAW GP-3-2, step 6.19. |
| | URO | Reduce recirculation pump speeds to reduce total core flow to 51.25 MLB/HR.<br>• Verify both Moore Controllers are set to monitor the 'V' (% output) variable.<br>• Slowly reduce Moore controller demand signals for 'A' and 'B' recirc pumps.<br>• Observe recirc system response for approximately 30 seconds before making additional speed changes. |
| | PRO | Monitor plant equipment during power reduction. |

## Operator Actions

| Op Test No.: | 1 | Scenario No.: | 2 | Event No.: | 2 | Page: | 2 of 14 |
|---|---|---|---|---|---|---|---|

**Event Description:** Secure a condensate pump

**Cause:** N/A

**Effects:** N/A

| Time | Position | Applicant's Actions Or Behavior |
|---|---|---|
| | CRS | When reactor power drops to approximately 35%, direct the PRO to shutdown a condensate pump in accordance with SO 5.2.A-2. |
| | PRO | Review SO 5.2.A-2 "Condensate System Condensate Pump Shutdown" and ensure prerequisites are met.<br>Secure one condensate pump, as directed:<br>• Close the discharge valve for the pump to be shut down.<br>• Stop the selected pump by turning the control switch to STOP (within 2 minutes of closing the discharge valve).<br>• Direct an Equipment Operator to close the Seal Water Supply Valve for the condensate pump that was shut down. |
| | URO | Monitor reactor parameters during condensate pump shutdown. |

**Op Test No.:** 1 **Scenario No.:** 2 **Event No.:** 3 **Page:** 3 of 14

**Event Description:** Loss of 480 VAC MCC E324-D-A

**Cause:** MCC fault

**Effects:**
1. Alarm: 004 F-1 "E324 MCC Fdr Bkr Trip"
2. Loss of power to E-3 diesel generator auxiliaries

| Time | Position | Applicant's Actions Or Behavior |
|---|---|---|
| | PRO | Recognize and report alarm 004 F-1 "E324 MCC Fdr Bkr Trip" and enter the corresponding Alarm Response Card.<br>Dispatch Equipment Operator to investigate the loss of MCC E324-D-A.<br>Green flag the tripped breaker by placing its control switch to the TRIP position.<br>Make a list of affected control room systems/loads (MOV's, etc.). |
| | CRS | Enter and direct actions of ARC 004 F-1 "E324 MCC Fdr Bkr Trip".<br>Review load list to determine affected loads (AO 56E.4-2 and/or E-1619). |
| | CRS | Recognize entry into Tech Spec 3.8.1.B for inoperable E-3 EDG.<br>Determine the following are required to meet the 14-day LCO:<br>• Breaker alignment IAW ST-O-054-951-2.<br>• SBO operability verification IAW ST-O-51H-200-2. (Otherwise, a 7-day LCO applies)<br>May also reference LCO 3.8.3 for loss of E-3 EDG auxiliary equipment.<br>Direct PRO to perform ST-O-054-951-2 and ST-O-51H-200-2. |
| | PRO | Perform ST-O-054-951-2 and ST-O-51H-200-2 (as time permits).<br>NOTE: the next event may be initiated before the ST's are completed. |

**Op Test No.:** 1 **Scenario No.:** 2 **Event No.:** 4 **Page:** 4 of 14

**Event Description:** Recirc RPT breaker trip ('A' recirc pump)

**Cause:** Failure of breaker control logic

**Effects:**
1. Alarms:
   - 214 A-3 "A Recirc Pump RPT Trip"
   - 214 B-4 "A Recirc Pump Low Diff Press"
   - 214 C-2 "A Recirc Gen Lockout Trip"
   - 214 C-3 "A Recirc Drive Motor Trip"
2. Trip of the 'A' recirc pump, causing reduction in core flow and reactor power

| Time | Position | Applicant's Actions Or Behavior |
|---|---|---|
| | URO | Recognize and report trip of the 'A' reactor recirc pump and entry into OT-112 "Unexpected/Unexplained Change in Core Flow".<br>Enter the corresponding Alarm Response Cards for alarms 214 A-3 "A Recirc Pump RPT Trip", 214 C-2 "A Recirc Gen Lockout Trip", and 214 C-3 "A Recirc Drive Motor Trip" (as time permits).<br>Perform rapid shutdown of 'B' feed pump as necessary to maintain RPV level in normal band using section 4.3 of SO 6D.2.A-2 "Reactor Feed Pump Shutdown"<br>• Open AO-2139B "Recirc Valve"<br>• Close AO-2147B "Check Valve"<br>• Place the B RFP M/A Station in MANUAL<br>• Close MO-2149B "Discharge"<br>• Verify feed pump responds. |
| | CRS | Enter and execute OT-112 "Unexpected/Unexplained Change in Core Flow".<br>Determine current operating point on Power-Flow Operation Map.<br>Direct monitoring for THI.<br>Direct closing 'A' recirc pump suction valve MO-053A, then re-opening valve after 5 minutes.<br>Direct performing SO 2A.2.A-2 "Recirculation System Shutdown". |
| | URO | Monitor for THI.<br>Close 'A' recirc pump suction valve MO-053A; re-open after 5 minutes.<br>Perform SO 2A.2.A-2 "Recirculation System Shutdown" (as time permits). |

| Op Test No.: | 1 | Scenario No.: | 2 | Event No.: | 4 | Page: | 5 of 14 |
|---|---|---|---|---|---|---|---|

**Event Description:** Recirc RPT breaker trip...(continued)

| Time | Position | Applicant's Actions Or Behavior |
|---|---|---|
| | CRS | Perform AO 2A.1-2 "Recirculation System Single Loop Operation".<br>Refer to Tech Spec 3.4.1 and determine requirements for operating in single loop.<br>NOTE: since OT-112 and Tech Spec 3.4.1 allow up to 12 hours for transitioning to single loop, these actions may be assessed as follow-up questions after the scenario is complete, as determined by the Lead Examiner. |

