**Facility: Perry** **Scenario No.: 1 (spare)** **Op-Test No.: 2007-01**

**Examiners:** _____ **Operators:**_____

_____ _____

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**Initial Conditions:** **Completed repairs of Reactor Recirc FCV HPU leak in Drywell. Power ascension in progress at 9%, IOI-3 step 4.3.6, and 4.3.10.d, rods at step 28 gangs 40/39 at 8. Turbine is at 1800 RPM with Turbine vibration trips bypassed per RSE. SVI M56-T5417 is in progress, along with fuel moves in FHB to comply with NRC B.5.B. FHB integrity is established. Severe Thunderstorm watch is in affect for Lake County. OPRM's are Inoperable. Division 1 igniters Inoperable for SVI-M56-T5417, maintenance at step 5.1.1.30.**

**Turnover:** **Raise power with rods per IOI-3 and Synch the Generator.**

| Event No. | Malf. No. | Event Type* | Event Description |
|---|---|---|---|
| 1 | | R(atc) | Withdraw Rods to get at least 1.5 bypass valves open |
| 2 | | N(bop) | Synch the Generator |
| 3 | trg 1, imf 1e31n040a | I/C (bop) | RWCU Pump room instrument fails high, TS 3.3.6.1 |
| | mv05:1g33f 004 | | G33F0004 Fails to Auto Isolate, Operator isolates TS 3.6.1.3 |
| 4 | trg 5 | I/C (atc) | High Vibrations Main Turbine Bearing, Turbine fails to trip. Operator trips Main Turbine. Enter ONI-N32 Turbine Trip |
| | cb03:1n514 mcs | | Generator Field Breaker Fails to open, Operator opens Field Breaker |
| 5 | trg 10 | M(all) | Loss of RFBP's on hot surge tank level instrument failure. No Feedwater |
| | ry02 div 2 rp03 ari | I/C (bop) | PEI-B13 ATWS, Failure of RPS B and ARI to Scram, Pull Scram Fuses PEI-SPI-1.1. |
| 6 | bs01:692b/f, rc03 5 min. | I/C(atc) | RCIC Level 2 instrument failure, Ops arms and depresses to start RCIC. RCIC will trip 5 minutes after injection. High Pressure injection not available. |
| | cb04:hpcs pump | I/C (bop) | HPCS Pump will not start automatically, start with switch. |
| 7 | | | Emergency Depressurize on Level, PEI-B13 ED. If all rods inserted can restore level with HPCS and ED is not required. |

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

**Op-Test No.: 2007-01** **Scenario No.: 1** **Page 1 of 20**

**Event Description: Event 1** Withdraw Rods to get at least 1.5 bypass valves open.

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | **SRO** | IOI-3 step 4.3.6 has power increased until bypass valve 2 is at least 50% open. Directs RO to withdraw rods to meet desired power level. |
| | **ATC** | Withdraws Rods per US direction, Should withdraw gangs 40, 39, and 42. |
| | | Selects Correct Rod or Gang. Gang 40 Rods are 10-19, 18-51, 50-43 and 42-11. Gang 39 Rods are 18-11, 10-43, 42-51, and 50-19. Gang 42 Rods are 18-27, 26-43, 42-35 and 34-19. |
| | | Withdraws Rods from position 8 to position 12 by depressing withdraw pushbutton. |
| | | Monitors Reactor Power and Bypass Valve position. Pulling Rods to a Bypass valve position of one and half bypass valves open. |
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Event Description: **Event 2** Synch the Generator

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | **SRO** | When at desired power directs BOP operator to synch generator. |
| | **BOP** | Synchs generator per IOI-3 step 4.3.10.d to 4.3.27 |
| | | 4.3.10.d CLOSE the GEN FIELD BREAKER. |
| | | 4.3.10.e CLOSE the EXCITER FIELD BREAKER. |
| | | 4.3.10.f OBSERVE indication of voltage on GEN. FIELD VOLTS. |
| | | 4.3.10.g OBSERVE indication of voltage on all three phases of GEN VOLTS. |
| | | 4.3.11 ADJUST the MAN. VOLT. ADJUST to increase generator terminal voltage to 22 kV and a Main Transformer output voltage of 345 kV. |
| | | 4.3.12.a ADJUST the AUTO. VOLT. ADJUST to Zero the REG TRANSFER DIFF VOLTS. |
| | | 4.3.12.b TRANSFER the VOLTAGE REGULATOR to the AUTO position. |
| | | 4.3.13 MATCH the incoming voltage with running voltage using the AUTO. VOLT. ADJUST. |
| | | 4.3.15 TURN the SYNC. SELECT. SWITCH to the position of the first GEN BRKR to be closed as directed by the switching order. S-611-PY-TIE |
| | | 4.3.16 ADJUST turbine speed UNTIL the synchroscope pointer is rotating slowly clockwise. |
| | | 4.3.17 WHEN the synchroscope pointer is rotating clockwise AND is approximately the width of the pointer before the 12 o'clock position, THEN CLOSE GEN BRKR. S-611-PY-TIE |
| | | 4.3.18 INCREASE the turbine LOAD SELECTOR UNTIL Bypass Valve 1 is fully closed. |
| | | 4.3.19 SELECT OFF on the SYNC SELECTSWITCH. |
| | | 4.3.20 ADJUST Main Generator voltage to bring generator megavars to zero. |
| | | 4.3.22 TURN the SYNC SELECT SWITCH to the position for the second GEN BRKR to be closed S-610-PY-TIE. |
| | | 4.3.23 VERIFY synchronization |
| | | 4.3.24 CLOSE the second GEN BRKR. S-610-PY-TIE. |
| | | 4.3.25 PLACE the SYNC SELECT SWITCH in OFF. |
| | | 4.3.27 SELECT turbine STARTING RATE-SLOW. |
| | **NRC** | Recommend after step 4.3.27 is complete to insert **trigger 1,** Leak Detection instrument failure. |

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**Event Description: Event 3** RWCU Pump room instrument fails high, TS 3.3.6.1. G33F0004 Fails to Auto Isolate, Operator isolates. TS 3.6.1.3

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | **Crew** | RWCU Pump Rm A High Temperature. ARI-1H13P680-1 C5 |
| | **BOP** | Investigates Division 1 NUMAC module to determine temperature**, 359 degrees failed instrument. All other temps are normal. E31N040A is failed high for RWCU Pump Room A. Division 2 instruments read normal.** |
| | **ATC/BOP** | Verify RWCU Trips and isolates, **1G33F0004 fails to isolate in auto** |
| | **BOP** | Closes 1G33F0004 with switch at back panel. |
| | **SRO** | Tech Specs 3.3.6.1.4.d for instrument and 3.6.1.3 for CTMT penetration. ORM 6.3.1 chemistry informed. |
| | **SRO** | 4 hours to close and deactivate 1G33F0004, per TS 3.6.1.3. TS for 3.3.6.1.4.d is met, place in trip in 24 hours. |
| | **BOP/ATC** | May dispatch NLO to deactivate G33 valve. Contact Chemistry to inform of loss of RWCU Filter Demins. |
| | **SRO** | May enter PEI-N11 CTMT Leakage Control until instrument failure is identified. |
| | | Directs Check of Ventilation Systems, FHB, Intermediate Bldg, Aux Bldg. |
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| | **NRC** | **When Ready can move on to trigger 5, Main Turbine High Vibration** |
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**Event Description: Event 4** High Vibrations Main Turbine Bearing, Turbine fails to trip. Operator trips Main Turbine. Enter ONI-N32 Turbine Trip. Generator Field Breaker Fails to open, Operator opens Field Breaker

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | **ATC** | Report high vibrations on Main Turbine bearings 5 and 6 of 13.5 and 14 mils. Refers to ARI, ARI direction is to trip Main Turbine. |
| | **SRO** | Enter ONI-N32, concurs with Main Turbine Trip |
| | **ATC** | DEPRESS the TURBINE TRIP pushbutton to trip the main turbine. |
| | | VERIFY the following: |
| | | MAIN STOP VALVEs close. CONTROL VALVEs close. COMBINED INTERMEDIATE VALVEs close. |
| | | GEN BRKRs trip S-610 and S-611, and GEN FIELD BREAKER trips. Generator Field Breaker **Fails to trip**, **Operator Opens breaker**. |
| | **ATC** | 4.5 VERIFY the TURNING GEAR OIL PUMP is running. |
| | **BOP** | 4.7 CONFIRM all positive air assisted check valves are closed. |
| | | EXST TO HEATER 6A(B) NON-RETURN CHK V, 1N36-F140A(B) |
| | | EXST TO HEATER 5A(B) NON-RETURN CHK V, 1N36-F455A(B) |
| | | EXST TO HEATER 4 NON-RETURN CHK V, 1N36-F250A(B) |
| | | EXST TO HEATER 3A(B) NON-RETURN CHECK V,1N36-F390A(B) |
| | | EXST TO HEATER 3 NON-RETURN CHECK V, 1N36-F460 |
| | | EXST TO 1ST STAGE NON-RETURN CHK V, 1N36-F465 |
| | | EXST TO ST SEALS NON-RTN CHK V's, 1N33-F150 and 1N33-F035 |
| | **ATC** | 4.8 WHEN the turbine is in coastdown, THEN VERIFY the following pumps automatically start: MOTOR SUCTION PUMP and Bearing Lift Pumps 2, 3, 4, 5, 6, 7, 8, 9, and 10. |
| | | 4.9 MONITOR turbine vibration during coastdown. |
| | | 4.10 MONITOR turbine bearing metal temperatures during coastdown |
| | | 4.11 ADJUST the MAIN TURB LUBE OIL TEMP CONTROL to 90°F. |
| **NRC** | | Operator may start oil pumps. Pumps will auto start when turbine speed is low enough for low discharge pressure from shaft driven oil pump. |
| | **DRIVER** | After Turbine Trip slowly lower vibration readings |
| **NRC** | | When ready move on to **trigger 10, loss of Feedwater** |

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**Event Description: Event 5** Loss of RFBP's on Hot Surge Tank Level instrument failure. No Feedwater.