## Operator Actions

**Op Test No.:** 1 **Scenario No.:** 2 **Event No.:** 5 **Page:** 6 of 14

**Event Description:** Loss of off-site power

**Cause:** Loss of the grid

**Effects:** Reactor scrams, emergency diesels receive start signal, emergency buses transfer to the diesels when available

| Time | Position | Applicant's Actions Or Behavior |
|---|---|---|
| | PRO | Recognize by reporting the loss of off-site power. |
| | URO | Perform scram actions:<br>• Verify control rods are inserting.<br>• Place the mode switch in Shutdown.<br>• Verify APRMs are downscale (when power is available).<br>• Report to the CRS that the mode switch is in Shutdown, control rods are inserting, and the APRMs are downscale (when power is available).<br>• Verify all control rods are fully inserted. |
| | CRS | Recognize by reporting the event is an entry condition for T-100 "Scram".<br>Enter and execute T-100 "Scram".<br>Direct the URO to maintain RPV level between +5 to +35 inches using RCIC and/or HPCI.<br>Direct the URO to stabilize RPV pressure below 1050 psig using SRVs and/or HPCI in CST-to-CST mode.<br>Direct placing torus cooling in service. |
| | PRO | Recognize by reporting that the E-2 diesel is running but the E-22 breaker failed to close (see Event #6 for details).<br>Recognize by reporting that the E-3 and E-4 diesels failed to start (see Event #6 for details). |
| | CRS | Recognize by reporting the loss of off-site power as an entry into SE-11 "Loss of Off-Site Power".<br>Enter and execute SE-11 "Loss of Off-Site Power". |

**Op Test No.:** 1 **Scenario No.:** 2 **Event No.:** 5 **Page:** 7 of 14

**Event Description:** Loss of off-site power ...(continued)

| Time | Position | Applicant's Actions Or Behavior |
|---|---|---|
| | PRO | Perform scram actions:<br>• Verify main turbine trip and generator lockout.<br>• Verify Group I, II, and III isolations and verify SGTS initiation, as applicable.<br>• Verify scram discharge volume vents and drains are closed.<br>• Verify Hydrogen Water Chemistry is isolated.<br>• Verify recirc pumps are tripped.<br>• Monitor Instrument Air header pressure and drywell pressure. |
| | URO | Maintain RPV level +5 to +35 inches using RCIC.<br>Place RCIC in service IAW RRC 13.1-2:<br>• Arm and depress RCIC Manual Initiation Pushbutton.<br>• Verify MO-131, MO-021, MO-132 open.<br>• Verify AO-034 and AO-035 close.<br>• Verify vacuum pump starts.<br>• Verify RCIC system flow rate is 600 gpm.<br>• Place RCIC Manual Initiation Pushbutton in DISARM. |
| | URO/PRO | Place torus cooling in service IAW RRC 10.1-2:<br>• Open MO-039A(B).<br>• Open MO-089A(B).<br>• Verify associated diesel load is ≤ 1400 KW.<br>• Start RHR pump.<br>• Open MO-034A(B) while verifying diesel loading.<br>• Verify flow is 11,500-12,200 gpm for one RHR pump in service.<br>• Verify associated diesel load is ≤ 2300 KW.<br>• Start HPSW pump in each loop to be used for torus cooling.<br>• Start additional RHR and HPSW pumps as necessary/directed (verifying diesel generator load as indicated above).<br>• Verify flow is ≥ 20,000 gpm for two RHR pumps in service.<br>• Direct Equipment Operator to close stay full injection valve(s) for the RHR loop(s) in service. |

**Event Description:** Loss of off-site power ...(continued)

| Time | Position | Applicant's Actions Or Behavior |
|---|---|---|
| | URO | Stabilize RPV pressure below 1050 psig using SRVs and/or HPCI in CST to CST mode for pressure control IAW RRC 23.1-2 Section D:<br>• Open MO-2-23-24 "Cond Tank Return".<br>• Verify closed MO-2-23-19 "To Feed Line".<br>• Start Vacuum Pump.<br>• Throttle OPEN MO-2-23-21 "Full Flow Test" for 3 to 4 seconds.<br>• Simultaneously START Aux Oil Pump AND OPEN MO-2-23-14 "Steam Supply".<br>• Verify HPCI system flow rate is 5000 gpm (see Event #7). |
| | CRS | Direct restoration of instrument nitrogen using either:<br>• Backup Instrument Nitrogen to ADS using SO 16A.7.A-2<br>  o Place SV-8130A and SV-8130B control switches on panel 20C003-03 to RESET and then in AUTO/OPEN.<br>  o Verify open SV-8130A & B.<br>  o Verify PI-8142 "Backup N2" on the 20C003-03 panel is ≥ 85 psig.<br>• T-261 "Placing the Backup Instrument Nitrogen Supply From the CAD Tank in Service". |
| | URO | Restore drywell instrument nitrogen as directed.<br>• If directed to use Backup Instrument Nitrogen to ADS using SO 16A.7.A-2:<br>  o Place SV-8130A and SV-8130B control switches on panel 20C003-03 to RESET and then in AUTO/OPEN.<br>  o Verify open SV-8130A & B.<br>  o Verify PI-8142 "Backup N2" on the 20C003-03 panel is ≥ 85 psig.<br>• If directed to perform T-261 "Placing the Backup Instrument Nitrogen Supply From the CAD Tank in Service":<br>  o Verify closed AO-2969B on panel 20C003-03.<br>  o Dispatch an Equipment Operator to the CAD Building perform step 4.2 (manual valving). |

## Operator Actions

**Op Test No.:** 1 **Scenario No.:** 2 **Event No.:** 6 **Page:** 9 of 14

**Event Description:** E-2 diesel generator breaker auto closure failure

**Cause:** Timer contact in breaker auto close circuit fails to close

**Effects:** Diesel will auto start but the output breaker will not close on the loss of off-site power (breaker can be closed manually).

| Time | | Position | Applicant's Actions Or Behavior |
|---|---|---|---|
| | | PRO | Recognize E-2 Diesel output breaker failure to auto close. |
| | | | Verify that no bus faults exist. |
| | | | Turn on the Sync Selector switch for E-22 output breaker. |
| | CT | | Close the E-22 output breaker. |
| | | | Verify that the bus reenergizes. |
| | | | Inform the CRS that the bus has been restored. |
| | | | Start the 'A' ESW pump. |
| | CT | CRS | Direct the E-2 diesel output breaker closed, if not done. |
| | | | NOTE: this task is critical in that it provides the electrical power required for containment sprays, which will be needed in Event #8. |

## Operator Actions

**Op Test No.:** 1 **Scenario No.:** 2 **Event No.:** 6 **Page:** 10 of 14

**Event Description:** E-3 and E-4 diesel generator auto start failure

**Cause:** Various

**Effects:** E-3 diesel generator cannot be started; E-4 diesel generator fails to start automatically but can be manually started using the quick start pushbutton

| Time | | Position | Applicant's Actions Or Behavior |
|---|---|---|---|
| | | PRO | Recognize E-3 and E-4 diesel generator failure to start. |
| | CT | | Attempt a quick start of the E-3 and E-4 diesels by depressing the associated QUICK START pushbuttons. |
| | | | Recognize E-4 diesel starts and loads its busses. |
| | | | Report the E-3 diesel failed to start from the control room. |
| | | | Dispatch Equipment Operator to the E-3 diesel generator. |
| | CT | CRS | Direct E-3 and E-4 diesels quick started, if not done. |
| | | | NOTE: this task is critical in that it provides the electrical power required for containment sprays, which will be needed in Event #8. |

## Operator Actions

**Op Test No.:** 1 **Scenario No.:** 2 **Event No.:** 7 **Page:** 11 of 14

**Event Description:** HPCI flow controller fails in automatic

**Cause:** Instrument failure

**Effects:** When HPCI is initiated, it will not reach sufficient speed to inject water into the reactor due to the flow controller failure. Operator action will be required in order to inject and/or control RPV pressure with HPCI.

| Time | Position | Applicant's Actions Or Behavior |
|---|---|---|
| | URO | Recognize HPCI is not injecting after system startup. |
| | | Respond to the failure by taking manual control of the HPCI flow controller and raising turbine speed. |
| | | Manually control HPCI turbine speed as necessary to establish and control HPCI injection/RPV level. |
| | | Report the HPCI flow control failure and current status of HPCI to CRS. |

**Op Test No.:** 1 **Scenario No.:** 2 **Event No.:** 8 **Page:** 12 of 14

**Event Description:** Steam leak in the primary containment

**Cause:** Unknown

**Effects:** Various

| Time | Position | Applicant's Actions Or Behavior |
|---|---|---|
| | URO/PRO | Recognize by reporting the rise in drywell pressure.<br>Recognize by reporting the condition as an entry into OT-101 "High Drywell Pressure". |
| | CRS | Enter and execute OT-101 "High Drywell Pressure".<br>Direct drywell cooling maximized as necessary. |
| | URO/PRO | Recognize by reporting drywell pressure > 2 psig as an entry condition for T-101 "RPV Control" and T-102 "Primary Containment Control". |
| | CRS | Enter and execute T-101 "RPV Control".<br>Enter and execute T-102 "Primary Containment Control":<br>For PC/P:<br>• Direct GP-8B, "Manual Isol of RBCCW and DWCW"<br>• Direct torus sprays initiated IAW T-204, "Initiation of Torus Sprays Using RHR"<br>For DW/T:<br>• Direct drywell cooling maximized by performing T-223, "DW Cooler Fan Bypass"<br>• Before drywell temperature reaches 281°F, and when drywell pressure and temperature plot within the safe region of the Drywell Spray Initiation Limit Curve, direct drywell fans shut down and drywell sprays initiated IAW T-204, "Initiation of DW Sprays Using RHR."<br>For PC/G:<br>• Direct CAD placed in service. |
| CT | | |

**Op Test No.:** 1 **Scenario No.:** 2 **Event No.:** 8 **Page:** 13 of 14

**Event Description:** Steam leak in the primary containment...(continued)

| Time | Position | Applicant's Actions Or Behavior |
|---|---|---|
| | URO/PRO | Monitor T-102 parameters (torus temperature, torus level, drywell pressure, torus pressure, drywell temperature) and provide trends to the CRS, as appropriate.<br>Perform GP-8B, "Manual Isolation of RBCCW and DWCW" (no isolation actions are required, however the Operator may modify system flow paths due to RBCCW system pressure/flow oscillations). |
| | URO/PRO | Spray the torus in accordance with T-204-2, "Initiation of Containment Sprays using RHR"<br>• Verify System 1 and 2 Drywell Pressure Permits Containment Spray annunciators (224 D-3, 225 B-3) are lit.<br>• Place keylock switch 10A-S18A(B) in MANUAL OVERRIDE.<br>• Momentarily place switch 10A-S17A(B) in MANUAL.<br>• Open or verify open MO-2-10-39A(B) "Torus Header".<br>• Open or verify open MO-2-10-89A(B,C,D) HPSW Hx Outlet".<br>• Verify load on EDG supplying selected pumps is below 1400 KW.<br>• Start an RHR Pump.<br>• Start a HPSW Pump.<br>• Close or verify closed MO-2-10-34A(B) "Full Flow Test".<br>• Throttle open MO-2-10-38A(B) "Torus Spray" to obtain 1,000 gpm on FI-2-10-136A(B). |
| | URO/PRO | Maximize drywell cooling by performing T-223, "DW Cooler Fan Bypass."<br>• Verify operation on safe side of Figure 1 "DWCW Saturation Curve".<br>• Place all Drywell Cooler Fan control switches to OFF at panel 20C012.<br>• Momentarily place DW Cooler Fans switch 43-S-J165 control switch in BYPASS and let it spring return to NORMAL at panel 20C05A.<br>• Direct Equipment Operator to place Drywell Cooler Fan speed control switches to "SLOW" at their respective MCC in the Reactor Building.<br>• Operate Drywell Cooler Fans to reduce Drywell temperature and pressure. |