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | **ATC** | Hot Surge Tank Level Low Alarm, Hot Surge Tank Level Instrument Fails Low. Recognizes loss of RFBP's and Feedwater loss, Scrams the Reactor |
| | **SRO** | Concurs with Reactor Scram or directs Reactor Scram. |
| | **ATC** | Scram hard card actions, Arms and Depresses RPS pushbuttons, places Mode Switch in shutdown, and Arms and Depresses ARI pushbuttons. |
| | **Crew** | Enter PEI B13 NON ATWS on Level 3 and power |
| | **SRO** | PEI-B13 Non ATWS actions, Verifies RPS, ARI and Mode switch in Shutdown and directs Hydrogen Analyzers started. |
| | **SRO** | Directs Stabilize Level and Pressure |
| | **BOP** | Start Hydrogen Analyzers. |
| | | IF ESW PUMP is NOT running, THEN TAKE ESW PUMP, 1P45C001 control switch to START. |
| | | IF ECC PUMP is NOT running, THEN TAKE ECC PUMP, 1P42-C001 control switch to START. |
| | | PLACE the COMB GAS H2 ANAL SAMPLE VALVES keylock switch in OPEN. |
| | | VERIFY the MODE & FUNCTION SELECTOR, 1M51-HS3 is in SAMPLE. |
| | | PLACE the SYSTEM FUNCTION SW, 1M51-HS1 in ON |
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| | **SRO** | **All rods inserted** transition back to NON-ATWS, direct SLC pumps shutdown. |
| | **BOP/ATC** | Shutdown SLC Pumps |
| | **SRO** | Directs a level band of 185 to 215 inches using HPCS |
| | **ATC/BOP** | Restore level to band using HPCS. **Contingent Critical Task 4 for all rods in.** |

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**Event Description: Event 5** PEI-B13 ATWS, Failure of RPS B and ARI to Scram, Pull Scram Fuses PEI-SPI-1.1 or insert rods per PEI-SPI 1.3.

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | **SRO** | Enter PEI-B13 ATWS, Power Leg Actions directs Trip of Reactor Recirc pumps. |
| | **ATC** | Trips Recirc Pumps by opening the 1 and 2 breakers for Recirc pumps. |
| | **SRO** | Directs BOP to Inhibit ADS and Inject SLC |
| | **BOP** | Inhibit ADS, places both keylock switches for ADS to inhibit. **Critical Task 2.** |
| | | Inject Boron prior to 110 in pool, places PLACE both of the following keylock switches to ON: SLC PUMP A 1C41C001A and SLC PUMP B 1C41C001B |
| | | CONFIRM the following: Both SLC Pump suction valves open. |
| | | Both SLC Pumps start. |
| | | Both SQUIB CONTINUITY indicating lights deenergize. |
| | | SLC Pump discharge pressures are slightly above reactor pressure as indicated on SLC PUMP DISCH PRESS. |
| | | Inform SRO that **SLC is not injecting low discharge pressure.** Direct PEI-SPI 1.8 Alternate Boron Injection. |
| | **SRO** | Direct Rod Insertion per PEI-SPI section 1 |
| | **ATC** | Recognizes the need to Pull Scram Fuses, directs the BOP operator to Pull Fuses per PEI-SPI 1.1. **Critical Task 1** |
| | **BOP** | **IF** any SCRAM SOL VLVS status lights are energized, **THEN INSERT** a scram as follows: |
| | | **REMOVE** the following fuses to open scram valves: |
| | | H13-P694 B F22 (F18D), H13-P694 B F23 (F18H), H13-P692 A F30 (F18B), H13-P692 A F31 (F18F) |
| | | H13-P691 A F25 (F18A), H13-P691 A F26 (F18E), H13-P693 B F30 (F18C), H13-P693 B F31 (F18G) |
| | | H13-P692 A F17 (F17B), H13-P691 A F20 (F17A) |
| | | |
| | **SRO** | Insert Rods top priority, if rods are inserted can use HPCS to restore level. |
| | **SRO** | If all rods are inserted, Exit ATWS to Non ATWS. Terminate Boron in override step on ATWS chart. |

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**Event Description: Event 5** PEI-B13 ATWS, Failure of RPS B and ARI to Scram, Pull Scram Fuses PEI-SPI-1.1 or insert rods per PEI-SPI 1.3.

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | **SRO** | Direct Rod Insertion per PEI-SPI section 1 |
| | **ATC** | Inserts Control Rods per PEI-SPI 1.3. **Critical Task 1.** |
| | | **Have Bop Operator PLACE** LO POWER SET PT DIV 1 BYPASS C11A-S4 keylock switch in BYPASS. |
| | | **Have BOP Operator PLACE** LO POWER SET PT DIV 2 BYPASS C11A-S3 keylock switch in BYPASS. |
| | | **VERIFY** CRD HYDRAULICS FLOW CONTROL C11-R600 is in MANUAL. |
| | | **ADJUST** CRD HYDRAULICS FLOW CONTROL C11-R600 output to 100. |
| | | **CLOSE** CRD DRIVE PRESS CONTROL VALVE C11-F003. |
| | | **DEPRESS** and **HOLD** the IN TIMER SKIP pushbutton. |
| | | **SELECT** the desired Control Rod. |
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| | **SRO** | Insert Rods top priority, if rods are inserted can use HPCS to restore level. |
| | **SRO** | If all rods are inserted, Exit ATWS to Non ATWS. Terminate Boron in override step on ATWS chart. |

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**Event Description: Event 6** ATWS Level Leg, RCIC Level 2 instrument failure, Ops arms and depresses. RCIC will trip 5 minutes after injection. High Pressure injection not available. HPCS Pump will not start automatically, start with switch.

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | **SRO** | Directs Terminate and Prevent per 5.1 and 5.2. directs preps per 6.1 and 6.2, and directs MSIV open per 2.3 and 2.8. Directs bypass of low power setpoint. |
| | **BOP/ATC** | Terminate and Prevent per 5.1 and 5.2. |
| | | **TERMINATE** and **PREVENT** HPCS injection as follows:<br>**HOLD** HPCS INJECTION VALVE E22-F004 switch in CLOSE. |
| | | **THEN ARM** and **DEPRESS** HPCS MANUAL INITIATION E22A-S2 pushbutton to obtain white HPCS SEAL IN RESET light. |
| | | **THEN RELEASE** HPCS INJECTION VALVE E22-F004 control switch.<br>**Critical Task 3** |
| | | HPCS Pump Fails to start, Operator starts Pump. |
| | | **TERMINATE** and **PREVENT** LPCS and LPCI A injection as follows: **PLACE** BUS XH11 LOCA BYPASS keylock switch in BYPASS.<br>**HOLD** the following switches in CLOSE: LPCS INJECTION VLV E21-F005 and LPCI A INJECTION VALVE E12-F042A |
| | | **ARM** and **DEPRESS** LPCS & LPCI A MANUAL INITIATION E21A-S9 pushbutton to obtain the white LPCS & LPCI A SEAL IN RESET light. |
| | | **Terminate** and **PREVENT** LPCI B and LPCI C injection as follows: **PLACE** BUS XH12 LOCA BYPASS keylock switch in BYPASS. **HOLD** the following switches in CLOSE: LPCI B INJECTION VALVE E12-F042Band LPCI C INJECTION VALVE E12-F042C |
| | | **ARM** and **DEPRESS** LPCI B & C MANUAL INITIATION E12A-S21 pushbutton to obtain the white LPCI B & C SEAL IN RESET Light |
| | **BOP** | Preps per 6.1 and 6.2 |
| | | **VERIFY** RHR ISOL BYPASS E12-F053A keylock switch is in BYPASS. |
| | | **VERIFY** RHR ISOL BYPASS E12-F053B keylock switch is in BYPASS. |
| | **BOP** | Maintains MSIV's open per 2.3 and 2.8. |
| | | **DEFEAT** MSIV low RPV level isolation as follows: |
| | | **PLACE** MSIV ISOL LO LEVEL BYPASS CH A, B, C, and D B21H-S76A, B, C and D keylock switches in BYP. |
| | | **OPEN** INST AIR DRYWELL ISOL P52-F646. |
| | | **OPEN** INST AIR CNTMT ISOL P52-F200. |

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**Event Description: Event 6** ATWS Level Leg and Pressure Leg, RCIC Level 2 instrument failure, Ops arms and depresses to start RCIC. RCIC will trip 5 minutes after injection. High Pressure injection not available. HPCS Pump will not start automatically, start with switch.

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | **SRO** | Answer No to 4-question override and power is above 4%, Orders Level Band of 50 to 100 inches. |
| | **ATC** | Recognize **that RCIC failed to Auto start at Level 2 and start RCIC** by Arming and Depressing RCIC MAN INIT. |
| | **SRO** | Stops at step for level restored and maintained greater than minus 25 inches. |
| | **ATC/BOP** | Recognize RCIC trip. Report no high pressure injection available. |
| | **SRO** | Briefs Crew on level limit before minus 25 inches when ED will be required. |
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| | | **ATWS PRESSURE LEG** |
| | **SRO** | Directs Pressure Band of 800 to 1000 psig. |
| | **ATC** | Pressure maintained in band with bypass valves in Auto. |
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| | **SRO** | If all rods are inserted, Exit ATWS to Non ATWS. Restore Level using HPCS. |
| | **ATC/BOP** | Restores Level 185 to 215 inches by opening HPCS Injection Valve 1E22F004. Operator will have had to manually start HPCS Pump. **Contingent Critical Task** |
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**Event Description: Event 5,** PEI-T23 Containment Control

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | **SRO** | Enter PEI T23 on Drywell Temperature. Enter all legs. |
| | **SRO** | Direct BOP to operate all available Drywell Cooling and perform PEI-SPI 2.1. |
| | **BOP** | Starts all Drywell Cooling Fans and performs PEI-SPI 2.1. |
| | | **VERIFY** only one of the following is running: NCC PUMP A P43-C001A, NCC PUMP B P43-C001B, NCC PUMP C P43-C001C |
| | | **PLACE** NCC LOCA BYPASS P43-BS2 keylock switch in BYPASS. **OPEN** the following valves: NCC CNTMT RETURN INBD ISOL P43-F215, and NCC DW RETURN INBD DW ISOL P43-F400. |
| | | **PLACE** NCC LOCA BYPASS P43-BS1 keylock switch in BYPASS. **OPEN** the following valves: NCC DW SUPPLY OTBD DW ISOL P43-F355, NCC DW RETURN OTBD DW ISOL P43-F410, NCC CNTMT RETURN OTBD ISOL P43-F140, and NCC CNTMT SUPPLY OTBD ISOL P43-F055. |
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**Event Description: Event 7** Emergency Depressurize on Level, PEI-B13 ED. If all rods inserted can restore level with HPCS and ED is not required.