**Op Test No.:** 1 **Scenario No.:** 2 **Event No.:** 8 **Page:** 14 of 14

**Event Description:** Steam leak in the primary containment...(continued)

| Time | Position | Applicant's Actions Or Behavior |
|---|---|---|
| | URO/PRO | When directed, shutdown the drywell cooler fans by placing all fan control switches in OFF. |
| CT | URO/PRO | Spray the drywell in accordance with T-204, "Initiation of Drywell Sprays Using RHR."<br>• Verify Recirc Pumps are tripped.<br>• Verify all Drywell coolers are OFF.<br>• Open MO-2-10-31A(B) "DW Spray Inboard".<br>• Open MO-2-10-26A(B) "DW Spray Outboard".<br>• Close or verify closed MO-2-10-34A(B) "Full Flow Test".<br>• Monitor containment pressure.<br>• Adjust spray flow rate by throttling MO-2-10-26A(B) as necessary. |
| | URO/PRO | Place CAD in service when directed. |

**TERMINATION CRITERIA:**

The scenario may be terminated when Primary Containment parameters, RPV pressure and level are stable and under control.

**POST SCENARIO EMERGENCY CLASSIFICATION:**

Classification is an Alert IAW EAL FA1.

# SHIFT TURNOVER

**PLANT CONDITIONS:**

- Unit 2 is at 100% power.

**INOPERABLE EQUIPMENT/LCOs:**

- 2B EHC Pump is blocked OOS for fullers earth filter replacement.

**SCHEDULED EVOLUTIONS:**

- Transfer of 2B RPS to alternate feed to facilitate repairs for a failed trip coil continuity check of the 'B' RPS feeder breaker 52-BC757B.

**SURVEILLANCES DUE THIS SHIFT:**

- None

**ACTIVE CLEARANCES:**

- 2B EHC Pump

**GENERAL INFORMATION:**

- None

## Operator Actions

| Op Test No.: | 1 | Scenario No.: | 3 | Event No.: | 1 | Page: | 1 of 10 |
|---|---|---|---|---|---|---|---|

**Event Description:** Transfer 'B' RPS bus to alternate supply

**Cause:** N/A

**Effects:** Temporary loss of power, which will cause a reactor half scram and half Group 1 and Group 3 isolations

| Time | Position | Applicant's Actions Or Behavior |
|---|---|---|
| | CRS | Direct that 2B RPS power supply be transferred to alternate using SO 60F.6.A-2, "Transferring Reactor Protection System Power Supplies". |
| | PRO | At the 20C017 panel verify:<br>• "Alt. Source Available" light is on,<br>• Control Rod Drive Scram Solenoid Group 1,2,3,4 indicating lights are lit on the 20C015 panel,<br>• Place B RPS M/G Set Alt. Feed Transfer Switch to ALTERNATE position. |
| | URO | Reset the half scram using GP-11.E "Reset Reactor Protection System-Scram Reset:<br>• Place the Scram Reset switch in the Group 1 & 4 position, then in the Group 2 & 3 position.<br>• Verifies the four scram group white lights are lit on the 20C015 and 20C017 panels.<br>• Verifies that the A and B Reactor Auto Scram annunciators are clear.<br>• Places SDV Inboard Valve switch 5A-S14A to OPEN position and verifies the inboard SDV vents and drains are open.<br>• Places SDV Outboard Valve switch 5A-S14B to OPEN position and verifies the outboard SDV vents and drains are open.<br>• Verifies SDV not drained annunciators 210(C-1) and 210 (B-2) for are clear. |

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

**Event Description:** Transfer 'B' RPS bus to alternate supply...(continued)

| Time | Position | Applicant's Actions Or Behavior |
|---|---|---|
| | PRO | Reset the Group 1 and 3 half isolations using GP-8.D "Group 1,2,3 Outboard Half Isolation:<br>• Verifies that the isolation has occurred IAW COL GP-8.D "Required Position" column.<br>• Direct an Equipment Operator to verify all RB and Refuel Floor fans are tripped and to place all fan control switches to OFF.<br>• Place control switches in COL GP-8.D to the position listed in the "PLACE SWITCH TO" column.<br>• Reset Exhaust Radiation Monitors RIS-2-17-452B & D, AND RIS-2-17-458B & D on the 20C010 panel.<br>• Place Outboard Isolation Logic Reset Switch 16A-S33 on the 20C05A panel to the "GRP 2/3" position AND verify "Group 2/3 Outboard Isolation Relays Not Reset" annunciator is clear.<br>• Shutdown SBGT System using SO 9A.2.A "SBGT System Shutdown Following an Automatic Start."<br>• Restore RB and Refuel Floor ventilation using SO 40B.1.A-2 "RB Ventilation System Startup and Normal Operation" |
| | PRO | Direct an Equipment Operator to measure voltage at the 20X040 transformer per step 4.1.6 of SO 60F.6.A-2. |

## Operator Actions

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

**Event Description:** RCIC 250 VDC bus failure

**Cause:** Blown RCIC 250 VDC bus fuses

**Effects:** RCIC is inoperable and unavailable for operation

| Time | Position | Applicant's Actions Or Behavior |
|---|---|---|
| | PRO | Reference ARC 209 (C-2) "2 DA RCIC 250 VDC BUS LO VOLTAGE"<br>Dispatch Equipment Operator to perform ARC Operator Actions:<br>• Check operation of battery chargers 2AD003 and 2CD003 (output voltage)<br>• Check bus feed fuses at Panel 2AD018. |
| | CRS | Refer to Tech Spec 3.5.3 for RCIC being inoperable.<br>Enter Tech Spec 3.5.3.A. Verify HPCI is operable immediately and restore RCIC to operable within 14 days.<br>May also refer to Tech Spec 3.8.7 (for RCIC 250 VDC Distribution System).<br>Requests assistance for troubleshooting/investigation from Shift Manager. |

## Operator Actions

**Op Test No.:** 1 **Scenario No.:** 3 **Event No.:** 3 **Page:** 4 of 10

**Event Description:** Loss of RBCCW

**Cause:** Trip of both the 2A and 2B RBCCW pumps

**Effects:** Loss of cooling to RWCU System and recirc pumps

| Time | Position | Applicant's Actions Or Behavior |
|---|---|---|
| | CRS | Direct entry into ON-113 "Loss of RBCCW" including:<br>• Shutdown of RWCU pumps<br>• Close MO-2-12-068 RWCU Outlet<br>• Monitoring Recirc Pump temperatures on TR-2-2-2-031 on panel 20C021.<br>• Performance of GP-4 "Manual Reactor Scram" when it is determined that both recirc pumps need to be tripped (at approx. 200°F on bearings and seal cavities) |
| | URO/PRO | Shut down running RWCU pumps.<br>Close MO-2-12-068 RWCU Outlet. |
| | PRO | Monitor recirc pump motor bearing and seal cavity temperatures on TR-2-2-2-031 on panel 20C021 |

## Operator Actions

**Op Test No.:** 1 **Scenario No.:** 3 **Event No.:** 4 **Page:** 5 of 10

**Event Description:** Reduce reactor power

**Cause:** Fast power reduction per GP-9-2 driven by ON-113 (Loss of RBCCW)

**Effects:** Reactor power is quickly lowered using recirc flow

| Time | Position | Applicant's Actions Or Behavior |
|---|---|---|
| | CRS | Direct reactor power be lowered IAW GP-9-2 "Fast Power Reduction". |
| | URO | Lower reactor power IAW GP-9-2 "Fast Power Reduction".<br>• Lowers recirc flow until total core flow reaches 61.5Mlb/hr on FR-2-02-3-095 on the 20C05A panel OR An "APRM HIGH" alarm occurs.<br>• If further power reduction is required, then insert GP-9-2 Appendix 1 control rods using the Rod Control Handswitch OR the Emergency In/Notch Override Handswitch on the 20C05A panel. |

## Operator Actions

**Op Test No.:** 1 **Scenario No.:** 3 **Event No.:** 5 **Page:** 6 of 10

**Event Description:** ATWS (hydraulic)

**Cause:** Control rods insert to various positions due to limited Scram Discharge Volume

**Effects:** Requires the crew to take actions to terminate the ATWS, as well as control RPV level/power

| Time | Position | Applicant's Actions Or Behavior |
|---|---|---|
| | CRS | Direct performance of GP-4 "Manual Reactor Scram" |
| | URO | Perform GP-4 "Manual Reactor Scram"<br>• Reduce recirc flow controllers to minimum (20% demand)<br>• Place the reactor mode switch to shutdown position. |
| | PRO | Perform of GP-4 "Manual Reactor Scram"<br>• Transfer house loads using Rapid Response Card RRC 53.1-2. |
| CT | CRS | Direct T-101, RC/Q ATWS actions:<br>• Initiation of ARI<br>• Trip Recirc pumps at least 10 seconds apart<br>• T-216, "Control Rod Insertion by Manual Scram"<br>• T-220, "Drive Rods"<br>• Enter T-117, "Level/Power Control"<br>• SLC injection |

| Op Test No.: | 1 | Scenario No.: | 3 | Event No.: | 5 | Page: | 7 of 10 |
|---|---|---|---|---|---|---|---|

**Event Description:** ATWS (hydraulic)...(continued)

| Time | Position | Applicant's Actions Or Behavior |
|---|---|---|
| | URO | Perform T-101, RC/Q actions: |
| | | • Initiate ARI; report that the scram air header is depressurized. |
| | | • Trip Recirc pumps at least 10 seconds apart. |
| CT | | • Direct an Equipment Operator to perform T-216 steps 4.1 and 4.2 (install jumpers in Cable Spreading Room and Main Control Room to defeat ARI Initiation Logic and bypass all RPS Auto scrams signals). |
| CT | | • Per T-216 (on the 20C05A panel) |
| | | ○ Reset ARI by placing ARI A & B manual pushbutton collars in "Disarm", |
| | | ○ Depress the A & B ARI reset pushbuttons, |
| | | ○ Place the Scram Reset switch 5A-S9 to the "Group 1&4" and "Group 2&3" positions |
| | | ○ Open Scram Discharge Volume inboard and outboard vents and drains. |
| | | • Perform T-220. |
| | CRS | Direct T-117 actions: |
| | | • Inhibit ADS. |
| | | • T-221, "Main Steam Isolation Valve Bypass". |
| CT | | • T-240, "Termination And Prevention Of Injection Into The RPV". |
| | PRO | Perform T-117 actions: |
| | | • Inhibit ADS. |
| | | • Direct Equipment Operator to perform T-221. |
| CT | | • Perform T-240: terminate and prevent injection from all injection sources except RCIC, SLC and CRD; control RPV level below –60" and within the specific RPV level band directed by the CRS. |
| | | ○ Place HPCI Aux. Oil Pump in the "Pull to Lock " position. |
| | | ○ Press "Emergency Stop" for all reactor feed umps |
| | | ○ Close reactor feed pump discharge valves MO-2149A,B,C |
| | | ○ Verify closed MO-8090 "C RFP Discharge Bypass" |

## Operator Actions

**Op Test No.:** 1 **Scenario No.:** 3 **Event No.:** 6 **Page:** 8 of 10

**Event Description:** Standby liquid control pump trips

**Cause:** SLC Pump first placed into service trips on overcurrent

**Effects:** Standby SLC Pump must be placed into service manually to mitigate ATWS

| Time | Position | Applicant's Actions Or Behavior |
|---|---|---|
| | URO | Recognize that the Standby Liquid Control (SLC) Pump placed into service has tripped.<br>Place the standby SLC Pump in service using keylock control switch on the 20C05A panel. |