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | **SRO** | Briefs Crew on level limit before minus 25 inches when ED will be required. |
| | **SRO** | At established level transition to PEI-B13 Emergency Depressurization. |
| | **SRO** | Verify Terminate Prevent per PEI-SPI 5.1, 5.2 and 5.3 complete prior to ED. **Contingent Critical Task 6** |
| | **ATC** | Terminate prevent feedwater. All RFBP are tripped, Feedwater is Terminated. |
| | **BOP** | Verify 5.1 |
| | | Verifies HPCS Injection Valve is closed 1E22F004 or HPCS Pump is stopped. |
| | **BOP** | Verify 5.2 |
| | | **VERIFY** the following valves are closed: |
| | | SHUTDOWN COOLING TO FDW SHUTOFF Valves E12-F053A and B |
| | | RHR A HEAD SPRAY ISOL E12-F023 |
| | | LPCI A INJECTION VALVE E12-F042A |
| | | LPCS INJECTION VLV E21-F005 |
| | | LPCI B INJECTION VALVE E12-F042B |
| | | LPCI C INJECTION VALVE E12-F042C |
| | | |
| | **SRO** | Direct Emergency Depressurization, if level cannot be restored and maintained greater than minus 25 inches. **Contingent Critical Task 5.** |
| | **BOP/ATC** | Opens 8 ADS Valves |
| | | |
| | | |
| | **Crew** | Enters PEI-M51/56 on Level 1 |
| | **SRO** | Works down flowchart and directs H2 igniters started |
| | **BOP** | Starts H2 igniters |
| | | |
| **NRC** | | If all rods insert level can be restored using HPCS and ED will not be required. |

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**Event Description: Event 7** Level Control after Emergency Depressurization

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | **SRO** | Enter Level Leg at X, following Emergency Depressurization. |
| | **SRO** | Direct Level be restored and maintained greater than minus 25 inches using LPCI A and B outside the shroud once pressure is less than MSCP at 140 psig. |
| | **ATC** | Restores and maintains level greater than minus 25 inches after MSCP by using RHR A/B outside the shroud per PEI-SPI 6.1 and 6.2.<br>**Contingent Critical Task 7.** |
| | | **VERIFY** RHR A/B TEST VALVE TO SUPR POOL E12-F024A/B is CLOSED. |
| | | **VERIFY** RHR A/B HX'S OUTLET VALVE 1E12-F003A/B is OPEN. |
| | | **VERIFY** RHR A/B HX'S BYPASS VALVE 1E12-F048A/B is OPEN. |
| | | **THROTTLE** SHUTDOWN COOLING A/B TO FDW SHUTOFF E12-F053A/B to establish desired injection flowrate. |
| | **ATC** | Establish Level in directed band and monitor SRM's for power spikes. |
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**Event Description: Scenario Termination Criteria**

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | | 1. All Control Rods are fully inserted or are being inserted |
| | | |
| | | 2. RPV level is being maintained between 185 and 215 inches using HPCS if all RODS are inserted **or** |
| | | RPV level is being maintained in the band directed by the SRO by Low Pressure ECCS systems if E.D. was performed and all RODS are not in. |
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| | | 3. MSIV's are being operated to maintain RPV pressure either: |
| | | - within a band as determined by the SRO, or |
| | | - the RPV has been Emergency Depressurized |
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**Event Description: Critical Task 1**

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | | Critical Task 1 – With a reactor scram required and the reactor not |
| | | shutdown, initiate action to reduce power by inserting control rods |
| | | |
| | | 1. Safety Significance: |
| | | - Shutting down the reactor can preclude failure of |
| | | Containment or equipment necessary for the safe |
| | | shutdown of the plant |
| | | 2. Cues: |
| | | - Procedural compliance |
| | | 3. Measured by: |
| | | - Control Rod insertion before the end of the scenario |
| | | 4. Feedback: |
| | | - Reactor power trend |
| | | |
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**Event Description: Critical Task 2**

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | | Critical Task 2 – With a reactor scram required and the reactor |
| | | not shutdown, to prevent an uncontrolled RPV depressurization |
| | | and subsequent power excursion, inhibit ADS |
| | | |
| | | 1. Safety Significance: |
| | | - Precludes core damage due to an uncontrolled reactivity addition |
| | | |
| | | 2. Cues: |
| | | - Procedural compliance |
| | | |
| | | 3. Measured by: |
| | | - ADS logic inhibited prior to an automatic initiation of |
| | | the ADS System unless all required injection |
| | | systems are terminated and prevented |
| | | - RPV pressure and level trends |
| | | |
| | | - RPV pressure and level trends |
| | | - ADS "Out of Service" annunciator status |
| | | |
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**Event Description: Critical Task 3**

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | | Critical Task 3 – During an ATWS terminate and prevent injection from HPCS |
| | | |
| | | 1. Safety Significance: |
| | | - Prevention of fuel damage due to uncontrolled feeding |
| | | |
| | | 2. Cues: |
| | | - Procedural compliance |
| | | |
| | | 3. Measured by: |
| | | - Observation – no injection into the RPV from HPCS |
| | | |
| | | 4. Feedback: |
| | | - Reactor power trend, power spikes, reactor short period alarms |
| | | |
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**Event Description: Critical Task 4**

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | | **Note: This is a contingent critical task** |
| | | |
| | | Critical Task 4 – When all RODS are inserted restore Reactor Vessel level to 185 to 215 inches using HPCS. |
| | | |
| | | 1. Safety Significance: |
| | | - Maintain adequate core cooling |
| | | |
| | | 2. Cues: |
| | | - Procedural compliance |
| | | - Level lowering with adequate high pressure injection available |
| | | |
| | | 3. Measured by: |
| | | -Establish injection after terminate and prevent actions were completed. |
| | | |
| | | 4. Feedback: |
| | | - Reactor level trend |
| | | - Reactor pressure trend |
| | | |
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**Op-Test No.: 2007-01** **Scenario No.: 1** **Page 18 of 20**

**Event Description: Critical Task 5**

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | | **Note: This is a contingent critical task** |
| | | |
| | | Critical Task 5 – When RPV water level cannot be restored and maintained |
| | | > -25" and the reactor is at pressure, initiate Emergency Depressurization |
| | | |
| | | 1. Safety Significance: |
| | | - Maintain adequate core cooling |
| | | |
| | | 2. Cues: |
| | | - Procedural compliance |
| | | - Level lowering without adequate high pressure injection available |
| | | |
| | | 3. Measured by: |
| | | - Observation – at least 5 SRVs open prior to |
| | | re-establishing injection after terminate and prevent |
| | | actions are completed |
| | | |
| | | 4. Feedback: |
| | | - Reactor pressure trend |
| | | - Suppression Pool temperature trend |
| | | |
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**Op-Test No.: 2007-01** **Scenario No.: 1** **Page 19 of 20**

**Event Description: Critical Task 6**

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | | **Note: This is a contingent critical task** |
| | | |
| | | Critical Task 6 – During an ATWS with Emergency Depressurization required |
| | | terminate and prevent injection, with the exception of RCIC, SLC and CRD, |
| | | into the RPV until reactor pressure is below MSCP. |
| | | |
| | | |
| | | 1. Safety Significance: |
| | | - Prevention of fuel damage due to uncontrolled feeding |
| | | |
| | | 2. Cues: |
| | | - Procedural compliance |
| | | |
| | | 3. Measured by: |
| | | - Observation – no injection into the RPV except for RCIC, |
| | | SLC and CRD prior to reaching the MSCP. |
| | | |
| | | 4. Feedback: |
| | | - Reactor power trend, power spikes, reactor short period alarms |
| | | |
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**Op-Test No.: 2007-01** **Scenario No.: 1** **Page 20 of 20**

**Event Description: Critical Task 7**

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | | **Note: This is a contingent critical task** |
| | | |
| | | Critical Task 7 – When RPV water level cannot be maintained |
| | | during an ATWS, when RPV pressure is below the MSCP, slowly |
| | | increase and control injection into the RPV to restore and maintain |
| | | RPV level > -25" |
| | | |
| | | 1. Safety Significance: |
| | | - Establish adequate core cooling |
| | | |
| | | 2. Cues: |
| | | - RPV pressure trend |
| | | - Procedural compliance |
| | | |
| | | 3. Measured by: |
| | | - RPV level is established and controlled above –25" |
| | | |
| | | 4. Feedback: |
| | | - Lack of power excursion |
| | | - RPV level and pressure indications |
| | | |
| | | |
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| | | |

**Facility: Perry** **Scenario No.: 2** **Op-Test No.: 2007-01**

**Examiners:** _____ **Operators:**_____
_____ _____
_____ _____

**Initial Conditions:** Reactor Power 37%, power ascension in progress IOI-3 4.5.5.h. Rods at step 57 gang 44 at 12. Division 2 DG is in secured status with work complete. Circulating Water Pump C is OOS. Fuel moves in progress for NRC B.5.B concerns. Chemistry investigating possible tube leak in train D. SVI-R45-T2002 in progress. OPRM's are Operable. SVI-R10-T5227 is due in 6 hours for Division 2 DG.