## Operator Actions

**Op Test No.:** 1 **Scenario No.:** 3 **Event No.:** 7 **Page:** 9 of 10

**Event Description:** Drywell vent valve (AO-2509) fails to isolate

**Cause:** Group 3 isolation signal fails to close AO-2509 on RPV low level during scram

**Effects:** AO-2509 stays open potentially affecting Secondary Containment isolation capability

| Time | Position | Applicant's Actions Or Behavior |
|---|---|---|
| | URO/PRO | Recognize that AO-2509 did not auto close on Group 3 signal. |
| | | Close AO-2509 by placing valve control switch to close position on panel 20C484B. |

## Operator Actions

**Op Test No.:** 1 **Scenario No.:** 3 **Event No.:** 8 **Page:** 10 of 10

**Event Description:** 'A' EHC pump trips / loss of turbine bypass valves

**Cause:** 'A' EHC pump trips on overcurrent condition

**Effects:** Complete loss of Turbine EHC System causing a turbine trip and bypass valve to close

| Time | Position | Applicant's Actions Or Behavior |
|---|---|---|
| | URO/PRO | Recognize turbine trip condition.<br>Recognize loss of only available EHC Pump. |
| | Crew | Recognize complete loss of EHC System and eventual loss of turbine bypass valves for RPV pressure control.<br>Direct RPV pressure control using SRVs |
| | URO/PRO | Controls RPV pressure below 1050 psig using SRVs<br>OR to stay on safe side of T-102 Curve T/L-1 "SRV Tail Pipe Limit" if Torus water level is high out of normal band. |
| | URO/PRO | Place Torus cooling in service using RRC 10.1-2<br>• Open MO-2-10-39A(B)<br>• Open MO-2-32-89A (B, C, or D)<br>• Start a HPSW Pump<br>• Start an RHR Pump<br>• Open MO-2-10-34A(B)<br>• Place additional pumps in service as required |

**TERMINATION CRITERIA:**

The scenario may be terminated when the crew has control of RPV power and level using T-240 "Termination and Prevention of Injection into the RPV" and the crew begins draining the Scram Discharge Volume per T-216 in order to attempt another scram to insert control rods.

**POST SCENARIO EMERGENCY CLASSIFICATION:**

Classification is a Site Area Emergency IAW EAL MS4 "Auto and Manual Scram NOT Successful".

# SHIFT TURNOVER

## PLANT CONDITIONS:

- Approximately 76% power with a GP-2 Startup in progress
- GP-2 is complete through step 6.3.60
- Control rod sequence is completed through Group 30
- RE's are currently evaluating the rod pattern changes and will provide an updated REMA following shift turnover
- The Unit 2 Turbine Building 116' Cardox Tank is being refilled
- A routine Diesel Fuel Oil delivery is expected this shift

## INOPERABLE EQUIPMENT/LCOs:

- 'B' RHR Pump out of service for motor replacement; day 1 of TSA (LCO 3.5.1). Expected to be returned to service in 2 days

## SCHEDULED EVOLUTIONS:

- None

## SURVEILLANCES DUE THIS SHIFT:

- Perform RT-O-01D-402-2, "Master Trip Solenoid Valves Operability Test"

## ACTIVE CLEARANCES:

- "B" RHR Pump

## GENERAL INFORMATION:

- Complete the Master Trip Solenoid Valves RT

## Operator Actions

| Op Test No.: | 1 | Scenario No.: | 4 | Event No.: | 1 | Page: | 1 of 9 |
|---|---|---|---|---|---|---|---|

**Event Description:** Main turbine master trip solenoid valves routine test

**Cause:** N/A

**Effects:** N/A

| Time | Position | Applicant's Actions Or Behavior |
|---|---|---|
| | CRS | Direct PRO to perform RT-O-01D-402-2, "Master Trip Solenoid Valves Operability Test". |
| | PRO | Perform RT-O-01D-402-2, "Master Trip Solenoid Valves Operability Test":<br>• Review RT<br>• Place the Master Trip Test Selector switch to TRIP A<br>• Verify "Test A" lamp if OFF<br>• Release and place Master Trip Test Selector switch to RESET<br>• Verify "Test A" lamp if ON<br>• Place the Master Trip Test Selector switch to TRIP B<br>• Verify "Test B" lamp if OFF<br>• Release and place Master Trip Test Selector switch to RESET<br>• Verify "Test B" lamp if ON<br>• Complete RT paperwork |
| | CRS | Review RT for completeness/satisfactory results. |
| | URO | Monitor plant parameters/assist as directed. |

## Operator Actions

| Op Test No.: | 1 | Scenario No.: | 4 | Event No.: | 2 | Page: | 2 of 9 |
|---|---|---|---|---|---|---|---|

**Event Description:** SBO line failure

**Cause:** Differential overcurrent trip of transformer 00X019

**Effects:**
1. Alarm: 006 G-2 "SBO Circuit Trouble"
2. Trip of the SBO-1005 breaker

| Time | Position | Applicant's Actions Or Behavior |
|---|---|---|
| | PRO | Recognize and report alarm 006 G-2, "SBO Circuit Trouble" and enter the corresponding Alarm Response Card.<br>Dispatch Equipment Operator to the SBO switchgear. |
| | CRS | Review TRM 3.18; determine the SBO line must be returned to service within 15 days. |