**Turnover:** Align systems to support a Div 2 DG maintenance run, start ESW B and shift M25/26. Continue power ascension shift reactor recirc to fast speed and raise core flow to 58 mlbm/hr.

| Event No. | Malf. No. | Event Type * | Event Description |
|---|---|---|---|
| 1 | | R(atc) | Shift Reactor Recirc Pumps to fast and raise flow to 58 mlbm/hr. |
| 2 | | N (bop) | Start ESW B and Shift M25/26 to Emergency Recirculation. |
| 3 | pt01:1e31n0018b, 350 | I/C | RHR B E31 instrument failure, TS 3.3.6.1 |
| | mv06:1e51f063 | I/C (bop) | 1E51F063 fails, loose indication, need to isolate penetration with E51F064, TS 3.6.1.3 and 3.5.3. |
| 4 | | ~~N(all)~~ | ~~Report of Informational Airplane threat from NRC, ONI-P56-3~~ |
| 5 | trg 10, batch nrc-2007-b33 | I/C (atc) | Reactor Recirc pump B vibration and seal failure. Trip B pump and isolate B reactor recirc loop. ONI-C51 and insert cram rods if in immediate exit region. |
| 6 | rd16 at 20% | M(all) | Scram Reactor on rising Drywell pressure (NON-ATWS). SDV rupture, Containment Pressure increases. |
| 7 | fw08c | I/C (atc) | Motor Feed Pump Failure, loss of oil. HPCS or RFPT's are level control. |
| | mv04:1e22f004 | | E22F004 fails to auto open, If level 8 is exceeded on scram E22F004 will not open unless level 8 is reset. |
| 8 | tf01:2s11 and 1s11 | I/C (bop) | Loss of Offsite power, ONI-R10, DG picks up Div 1 and Div 3 bus. RHR B not available for Containment Spray (no power) RHR A not available for Containment Spray 1E12F028A fails to open. |
| | | | Emergency Depressurize prior to exceeding PSP |

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

**Op-Test No.: 2007-01** **Scenario No.: 2** 

**Event Description No. 1: Shift Reactor Recirc Pumps to Fast Speed and Raise Core Flow to 58 Mlbm/hr.**

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | **SRO** | Conduct Reactivity Brief |
| | | Provides SRO oversight for Recirc Pump transfer. |
| | **SRO** | Directs RO to perform IOI-3 Step 4.5.3.h (Transfer Reactor Recirc Pumps to Fast Speed) |
| | **RO** | **Transferring a Rcirc Pump from Slow to Fast Speed per SOI-B33 Section 7.5.** |
| | | - Takes RX LEVEL LOW L3 RCIRC PUMP RESET 1B33-S113 to A. |
| | | - Takes RX LEVEL LOW L3 RCIRC PUMP RESET 1B33-S113 to B. |
| | | - Verifies the oncoming RCIRC PUMP BRKR 3A is closed. |
| | | - Verifies the oncoming RCIRC PUMP BRKR 4A is closed. |
| | | - Takes the CAVITATION/FCV LIMIT RCIRC RESET 1B33A-S111 to A. |
| | | - Takes the CAVITATION/FCV LIMIT RCIRC RESET 1B33A-S111 to B. |
| | **NRC** | **Note: Crew will contact Reactor Engineer and he will recommend the power interlock be bypassed.** |
| | **SRO** | Directs RO to bypass the power interlock. |
| | **RO** | - Considers the ICS Computer point (N27ME008) Total Rx Feedwater Flow (suct-recirc) indication (normally ≥ 3.43 Mlbm/hr). |
| | | - Considers the ICS Computer point (C34EA013) Total Rx Steam Flow indication (normally ≥ 3.1 Mlbm/hr). |
| | | - Considers the CAVITATION/FCV LIMIT RCIRC RESET lights status |
| | **NRC** | **Note: Alarm H13-P680-4 (D5), RCIRC A CAVITATION BYPASS, will occur (expected) during the next step.** |
| | | - Directs Plant Operator (PO) to place POWER INTERLOCK 1B33-S126A and TOTAL FEEDWATER LOW FLOW INTERLOCK 1 B33-S127A in BYPASS on Auxiliary Relay Panel 1B33-P001A. |
| | | |

**Op-Test No.: 2007-01** **Scenario No.: 2** **Page 2 of 7**

**Event Description No. 1: Shift Reactor Recirc Pumps to Fast Speed and Raise Core Flow to 58 Mlbm/hr.**

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | **NRC** | **Note: Alarm H13-P680-4 (D14), RCIRC B CAVITATION BYPASS, will occur (expected) during the next step.** |
| | **RO (cont.)** | - Directs Plant Operator (PO) to place POWER INTERLOCK 1B33-S126B and TOTAL FEEDWATER LOW FLOW INTERLOCK 1 B33-S127B in BYPASS on Auxiliary Relay Panel 1B33-P001B. |
| | | - Confirms both CAIVTATION/FCV LIMIT RCIRC RESET lights are off (above Switch 1B33-S111). |
| | | **Note: The valve position permissive may NOT initiate at a FCV position of 10%.** |
| | **NRC** | **Note: It is anticipated that Recirc Pump A will be transferred first followed by Recirc Pump B.** |
| | | - Operates the oncoming RECIRC LOOP FLOW CONTROL slide switch 1B33-K603A to obtain ≤ 10% VALVE TRAVEL. |
| | **NRC** | **Note: The crew may direct I&C to monitor the valve position permissive voltage in order to confirm the valve position permissive is met.** |
| | | - If the valve permissive is not met, then perform the following: |
| | | - While monitoring the voltages in the following step, then adjust the oncoming RCIRC LOOP FLOW CONTROL 1B33-K603A to between 8% and 10% VALVE TRAVEL. |
| | **NRC** | **Note: I&C will confirm the next step.** |
| | | - Confirm the voltage changes from 0 to approximately 68vdc at 1H13-P634 on Rack 2 between Terminal Pt 95 and ground for FCV A. |
| | | **Note: The FCV may not open from 8% while in fast speed operation.** |
| | | - If the oncoming FCV does NOT open from 8%, then refer to Recovery From Failure to Open Flow Control Valve From Minimum Position. |
| | **NRC** | **Note: The following alarm is NOT expected to be in.** |
| | | - If alarm 1H13-P680-4 C8, RECIRC A/B LO ΔT INTERLOCK, is in, then refer to SVI-B33-T1168, Idle Recirculation Loop Temperature and Flow. |
| | **NRC** | **Note: The RO should be monitoring power, pressure, and level during the next step.** |

**Op-Test No.: 2007-01** **Scenario No.: 2** **Page 3 of 7**

**Event Description No. 1: Shift Reactor Recirc Pumps to Fast Speed and Raise Core Flow to 58 Mlbm/hr.**

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | **NRC** | **Note: Alarm H13-P870-1 (E1), BUS H11 BREAKER TRIP, will occur (expected) during the next step.** |
| | **RO (cont.)** | - Take the RCIRC PUMP BRKR 5A to START. |
| | | - Verifies the LFMG SUPPLY BRKR 1A opens. |
| | | - Verifies the LFMG OUTPUT BRKR 2A opens. |
| | | - Confirms the RCIRC PUMP BRKR 5A closes. |
| | | - Confirms the RCIRC PUMP SPEED 1B33-R651A increases to 1800 rpm. |
| | | - If the other RCIRC PUMP is NOT in fast speed, then refer to Step 7.5.3 to transfer the other RCIRC PUMP to fast speed. |
| | | - Verifies the oncoming RCIRC PUMP BRKR 3B is closed. |
| | | - Verifies the oncoming RCIRC PUMP BRKR 4B is closed. |
| | | - Takes the CAVITATION/FCV LIMIT RCIRC RESET 1B33A-S111 to A. |
| | | - Takes the CAVITATION/FCV LIMIT RCIRC RESET 1B33A-S111 to B. |
| | **NRC** | **Note: The power interlock is still bypassed based on the Reactor Engineer direction and does NOT have to be repeated. Therefore, the second performance of this step should be N/A'd by the SRO.** |
| | | - Confirms both CAIVTATION/FCV LIMIT RCIRC RESET lights are off (above Switch 1B33-S111). |
| | | **Note: The valve position permissive may NOT initiate at a FCV position of 10%.** |
| | | - Operates the oncoming RECIRC LOOP FLOW CONTROL slide switch 1B33-K603B to obtain ≤ 10% VALVE TRAVEL. |
| | **NRC** | **Note: The crew may direct I&C to monitor the valve position permissive voltage in order to confirm the valve position permissive is met.** |
| | | |
| | | |

**Op-Test No.: 2007-01** **Scenario No.: 2** **Page 4 of 7**

**Event Description No. 1: Shift Reactor Recirc Pumps to Fast Speed and Raise Core Flow to 58 Mlbm/hr.**

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | **RO (cont.)** | - If the valve permissive is not met, then perform the following: |
| | | - While monitoring the voltages in the following step, then adjust the oncoming RCIRC LOOP FLOW CONTROL 1B33-K603B to between 8% and 10% VALVE TRAVEL. |
| | **NRC** | **Note: I&C will confirm the next step.** |
| | | - Confirm the voltage changes from 0 to approximately 68vdc at 1H13-P634 on Rack 2 between Terminal Pt 103 and ground for FCV B. |
| | | **Note: The FCV may not open from 8% while in fast speed operation.** |
| | | - If the oncoming FCV does NOT open from 8%, then refer to Recovery From Failure to Open Flow Control Valve From Minimum Position. |
| | **NRC** | **Note: The following alarm is NOT expected to be in.** |
| | | - If alarm 1H13-P680-4 C8, RECIRC A/B LO ΔT INTERLOCK, is in, then refer to SVI-B33-T1168, Idle Recirculation Loop Temperature and Flow. |
| | **NRC** | **Note: The RO should be monitoring power, pressure, and level during the next step.** |
| | **NRC** | **Note: Alarm H13-P870-1 (E2), BUS H12 BREAKER TRIP, will occur (expected) during the next step.** |
| | | - Take the RCIRC PUMP BRKR 5B to START. |
| | | - Verifies the LFMG SUPPLY BRKR 1B opens. |
| | | - Verifies the LFMG OUTPUT BRKR 2B opens. |
| | | - Confirms the RCIRC PUMP BRKR 5B closes. |
| | | - Confirms the RCIRC PUMP SPEED 1B33-R651B increases to 1800 rpm. |
| | | - Reset the Bus H11 and H12 breaker trip annunciators as follows: |
| | **NRC** | **Note: Alarms H13-P870-1 (E1), BUS H11 BREAKER TRIP, and (E2), BUS H12 BREAKER TRIP, will reset (expected) during the next steps.** |
| | | - Take LFMG A SUPPLY BRKR 1A to TRIP. |
| | | - Take LFMG B SUPPLY BRKR 1B to TRIP. |

**Op-Test No.: 2007-01** **Scenario No.: 2** **Page 5 of 7**

**Event Description No. 1: Shift Reactor Recirc Pumps to Fast Speed and Raise Core Flow to 58 Mlbm/hr.**

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | **NRC** | **Note: The SRO may direct the RO to raise Reactor Power per IOI-3 at this time prior to performing the remainder of SOI-B33, Section 7.5** |
| | **SRO** | Provides SRO oversight for Reactor Power increase using core flow. |
| | **NRC** | **Note: As part of the crew turnover, the crew was directed to raise core flow to 58 Mlbm/hr after Recirc Pumps had been transferred to fast speed.** |
| | **SRO** | Directs RO to perform IOI-3 Step 4.5.3.i (Increase core flow as directed by Reactor Engineering). |
| | **RO** | **Rcirc Flow Control in Loop Manual per SOI-B33 Section 7.7.** |
| | **NRC** | **Note: The RO will raise core flow to 58 Mlbm/hr in small increments using only one FCV at a time.** |
| | | - Confirm RCIRC LOOP FLOW CONTROL 1B33-K603A is in MAN. |
| | | - Confirm RCIRC LOOP FLOW CONTROL 1B33-K603B is in MAN. |
| | **NRC** | **Note: The RO should be monitoring power, pressure, and level during the next step.** |
| | **NRC** | **Note: The RO should maintain recirc loop flows matched during the next step.** |
| | | - Perform the following concurrently as required for the desired Recirc Flow: |
| | | - Adjust RCIRC LOOP FLOW CONTROL 1B33-K603A with the slide switch. |
| | | - Adjust RCIRC LOOP FLOW CONTROL 1B33-K603B with the slide switch. |
| | | - Informs SRO that core flow is at 58 Mlbm/hr. |
| | | |
| | **NRC** | **Note: The SRO may re-direct the RO to complete the remainder of SOI-B33 Section 7.5 for transferring a Rcirc Pump from slow to fast speed.** |
| | | |
| | **RO (cont.)** | **Transferring a Rcirc Pump from Slow to Fast Speed per SOI-B33 Section 7.5.** |
| | **NRC** | **Note: A Rcirc Flow Control Cavitation Runback was NOT expected during the Rcirc Pump transfer.** |

**Op-Test No.: 2007-01** **Scenario No.: 2** **Page 6 of 7**

**Event Description No. 1: Shift Reactor Recirc Pumps to Fast Speed and Raise Core Flow to 58 Mlbm/hr.**

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | **RO (cont.)** | - When the Total Rx Feedwater Flow (venturi) ICS Computer point N27ME009 consistently indicates > 3.43 Mlbm/hr, then perform the following: |
| | | - If RCIRC Flow Control Cavitation Runback is NOT reset, then perform Resetting RCIRC Flow Control Cavitation Runback. |
| | | - Direct I&C to verify Feedwater Cavitation Interlock 1C34-K718 LED's, 1H13-P612 Bay A: |
| | | **Note: The next 2 steps may be performed in any order.** |
| | | - FBM Module 1C34-K0718: |
| | | - Output 5 LED ON |
| | | - Output 6 LED ON |
| | | - Output 7 LED ON |
| | | - Output 8 LED ON |
| | | - FBM Module 1C34-K0719: |
| | | - Output 6 LED ON |
| | | - Output 8 LED ON |
| | **NRC** | **Note: Alarm H13-P680-4 (D5), RCIRC A CAVITATION BYPASS, will reset (expected) during the next step.** |
| | | - Directs Plant Operator (PO) to place POWER INTERLOCK 1B33-S126A and TOTAL FEEDWATER LOW FLOW INTERLOCK 1 B33-S127A in NORMAL on Auxiliary Relay Panel 1B33-P001A. |
| | **NRC** | **Note: Alarm H13-P680-4 (D14), RCIRC B CAVITATION BYPASS, will reset (expected) during the next step.** |
| | | - Directs Plant Operator (PO) to place POWER INTERLOCK 1B33-S126B and TOTAL FEEDWATER LOW FLOW INTERLOCK 1 B33-S127B in NORMAL on Auxiliary Relay Panel 1B33-P001B. |
| | **NRC** | **Note: The next step does NOT have to be completed prior to proceeding to Event 2.** |
| | | - Directs Plant Operator (PO) to perform independent verification of required components per Attachment 4 - Verification Checklist Section 7.5, RCIRC Pump Transfer from Slow Speed to Fast Speed. |

**Op-Test No.: 2007-01** **Scenario No.: 2** 

**Event Description No. 1: Shift Reactor Recirc Pumps to Fast Speed and Raise Core Flow to 58 Mlbm/hr.**

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | **NRC** | **Note: If NOT previously performed during SOI-B33 Section 7.5, then core flow will be raised to 58 Mlbm/hr at this time.** |
| | **SRO** | Provides SRO oversight for Reactor Power increase using core flow. |
| | **NRC** | **Note: As part of the crew turnover, the crew was directed to raise core flow to 58 Mlbm/hr after Recirc Pumps had been transferred to fast speed.** |
| | **SRO** | Directs RO to perform IOI-3 Step 4.5.3.i (Increase core flow as directed by Reactor Engineering). |
| | **RO** | **Rcirc Flow Control in Loop Manual per SOI-B33 Section 7.7.** |
| | **NRC** | **Note: The RO will raise core flow to 58 Mlbm/hr in small increments using only one FCV at a time.** |
| | | - Confirm RCIRC LOOP FLOW CONTROL 1B33-K603A is in MAN. |
| | | - Confirm RCIRC LOOP FLOW CONTROL 1B33-K603B is in MAN. |
| | **NRC** | **Note: The RO should be monitoring power, pressure, and level during the next step.** |
| | **NRC** | **Note: The RO should maintain recirc loop flows matched during the next step.** |
| | | - Perform the following concurrently as required for the desired Recirc Flow: |
| | | - Adjust RCIRC LOOP FLOW CONTROL 1B33-K603A with the slide switch. |
| | | - Adjust RCIRC LOOP FLOW CONTROL 1B33-K603B with the slide switch. |
| | | - Informs SRO that core flow is at 58 Mlbm/hr. |
| | | |
| | **NRC** | **Note: Crew can proceed to Event 2.** |
| | | |
| | | |
| | | |

**Op-Test No.: 2007-01** **Scenario No.: 2** **Page 1 of 4**

**Event Description No. 2: Start ESW Pump B and Shift M25/26 (Control Room HVAC) to Emergency Recirculation Mode.**

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | **NRC** | **Note: The next 2 normal tasks for the BOP will be performed in the order specified by the SRO. ESW Loop B Manual Startup is on page 3 of 4.** |
| | **SRO** | Directs BOP to shift the Control Room HVAC and Emergency Recirculation System from NORM or SMOKE CLEAR to EMERG RCIRC per SOI-M25/26 Section 7.5. |
| | **BOP** | **Shifting From NORM or SMOKE CLEAR to EMERG RCIRC per SOI-M25/26 Section 7.5.** |
| | NRC | **Note: Alarms H13-P904-2 (B3), CONT RM HVAC EMERG RCIRC A INITIATED, and (E3), CONT RM HVAC EMERG RCIRC B INITIATED will occur (expected) during the next step.** |
| | | - Place both of the following in EMERG RCIRC: |
| | | - CONT RM HVAC TRAIN A MODE SELECT M25-S7. |
| | | - CONT RM HVAC TRAIN B MODE SELECT M25-S8. |
| | **NRC** | **Note: a Plant Operator will be required to confirm and report the position of dampers M24-F051A&B for Attachment 5 during the next step.** |
| | **NRC** | **Note: The BOP should determine that Attachment 5, Train B in Operation and Train A Shutdown, is the correct Attachment to perform.** |
| | | - Confirm components are in the proper configuration in accordance with the appropriate attachment: |
| | | - Attachment 5, Train B in Operation and Train A Shutdown |
| | | **- Train A Components** |
| | | - M25-F250A closed |
| | | - M25-F255A closed |
| | | - M25-F130A closed |
| | | - M25-F263A closed |
| | | - M25-C002A off (Return Fan) |
| | | - M25-F110A closed |
| | | - M25-F040A closed |
| | | - M26-C001A off (Emerg Rcirc Fan) |

**Op-Test No.: 2007-01** **Scenario No.: 2** **Page 2 of 4**

**Event Description No. 2: Start ESW Pump B and Shift M25/26 (Control Room HVAC) to Emergency Recirculation Mode.**

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | **BOP (cont.)** | - M26-D001A off (Electric Heater) |
| | | - M25-F010A closed |
| | | - M25-F020B open |
| | | - M25-C001A off (Supply Fan) |
| | | - M24-F051A closed **(as reported by Plant Operator)** |
| | | **- Train B Components** |
| | | - M25-F250B closed |
| | | - M25-F255B closed |
| | | - M25-F130B closed |
| | | - M25-F263B closed |
| | | - M25-C002B off (Return Fan) |
| | | - M25-F110B closed |
| | | - M25-F040B open |
| | | - M26-C001A on (Emerg Rcirc Fan) |
| | | - M26-D001A on if manually started due to Control Room humidity; otherwise off (Electric Heater) |
| | | - M25-F010B closed |
| | | - M25-F020A open |
| | | - M25-C001B on (Supply Fan) |
| | | - M24-F051B closed **(as reported by Plant Operator)** |
| | **NRC** | **Note: BOP will determine the following step is N/A.** |
| | | - If the train is being shifted due to an emergency condition, then take the following to CLOSE: |
| | | - CONT RM HVAC A INBD SUPP DMPR M25-F020B. |
| | | - CONT RM HVAC B INBD SUPP DMPR M25-F020A. |

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**Event Description No. 2: Start ESW Pump B and Shift M25/26 (Control Room HVAC) to Emergency Recirculation Mode.**

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | **BOP (cont.)** | **Note: Relative humidity of ≥ 70% is determined by an alarm on the computer points M26-BC003 or M26-BC004.** |
| | | - If Control Room relative humidity is ≥ 70% or unknown, then take the CONT RM EMG RCIRC ELEC HTG CONT M26-D001B to START. |
| | | |
| | **SRO** | Directs BOP to perform ESW Loop B Manual Startup from Standby Readiness per SOI-P45/P49 Section 4.2. |
| | **BOP** | **ESW Loop B Manual Startup from Standby Readiness per SOI-P45/P49 Section 4.2.** |
| | | **Note: ECC temperatures of less than 55°F require P47 to be declared inoperable.** |
| | | - Refer to SOI-M32 to perform one of the following: |
| | | - If available, then start the associated ESWPH ventilation fan 1M32-C001B. |
| | | - If the associated ESWPH ventilation fan is NOT available, then start the alternate fan 1M32-C001A. |
| | **NRC** | **Note: BOP determines that the associated ESWPH ventilation fan 1M32-C001B is available and refers to SOI-M32.** |
| | | |
| | **BOP** | **Manual Startup from Standby Readiness per SOI-M32 Section 4.3** |
| | | **Note: Vent Fan Inlet Damper 1M32-F040B and Vent Fan Rcirc Damper 1M32-F050B controlled by Temperature Controller 1M32-R020B will throttle as necessary to maintain ESW Pumphouse temperature above 60°F.** |
| | | - Take the oncoming ESW PMP HOUSE VENT SUPP FAN 1M32-C001B switch to START. |
| | | - Verify the oncoming ESW PMP HOUSE EXH LOUVER 1M32-F070B opens. |
| | | |
| | **NRC** | **Note: BOP refers back to SOI-P45/P49 Section 4.2 for the remainder of the ESW Loop B Manual Startup.** |
| | | |