**Op Test No.:** 1 **Scenario No.:** 4 **Event No.:** 3 **Page:** 3 of 9

**Event Description:** Loss of extraction steam to 3A and 4A feedwater heaters

**Cause:** AO valves supplying the heaters fail closed

**Effects:**
1. No alarms
2. Reduced feedwater temperature; rising reactor power

| Time | Position | Applicant's Actions Or Behavior |
|---|---|---|
| | URO | Recognize rising reactor power, inform CRS and announce entry into OT-104 "Positive Reactivity Insertion". |
| | URO/PRO | Investigate cause of power rise.<br>Recognize lowering feedwater temperatures, inform CRS.<br>Recognize loss of extraction steam to feedwater heaters, inform CRS. |
| | CRS | Enter/direct actions IAW OT-104 "Positive Reactivity Insertion".<br>• Monitor position on Figure 1 of OT-104.<br>• Direct the insertion of control rods as required to reduce power to 10% below the pre-transient level, IAW GP-9-2 "Fast Reactor Power Reduction".<br>• Direct troubleshooting of feedwater heater problem. |
| | URO | Reduce power by driving GP-9-2 rods as required to reduce power to at least 10% below the pre-transient power level (to 66% power). |
| | CRS | Evaluate position on Figure 1 of OT-104 to determine whether Tech Spec action is required to implement Thermal Limit penalties, recover FW heating, or drop power <25%.<br>Determine feedwater heating is asymmetric due to > 5°F feedwater temperature ΔT.<br>Determine need to perform AO 6.7-2 "Asymmetric Feedwater Temperature Operation" within two hours to comply with Tech Specs 3.2.1, 3.2.2 and 3.2.3. |
| | PRO | Inform Power Systems Director of the power reduction.<br>Monitor plant parameters (especially feedwater flow status) and assist as necessary.<br>Assist with troubleshooting feedwater heaters as directed. |

**Op Test No.:** 1 **Scenario No.:** 4 **Event No.:** 4 **Page:** 4 of 9

**Event Description:** Failure of a vacuum transmitter / RPS half scram & reset

**Cause:** PT-2-5-11C fails resulting in an RPS half scram

**Effects:**
1. Alarms:
   - 210 D-1 "Condenser Lo Vacuum Trip"
   - 211 B-1 "'A' Channel Reactor Auto Scram"
2. "A" RPS channel half scram; no rod motion

| Time | Position | Applicant's Actions Or Behavior |
|---|---|---|
| | URO/PRO | Recognize and report alarms 210 D-1 "Condenser Lo Vacuum Trip" and 211 B-1 "'A' Channel Reactor Auto Scram" and enter the corresponding Alarm Response Cards.<br>Verify actual condenser vacuum is normal. |
| | CRS | Direct troubleshooting of failed instrument.<br>Refer to Tech Spec 3.3.1.1 to determine that a trip must be inserted in "A2" RPS within 12 hours.<br>Determine need to initiate GP-25 to insert a redundant trip into the "A2" RPS logic using Appendix 1 (this procedure is not required to be performed for 12 hours) OR,<br>Determine need to defeat the half scram IAW AO 60F.2-2 "Defeat of an RPS Half Scram". |
| | PRO | Direct Equipment Operator to inspect PT-2-5-11C. |
| | CRS | When report is received that PT-2-5-11C was accidentally bumped (and prompted to reset RPS), direct RPS reset IAW GP-11E. |
| | URO | Reset half scram IAW GP-11.E.<br>• Place the Scram Reset switch to the Group 1 & 4 position, then to the 2 & 3 position; verify scram is reset.<br>• Place the SDV Inboard Vent and Drain Valves switch to the OPEN position; verify the valves indicate open.<br>• Place the SDV Outboard Vent and Drain Valves switch to the OPEN position; verify the valves indicate open. |

**Op Test No.:** 1 **Scenario No.:** 4 **Event No.:** 5 **Page:** 5 of 9

**Event Description:** Steam leak in the Turbine Building

**Cause:** "D" MSL weld cracks

**Effects:**
1. Alarms:
   - 218 B-5 "Vent Exh Stack Rad Monitor Hi/Trouble A"
   - 218 C-5 "Vent Exh Stack Rad Monitor Hi/Trouble B"
2. Initially, alarms will be received indicating vent stack problems and then will progress to Group 1 isolation conditions.
3. Subsequent Group 1 isolation due to high steam line flow, results in a reactor scram signal on MSIV closure.

| Time | Position | Applicant's Actions Or Behavior |
|---|---|---|
| | URO/PRO | Recognize and report alarms 218 B-5 "Vent Exh Stack Rad Monitor Hi/Trouble A" and 218 C-5 "Vent Exh Stack Rad Monitor Hi/Trouble B" and enter the corresponding Alarm Response Cards.<br>Monitor RI-2979 to verify a valid signal.<br>Enter ON-104, "Vent Stack High Radiation". |
| | CRS | Enter ON-104 "Vent Stack High Radiation" and direct search for source of high vent exhaust radiation. |
| | URO/PRO | Recognize and report High Area Temperature alarm and potential T-103 (Secondary Containment Control) entry. |
| | PRO | Monitor area temperatures and determine there is a leak in the turbine building and there is NOT a T-103 entry.<br>Recognize by reporting the Group 1 alarms and failure of the Group 1 isolation to occur. |
| | CRS | Direct a reactor scram and closure of the MSIVs.<br>Enter T-100, "Scram". |
| | URO | Attempt to scram the reactor and report the mode switch failure (see Event #6 for reactor mode switch failure). |
| | PRO | Attempt to manually isolate the MSIVs.<br>Report inability to isolate the 'D' main steam line to the CRS (see Event #7 for Group 1 auto isolation failure / 'D' MSL failure to isolate). |

**Op Test No.:** 1 **Scenario No.:** 4 **Event No.:** 6 **Page:** 6 of 9

**Event Description:** Reactor mode switch failure / B RPS auto scram channel failure

**Cause:** Mode selector switch (MSS) contacts do not make up, MSS remains in "Run", 'B' RPS channel does not trip

**Effects:**
1. Alarms 211 D-1 "'A' Channel Reactor Manual Scram" and E-1 "'A' Channel Reactor Manual Scram" are NOT received.
2. Manual pushbuttons or ARI will scram the reactor.