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**Event Description No. 2: Start ESW Pump B and Shift M25/26 (Control Room HVAC) to Emergency Recirculation Mode.**

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | **BOP (cont.)** | **ESW Loop B Manual Startup from Standby Readiness per SOI-P45/P49 Section 4.2.** |
| | | - Direct Chemistry to perform the following: |
| | | - Obtain required samples of flow through the RHR heat Exchangers per REC-0104. |
| | | - Chlorinate ESW as required. |
| | | - Verify the oncoming RHR HX'S ESW INLET VALVE 1P45-F014B is OPEN. |
| | | - Verify the oncoming RHR HX'S ESW OUTLET VALVE 1P45-F068B is OPEN. |
| | **NRC** | **Note: Alarms H13-P601-17 (F6), ESW FROM ECC HX B FLOW LOW, H13-P601-17 (H5), ESW TO RHR B HX'S FLOW LOW, and H13-P877-2 (D1), ESW TO DIESEL HEAT EXCHANGER FLOW LOW will occur (expected) and reset (expected) during the next step.** |
| | | - Take the oncoming ESW PUMP 1P45-C001B control switch to START. |
| | | - Verify the following: |
| | | - The oncoming ESW PUMP DISCH VALVE 1P45-F130B starts opening. |
| | | - When the discharge valve reaches approximately 5% open, then the oncoming ESW PUMP 1P45-C001B starts. |
| | | - The oncoming ESW PUMP DISCH VALVE 1P45-F130B fully opens. |
| | | - Perform a Channel Check of ESW Effluent flow indication per the Technical Specification Rounds, and record the channel check in the Narrative Log. |
| | **NRC** | **Note: BOP will determine the following step is N/A.** |
| | | - If service water inlet temperature falls below 34°F, then refer to IOI-15, Seasonal Variations to perform De-icing Operation. |
| | | |
| | **NRC** | **When ready, proceed to Event 3 and insert Trigger 1.** |
| | | |

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**Event Description No. 3: Failure of Temperature Transmitter 1E31-R018B (RHR Equipment Area 1 Ambient Temperature) High / Failure of RCIC to Automatically Isolate.**

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | **NRC** | **Event 3 Summary: Temperature Transmitter 1E31-R018B (RHR Equipment Area 1 Ambient Temperature) will fail high and initiate an isolation signal for the Division 2 RCIC System valves and Division 2 RHR Shutdown Cooling System valves. RCIC Valve 1E51-F063 (RHR & RCIC ST SUPP INDB ISOL) will blow a fuse and fail to automatically isolate. Technical Specifications will be referenced for an inoperable Leak Detection (E31) instrument, an inoperable Primary Containment Isolation Valve (1E51-F063), and an inoperable RCIC System.** |
| | | |
| | NRC | **Note: Two (2) alarms will be received and discussed separately.** |
| | **BOP** | - Reports alarm H13-P601-20 (D5), RCIC & RHR ISOL RHR RM A/B TEMP HIGH (unexpected). Informs SRO. |
| | | - Automatic Actions: |
| | **NRC** | **Note: The Division 2 RHR SDC valves were already in their normally closed position.** |
| | **BOP (cont.)** | - Confirms the following Division 2 RHR SDC valves are closed: 1E12-F009, 1E12-F049, 1E12-F060A, 1E12-F060B, 1E12-F037B and 1E12-F053B, |
| | **NRC** | **Note: Division 2 RCIC valve 1E51-F076 was already in its normally closed position.** |
| | **BOP (cont.)** | - Confirms RCIC valve 1E51-F076 is closed and the RCIC Turbine is tripped. |
| | **BOP (cont.)** | **- Identifies Division 2 RCIC valve 1E51-F063 (RHR & RCIC ST SUPP INBD ISOL) did not automatically isolate and has lost all valve position indication. Informs SRO.** |
| | **BOP (cont.)** | - Dispatches Plant Operator to investigate MCC EF1D07-XN for RCIC valve 1E51-F063. |
| | **Driver** | - Plant Operator (PO) reports that EF1D07-XN has a blown fuse. |
| | **BOP (cont.)** | - Informs SRO of blown fuse. |
| | | - Immediate Actions: None |

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**Event Description No. 3: Failure of Temperature Transmitter 1E31-R018B (RHR Equipment Area 1 Ambient Temperature) High / Failure of RCIC to Automatically Isolate.**

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | **BOP (cont.)** | - Subsequent Operator Actions: |
| | NRC | **Note: Only applicable Subsequent Operator Actions will be discussed.** |
| | NRC | **Note: SRO may direct the RO (vice BOP) to monitor Leak Detection (E31) temperatures at panel H13-P632 and P642.** |
| | | - Monitor the following: |
| | **BOP (cont.)** | - RHR Rooms ambient temperature 1E31-N700A(B)-A6-4 at panel H13-P632 (P642). |
| | **BOP (cont.)** | - Determines that Leak Detection instrument 1E31-N700B-A6-4 (RHR Equipment Area 1 Ambient Temperature) at panel H13-P642) has failed high, indicates 350°F, and has generated a Trip (Isolation) signal. Informs SRO. |
| | **SRO** | - Determines that PEI-N11, Containment Leakage Control does NOT have to entered because there are no indications of a pipe break. |
| | **BOP (cont.)** | - Reports alarm H13-P601-21 (C5), RCIC OUT OF SERVICE (unexpected). Informs SRO. |
| | | - Automatic Actions: None |
| | | - Immediate Actions: None |
| | | - Subsequent Operator Actions: |
| | **NRC** | **Note: Only applicable Subsequent Operator Actions will be discussed.** |
| | **BOP (cont.)** | - Checks the Inop and Bypass matrix to determine the cause of the alarm. |
| | **BOP (cont.)** | - Reports the following amber status lights are on and informs the SRO: |
| | **BOP (cont.)** | - Trip throttle valve 1E51-F510 closed. |
| | **BOP (cont.)** | - RCIC Division 1(2) system isolation signal received. |
| | **BOP (cont.)** | - Power/control power loss to valve 1E51-F063. |

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**Event Description No. 3: Failure of Temperature Transmitter 1E31-R018B (RHR Equipment Area 1 Ambient Temperature) High / Failure of RCIC to Automatically Isolate.**

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | **BOP (cont.)** | - Informs SRO. If operability of RCIC is affected, then consider placing RCIC in Secured Status per SOI-E51. |
| | | |
| | NRC | **Notes: The SRO will refer to three (3) Technical Specifications, in no particular order.** |
| | **SRO** | - Refers to the following Technical Specification LCO's: |
| | **SRO (cont.)** | - LCO 3.3.6.1, Primary Containment and Drywell Isolation Instrumentation for failed instrument 1E31-R018B. |
| | **SRO (cont.)** | - Table 3.3.6.1-1 Function 3.h |
| | **SRO (cont.)** | - Enter Condition A (ALCO) |
| | **SRO (cont.)** | - 24 hours to place channel in trip. |
| | **SRO (cont.)** | - Table 3.3.6.1-1 Function 5.a |
| | **SRO (cont.)** | - Enter Condition A (ALCO) |
| | **SRO (cont.)** | - 24 hours to place channel in trip. |
| | **SRO (cont.)** | - LCO 3.6.1.3, Primary Containment Isolation Valves for failed isolation valve 1E51-F063. |
| | **SRO (cont.)** | - Enter Condition A (ALCO) |
| | **SRO (cont.)** | - 4 hours to isolate the containment penetration. |
| | **NRC** | **Note: SRO has 4 hours to direct BOP to close 1E51-F064 (RHR & RCIC ST SUPP OTBD ISOL VLV) and open its MCC disconnect in order to isolate the Containment penetration.** |
| | **SRO (cont.)** | - LCO 3.5.3, RCIC System. |
| | **SRO (cont.)** | - Enter Condition A (ALCO) |
| | **SRO (cont.)** | - 1 hour to verify by administrative means that HPCS System is operable. |
| | **SRO** | - May direct BOP to place RCIC System in secured status per SOI-E51 Section 6.1. |
| | **NRC** | **When ready, proceed to Event 4.** |

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~~**Event Description No. 4: Informational Aircraft Threat ONI-P56-3.**~~

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | ~~**Driver**~~ | ~~**As the NRC Washington Operations Center representative, contact the Control Room and report that the NRC has issued an 'Informational Aircraft Threat' for all Midwestern nuclear plants.**~~ |
| | | |
| | ~~**SRO**~~ | ~~- Upon receiving report, enters ONI-P56-3, Aircraft Security Threat.~~ |
| | | ~~**ONI-P56-3, Aircraft Security Threat**~~ |
| | | ~~- Immediate Actions~~ |
| | ~~**NRC**~~ | ~~**Note: The SRO may request assistance from the Shift Manager for completion of Attachments 4 and 3.**~~ |
| | ~~**SRO**~~ | ~~- Refer to Attachment 4, Immediate NRC Notifications and notify the NRC.~~ |
| | ~~**SRO (cont.)**~~ | ~~- Refer to Attachment 3, Personnel Notification and perform the actions~~ |
| | | ~~- Supplemental Actions:~~ |
| | | ~~**- Section 4.1, All Aircraft Threats**~~ |
| | ~~**SRO (cont.)**~~ | ~~- Directs Security to validate the authenticity of the call.~~ |
| | ~~**SRO (cont.)**~~ | ~~- Refers to EPI-A1 and determines if an Emergency Action Level (EAL) has been exceeded.~~ |
| | ~~**SRO (cont.)**~~ | ~~- Directs BOP to take the following valves to CLOSE at 1H13-P882: 1G33-F001/ F040 / F053 / F028.~~ |
| | ~~**BOP**~~ | ~~- Takes the following valves to CLOSE at 1H13-P882: 1G33-F001/ F040 / F053 / F028. Informs SRO.~~ |
| | ~~**SRO (cont.)**~~ | ~~- Directs BOP to take the following valves to CLOSE at 1H13-P881: 1G33-F004/ F054 / F039 / F034.~~ |
| | ~~**BOP**~~ | ~~- Takes the following valves to CLOSE at 1H13-P881: 1G33-F004/ F054 / F039 / F034. Informs the SRO.~~ |
| | ~~**SRO (cont.)**~~ | ~~- Directs RO to verify the RWCU Pumps are NOT running.~~ |
| | ~~**RO**~~ | ~~- Verifies the RWCU Pumps are NOT running. Informs the SRO.~~ |
| | ~~**SRO (cont.)**~~ | ~~- Suspends handling fuel in the Fuel Handling Building.~~ |
| | | |

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~~**Event Description No. 4: Informational Aircraft Threat ONI-P56-3.**~~

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | ~~**SRO (cont.)**~~ | ~~- Directs BOP/RO to verify the following ventilation systems are in emergency recirculation/recirculation: M25/26, M23/24, M21.~~ |
| | ~~**NRC**~~ | ~~**Note: M25/26 was placed in emergency recirculation mode during Event 2.**~~ |
| | ~~**BOP/RO**~~ | ~~- Confirms M25/26 is in emergency recirculation mode.~~ |
| | ~~**BOP/RO**~~ | ~~- Directs Plant Operator (PO) to place M23/24 and M21 in recirculation mode.~~ |
| | ~~**SRO (cont.)**~~ | ~~- Directs BOP/RO to shutdown Computer Room HVAC per SOI-M27.~~ |
| | ~~**BOP/RO**~~ | ~~- Directs Plant Operator (PO) to shutdown Computer Room HVAC per SOI-M27.~~ |
| | ~~**SRO (cont.)**~~ | ~~Goes to the appropriate section depending on the threat received: Section 4.4, Informational Aircraft Threat.~~ |
| | | ~~**- Section 4.4, Informational Aircraft Threat**~~ |
| | ~~**SRO (cont.)**~~ | ~~- Prepares to take actions per Section 4.3, Probable Aircraft Threat.~~ |
| | ~~**NRC**~~ | ~~**Note: A 'Probable Aircraft Threat' does NOT occur in this scenario. Therefore, the actions in Section 4.3 do NOT need to be listed.**~~ |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | **NRC** | **Note: The remaining Events 5 through 8 will occur in rapid succession.** |
| | | |
| | **NRC** | **When ready, proceed to Event 5 and insert Trigger 10.** |

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**Event Description No. 5: Recirculation Pump B Vibration and Motor Cooler Leakage./ ONI-C51, Unplanned Change in Reactor Power or Reactivity / Trip of Recirculation Pump B / Pump Seal Failure / Recirculation Loop B Isolation**

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | **NRC** | **Event 5 Summary: Recirculation Pump B will experience high vibration and motor cooler leakage. The RO will trip Recirculation Pump B based on direction from the Alarm Response Instructions (ARI's). The SRO will enter ONI-C51 due to an unplanned change in reactor power. Technical Specifications will be referenced for an inoperable Recirculation Loop. Subsequent Recirculation Pump B seal failure will result in rising Drywell pressure and Drywell unidentified leakage. The Operators should attempt to isolate Recirculation Loop B.** |
| | **NRC** | **Note: Four (4) alarms will be received and discussed separately during this Event. (Two alarms on page 1 of 6) (Two alarms on page 4 of 6)** |
| | **RO** | - Reports alarm H13-P680-4 (E11), RCIRC B MOTOR VIB HI (unexpected). Informs SRO. |
| | | - Automatic Actions: None |
| | | - Immediate Actions: None |
| | | - Subsequent Operator Actions: |
| | **NRC** | **Note: Only applicable Subsequent Operator Actions will be discussed.** |
| | **RO** | - Attempt to reset the alarm by taking RCIRC MOTOR VIB HI ALARM RESET 1B33-S110 to the B position at 1H13-P680. |
| | **RO (cont.)** | - Alarm H13-P680-4 (E11) resets. Informs SRO. |
| | **RO** | - Reports alarm H13-P680-4 (C11), RCIRC B MOTOR CLR LEAKAGE HI (unexpected). Informs SRO. |
| | | - Automatic Actions: None |
| | | - Immediate Actions: None |
| | | - Subsequent Operator Actions: |
| | **NRC** | **Note: Only applicable Subsequent Operator Actions will be discussed.** |
| | **RO (cont.)** | - Trips RCIRC PUMP B. Informs SRO. |
| | **SRO** | - Refers to ONI-C51, Unplanned Change in Reactor Power or Reactivity. |
| | **SRO** | - Refers to Technical Specification LCO 3.4.1, Recirculation Loops-Operating. |
| | **NRC** | **Note: Recirc Pump B seal failure will be discussed on page 4 of 5** |

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**Event Description No. 5: Recirculation Pump B Vibration and Motor Cooler Leakage./ ONI-C51, Unplanned Change in Reactor Power or Reactivity / Trip of Recirculation Pump B / Pump Seal Failure / Recirculation Loop B Isolation**

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | **SRO** | - Upon receiving report, enters ONI-C51, Unplanned Change in Reactor Power or Reactivity. |
| | | **ONI-C51, Unplanned Change in Reactor Power or Reactivity** |
| | | - Immediate Actions: None |
| | | - Supplemental Actions: |
| | **NRC** | **Note: Only applicable Supplemental Actions will be discussed.** |
| | **SRO** | - Plant is in Mode 1 or 2 then perform the remainder of actions in ONI-C51FLOWCHART Revision G. |
| | | **ONI-C51 FLOWCHART Revision G** |
| | **SRO (cont.)** | - Verifies that NO Immediate Actions are required to be completed. |
| | **SRO (cont.)** | - Records Entry Time. |
| | **SRO (cont.)** | - Directs RO to monitor for oscillations. |
| | **RO** | - Monitors APRMs, LPRMs, and SRM Period meters for oscillations. |
| | **SRO (cont.)** | - Answers NO to the Override 'Are Power Oscillations Observed?' |
| | **NRC** | **Note: For the next Override, if SRO believes power/flow is in the Immediate Exit Region, then Cram Rod insertion will be required. The SRO will still direct all remaining Flowchart steps regardless if the Override is answered YES or No.** |
| | **SRO (cont.)** | - Answers YES to the Override 'Is power in either: **Immediate Exit Region** or Controlled entry/Immediate Exit Region?' |
| | **SRO (cont.)** | - Performs the following steps concurrently |
| | **SRO (cont.)** | - When sufficient manpower is available then proceed.<br>**Note: This flowchart path will also be entered when the SRO answers NO to the above Override.** |
| | **SRO (cont.)** | - Determines both reactor Recirc pumps are NOT running in fast speed. |
| | **SRO (cont.)** | - Determines Cram Rods can be inserted. |
| | **SRO (cont.)** | - Directs RO to insert CRAM RODS per FTI-B02. |
| | **RO** | - Insert CRAM RODS per FTI-B02. Informs SRO. |

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**Event Description No. 5: Recirculation Pump B Vibration and Motor Cooler Leakage./ ONI-C51, Unplanned Change in Reactor Power or Reactivity / Trip of Recirculation Pump B / Pump Seal Failure / Recirculation Loop B Isolation**

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | **SRO (cont.)** | - Answers NO to the Override 'Is power in either: **Immediate Exit Region** or Controlled entry/Immediate Exit Region?' |
| | **SRO (cont.)** | - Directs Shift Engineer to collect data. |
| | **SE** | - Refers to ONI-SPI G-4, Power Verification |
| | **SRO (cont.)** | - Determines an unplanned Reactor Power increase has NOY occurred. |
| | **SRO (cont.)** | - Determines nuclear instrumentation has NOT failed. |
| | **SRO (cont.)** | - Determines both recirc pump A and recirc pump B are NOT operating. |
| | **SRO (cont.)** | - Determines both recirc pump A and recirc pump B are NOT tripped. |
| | **SRO (cont.)** | - Directs RO to stabilize Loop parameters. |
| | **RO** | - Stabilizes Loop parameters per ONI-SPI G-2, Single Pump Operation. |
| | | **Section 1.0 Procedure** |
| | **RO (cont.)** | - Records Recirculation Loop data. |
| | **RO (cont.)** | - When Recirculation loop flow mismatch is within tech spec limits then record the END time of mismatch. |
| | **RO (cont.)** | - When time permits then record the data in previous two (2) steps above in the Plant Narrative Log. |
| | **RO (cont.)** | - If only Reactor Recirculation Pump B is tripped then perform SECTION 3.0 RECIRCULATION PUMP B TRIP OPERATION. |
| | | **Section 3.0 Recirculation Pump B Trip Operation** |
| | **RO (cont.)** | - If Recirculation Pump A is operating in fast speed, then adjust flow within the following limitations: |
| | **RO (cont.)** | - PUMP AMPS: ≤ 307 amps |
| | **RO (cont.)** | - LOOP FLOW: > 45% (with the B pump declared not in operation) or < 103%. |
| | **RO (cont.)** | - Stator Temperature: ≤ 248°F |

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**Event Description No. 5: Recirculation Pump B Vibration and Motor Cooler Leakage./ ONI-C51, Unplanned Change in Reactor Power or Reactivity / Trip of Recirculation Pump B / Pump Seal Failure / Recirculation Loop B Isolation**

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | **NRC** | **Note: Isolation of Recirculation Loop B will be included in the following Recirc Pump seal failure discussion on page 4 of 5.** |
| | **NRC** | **Note: Recirculation Pump B is already tripped at this point in the Event.** |
| | **RO** | - Reports alarm H13-P680-4 (A10), RCIRC B INNER SEAL FLOW HI/LO (unexpected). Informs SRO. |
| | | - Automatic Actions: None |
| | | - Immediate Actions: None |
| | | - Subsequent Operator Actions: |
| | **NRC** | **Note: Only applicable Subsequent Operator Actions will be discussed.** |
| | **RO** | - Evaluates Recirculation Pump B inner (#1) B33-R603B and outer (#2) B33-R602B seal cavity pressures. |
| | **RO (cont.)** | - Determines only the inner seal has failed because outer seal pressure is approaching inner seal pressure. Informs SRO. |
| | **RO/BOP** | - Monitors for an increase in IDENTIFIED LEAKAGE. |
| | **RO** | - Reports alarm H13-P680-4 (B10), RCIRC B OUTER SEAL LEAKAGE HI (unexpected). Informs SRO. |
| | | - Automatic Actions: None |
| | | - Immediate Actions: None |
| | | - Subsequent Operator Actions: |
| | **NRC** | **Note: Only applicable Subsequent Operator Actions will be discussed.** |
| | **RO** | - Evaluates Recirculation Pump B inner (#1) B33-R603B and outer (#2) B33-R602B seal cavity pressures. |
| | **RO (cont.)** | - Determines both seals have failed because pressure in both seals is decreasing. Informs SRO. |
| | **RO/BOP** | - Monitors for an increase in IDENTIFIED LEAKAGE. |
| | | |