| Time | Position | Applicant's Actions Or Behavior |
|---|---|---|
| | URO | Initiate scram actions by placing the mode selector switch in Shutdown.<br>Recognize by reporting that the control rods are not inserting and APRMs are NOT downscale. |
| CT | | Press manual scram pushbuttons or manually initiate ARI.<br>Verify and report rods are inserting and APRMs are downscale.<br>Perform scram actions:<br>• When RPV level begins to recover, "Emergency Stop" RFPTs.<br>• Depress "SLOW RAISE" or "FAST RAISE" on the RFPT to remain in service.<br>• Close all RFP discharge valves and open 'C' RFP discharge bypass valve.<br>• Establish and maintain RPV level control with feedwater.<br>• Verify all control rods are inserted.<br>• Verify RPV pressure, trend, and status of EHC.<br>• Notify health physics of changing plant conditions. |
| | CRS | May exit T-100 and enter T-101 based upon scram condition with power greater than 4% (MSS failure). |
| CT | | Direct the Manual Scram Pushbuttons depressed or ARI initiated, as necessary.<br>Direct level maintained +5 to +35 inches.<br>Direct restoration of drywell instrument nitrogen IAW GP-8.E "Primary Containment Isolation Bypass".<br>Direct a reactor depressurization to 500-600 psig with bypass valves or SRVs (if time allows; RPV is depressurizing slowly through the break).<br>NOTE: depending on when a reactor depressurization is directed, relative to the fuel failure, the CRS must direct use of the SRVs if MSL radiation levels are above the Group 1 isolation setpoint. |

| Op Test No.: | 1 | Scenario No.: | 4 | Event No.: | 6 | Page: | 7 of 9 |
|---|---|---|---|---|---|---|---|

**Event Description:** Reactor mode switch failure / B RPS auto scram channel failure...(continued)

| Time | Position | Applicant's Actions Or Behavior |
|---|---|---|
| | URO | Restore and maintain RPV level +5 to +35 inches.<br>Initiate a reactor depressurization, as directed, using bypass valves or SRVs.<br>• For bypass valves, reduce EHC pressure setpoint or use the Bypass Jack.<br>• Operate SRVs IAW RRC 1G.2-2 "Relief Valve Manual Operation During A Plant Event".<br>If non-ADS SRVs (D, E, F, H, J, L) are used, recognize SRV failure (see Event #8). |
| | PRO | Perform scram actions.<br>• Transfer 13 KV house loads.<br>• Trip main turbine when generator load drops to ~ 50 MWE.<br>• Verify main generator lockout.<br>• Verify Group II and III isolations and SGTS initiation.<br>• Verify scram discharge volume vents and drains are closed.<br>• Verify hydrogen water chemistry is isolated.<br>• Verify both recirc pumps speed have runback to 30%.<br>• Monitor instrument air header pressure and drywell pressure.<br>• Attempt to restore drywell instrument nitrogen IAW GP-8.E "Primary Containment Isolation Bypass" (see Event #8). |

**Op Test No.:** 1 **Scenario No.:** 4 **Event No.:** 7 **Page:** 8 of 9

**Event Description:** Group I failure to auto isolate (manual works) / failure of the "D" MSL to manually isolate

**Cause:** Failure of isolation logic to actuate; 'D' MSL will not isolate manually

**Effects:**
1. No alarms
2. Group 1 failure to isolate, manual isolation will work on all MSL with the exception of the 'D' line.
3. Reactor scram signal from MSIV closure will not occur until MSIVs closed manually.

| Time | | Position | Applicant's Actions Or Behavior |
|---|---|---|---|
| | | PRO | Recognize by reporting indications of major steam leak and the MSIVs failing to close. |
| | CT | | Close MSIVs with hand switches, recognize and report the 'D' main steam line failed to manually isolate. |
| | CT | CRS | Direct manual closure of the MSIVs, as necessary.<br>Direct the performance of AO 1A.2-2, "Closing Stuck Open MSIVs".<br>Direct a GP-15 evacuation of the Turbine Building. |
| | | PRO | Depress and latch the TEST pushbuttons for 'D' inboard and outboard MSIVs IAW AO 1A.2-2, "Closing Stuck Open MSIVs".<br>Direct an Equipment Operator perform AO 1A.2-2 to close the MSIVs.<br>Perform a GP-15 evacuation of the Turbine Building. |
| | | URO/PRO | Recognize and report alarms 218 B-4 "Vent Exh Stack Rad Monitor Hi-Hi A" and 218 B-5 "Vent Exh Stack Rad Monitor Hi-Hi B".<br>Announce T-104 "Radiation Release" entry. |
| | | CRS | Enter/direct actions IAW T-104 "Radiation Release".<br>• Initiate dose assessment.<br>• Continue to attempt to isolate the MSIVs.<br>• Continue to take action IAW T-101 "RPV Control" to shutdown and depressurize the plant.<br>• When the release cannot be maintained below the General Emergency level as indicated by dose assessment reports, then direct T-112, "Emergency Blowdown". |

**Op Test No.:** 1 **Scenario No.:** 4 **Event No.:** 8 **Page:** 9 of 9

**Event Description:** Unable to restore drywell instrument nitrogen / loss of non-ADS SRVs

**Cause:** Drywell nitrogen not available

**Effects:** Non-ADS SRVs not available for reactor pressure control and/or depressurization

| Time | | Position | Applicant's Actions Or Behavior |
|---|---|---|---|
| | | PRO | Recognize by reporting that while attempting to restore drywell instrument nitrogen, the valves did not reopen. |
| | | CRS | Direct alternate methods of supplying nitrogen to the SRVs.<br>Determine that release rates are going to reach General Emergency level by plant indications or outside reports. |
| | CT | | Emergency depressurize the reactor IAW T-112 'Emergency Blowdown".<br>Direct PRO to open all ADS SRVs.<br>Direct URO to control condensate injection to restore and maintain RPV level +5 to +35 inches. |
| | | URO | Prevent uncontrolled condensate injection. |
| | CT | PRO | Take the switches to OPEN on all ADS valves. |

**TERMINATION CRITERIA:**

The scenario may be terminated when 5 SRVS are open, the RPV is depressurized, and RPV level is under control.

**POST SCENARIO EMERGENCY CLASSIFICATION:**

Classification is a General Emergency IAW EAL RG1.