**Op-Test No.: 2007-01** **Scenario No.: 2** 

**Event Description No. 5: Recirculation Pump B Vibration and Motor Cooler Leakage./ ONI-C51, Unplanned Change in Reactor Power or Reactivity / Trip of Recirculation Pump B / Pump Seal Failure / Recirculation Loop B Isolation**

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | **SRO** | - When report is received that both Recirculation Pump B seals have failed, then directs RO to isolate Recirculation Loop B per SOI-B33 Section 7.18 |
| | | **Isolating RCIRC Loop(s) per SOI-B33 Section 7.18.** |
| | **RO** | - Confirms the offgoing Rcirc Pump B is shutdown |
| | **RO (cont.)** | - Records Initial Conditions Data on the Rcirc Loop Isolation Data Sheet. **(Attachment 2)** |
| | **RO (cont.)** | - Closes the offgoing loop RWCU SUCT FM RCIRC LOOP 1G33-F106. |
| | **RO (cont.)** | - If Seal Purge is in operation, then refers to the applicable Seal Purge Supply Shutdown section. |
| | **NRC** | **Note: The applicable section is Shutdown of Seal Purge Supply With the Control Rod Drive Hydraulic System per SOI-B33 Section 7.30.** |
| | | **Shutdown of Seal Purge Supply With the Control Rod Drive Hydraulic System per SOI-B33 Section 7.30.** |
| | **RO** | - Confirms the offgoing Rcirc Pump B is shutdown |
| | **RO (cont.)** | - Directs Plant Operator (PO) to close the RCIRC Pump Seal Flow Control Isol 1C11-F026B. |
| | **RO (cont.)** | - Directs Plant Operator (PO) to perform independent verification of required components per Attachment 22-Verification Checklist Section 7.30, Shutdown of Seal Purge Supply With the Control Rod Drive Hydraulic System to RCIRC Pump B. |
| | **NRC** | **Note: RO refers back to SOI-B33 Section 7.18 for the remainder of the Recirculation Loop B isolation.** |
| | **RO (cont.)** | **Isolating RCIRC Loop(s) per SOI-B33 Section 7.18.** |
| | **RO (cont.)** | - Closes offgoing loop RCIRC PUMP SUCTION VALVE 1B33-F023B. |
| | **RO (cont.)** | - Closes offgoing loop RCIRC PUMP DISCHARGE VALVE 1B33-F067B. |
| | **RO (cont.)** | - Performs Independent Verification of the required components per Attachment 9- Verification Checklist Section 7.18, RCIRC Loop B Isolation. |
| | **RO (cont.)** | - When appropriate, then records Cooldown Completion Data on the RCIRC Loop Isolation Data Sheet (Attachment 2). |

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**Event Description No. 6: Manual Reactor Scram Due to Increasing Drywell Pressure / ONI-C71-1, Reactor Scram / PEI-B13, RPV Control (Non-ATWS) / Increasing Containment Pressure Due to SDV Rupture / PEI-T23, Containment Control**

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | **NRC** | **Event 6 Summary: Drywell pressure will increase due to Recirculation Pump B seal failure. The SRO will establish a Drywell pressure limit that, when reached, will require the RO to insert manual reactor scram. ONI-C71-1, Reactor Scram will be entered. PEI-B13, RPV Control (Non-ATWS) will be entered on RPV low level and/or high Drywell pressure. Containment pressure will also increase due to a rupture of the SDV. PEI-T23, Containment Control will also be entered.** |
| | **NRC** | **Note: Two (2) alarms will be received and discussed separately during this Event.** |
| | **BOP** | - Reports alarm H13-P601-18 (C1), DW UNIDENTIFIED RATE OF CHANGE HIGH (unexpected). Informs SRO. |
| | | - Automatic Actions: None |
| | | - Immediate Actions: None |
| | | - Subsequent Operator Actions: |
| | **NRC** | **Note: Only applicable Subsequent Operator Actions will be discussed.** |
| | **BOP/RO** | - Monitor the Drywell temperature. |
| | **BOP/RO** | - Monitor the Drywell pressure. |
| | **BOP (cont.)** | - Monitor the following on DW FLOOR DRAIN SUMP LEVEL & RATE recorder on Leak Detection Panel Division 2, 1H13-P642: |
| | **BOP (cont.)** | - DW Floor Drain Sump level trend on 1E31-R618. |
| | **BOP (cont.)** | - DW Floor Drain Sump fill-rate trend on 1E31-R618. |
| | **SRO** | - If the cause of the leak can NOT be corrected, then refer to IOI-4, Shutdown and commence a reactor shutdown. |
| | **SRO** | - Consult EPI-A1, Emergency Action Levels, for Emergency Plan Classification and actions. |
| | | |
| | **BOP/RO** | - Observes rising Drywell pressure trend. Informs SRO. |
| | | |

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**Event Description No. 6: Manual Reactor Scram Due to Increasing Drywell Pressure / ONI-C71-1, Reactor Scram / PEI-B13, RPV Control (Non-ATWS) / Increasing Containment Pressure Due to SDV Rupture / PEI-T23, Containment Control**

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | **BOP** | - Observes rising DW Floor Drain Sump level and fill rate trend. Informs SRO. |
| | | |
| | **BOP** | - Reports alarm H13-P601-18 (A1), DW IDENTIFIED RATE OF CHANGE HIGH (unexpected). Informs SRO. |
| | | - Automatic Actions: None |
| | | - Immediate Actions: None |
| | | - Subsequent Operator Actions: |
| | **NRC** | **Note: Only applicable Subsequent Operator Actions will be discussed.** |
| | **BOP** | - Monitor the following at ECCS Benchboard, 1H13-P601: |
| | **BOP (cont.)** | - Drywell temperature |
| | **BOP (cont.)** | - Drywell pressure |
| | **BOP (cont.)** | - Monitor the following at Leak Detection Panel Division 2, 1H13-P642 to determine if Technical Specification limit is exceeded: |
| | **BOP (cont.)** | - DW Equipment Drain Sump level trend. |
| | **BOP (cont.)** | - DW Equipment Drain Sump fill-rate trend. |
| | **SRO** | - If the cause of the identified leak can NOT be corrected, then go to IOI-4, Shutdown to commence a Reactor Shutdown. |
| | | |
| | **SRO** | - Based on rising Drywell pressure trend, establishes a limit on Drywell pressure at which time the RO will insert a manual reactor scram. |
| | | |
| | **RO/BOP** | - Continue to monitor rising Drywell pressure and inform SRO. |
| | **NRC** | **Note: The reactor will automatically scram if Drywell pressure exceeds 1.68 psig.** |
| | **RO** | - Informs SRO when Drywell pressure reaches established limit. |
| | **RO** | - Inserts a manual reactor scram. |

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**Event Description No. 6: Manual Reactor Scram Due to Increasing Drywell Pressure / ONI-C71-1, Reactor Scram / PEI-B13, RPV Control (Non-ATWS) / Increasing Containment Pressure Due to SDV Rupture / PEI-T23, Containment Control**

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | **SRO** | - Upon receiving report from RO, enters ONI-C71-1, Reactor Scram. |
| | | **ONI-C71-1, Reactor Scram** |
| | | - Immediate Actions |
| | **RO** | - If this instruction is NOT being entered from PEI-B13, Reactor Pressure Vessel Control, then refer to the Reactor Scram Hardcard, Rev 4-10-06 and perform the actions. |
| | **NRC** | **Note: ONI-C71-1 Supplemental Actions, although required to be performed, will NOT be discussed since entry into and execution of PEI-B13 and PEI-T23 will be a higher priority.** |
| | | |
| | | **Reactor Scram Hardcard (Attachment 10 of PYBP-SITE-0052)** |
| | **NRC** | **Note: Only applicable Hardcard Actions will be discussed.** |
| | **RO** | - Place Mode Switch in Shutdown and remove the key. |
| | | **- Note: Suggested wording is presented for announcements. Similar wording may be used.** |
| | **RO (cont.)** | - Perform the following: |
| | **RO (cont.)** | - Announce the following: |
| | **RO (cont.)** | - Crew – standby for scram announcement. |
| | **RO (cont.)** | - The Mode Switch is locked in shutdown. |
| | **RO (cont.)** | - All Control Rods are inserted. |
| | **RO (cont.)** | - When the above actions are complete, then announce the following: |
| | **RO (cont.)** | - Scram announcement complete. |
| | **RO (cont.)** | - Verify HST LVLCV MANUAL CONTROL, N21-S19, in OFF. |
| | | |

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**Event Description No. 6: Manual Reactor Scram Due to Increasing Drywell Pressure / ONI-C71-1, Reactor Scram / PEI-B13, RPV Control (Non-ATWS) / Increasing Containment Pressure Due to SDV Rupture / PEI-T23, Containment Control**

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | **RO (cont.)** | - Verify the reactor water level stabilizes near 200 inches (178 inches if Setpoint Setdown is actuated) using the following systems in the order indicated: |
| | **NRC** | **Note: MFP failure to start will be discussed in Event 7.** |
| | **NRC** | **Note: The REACTOR SCRAM FEEDWATER HARDCARD actions are discussed below at the bottom of page 4 of 9.** |
| | **RO (cont.)** | - Feedwater (Refer to REACTOR SCRAM FEEDWATER HARDCARD). |
| | **RO (cont.)** | - RCIC |
| | **RO (cont.)** | - HPCS |
| | **NRC** | **Note: Reactor pressure control is expected to be maintained with the Bypass Valves.** |
| | **RO (cont.)** | - Inform the Unit Supervisor of systems being used for current level and pressure control. |
| | **RO (cont.)** | - When generator load is reduced to less than 90 MWe, then perform the following: |
| | **RO (cont.)** | - Trip the main turbine by depressing the TURBINE TRIP pushbutton. |
| | **RO (cont.)** | - Verify the following have occurred: |
| | **RO (cont.)** | - MAIN STOP VALVES, CONTROL VALVES, and COMBINED INTERMEDIATE VALAVES shut. |
| | **RO (cont.)** | - GEN BRKRs S-610-PY-TIE and S-611-PY-TIE open. |
| | **RO (cont.)** | - GEN FIELD BRKR trips. |
| | **RO (cont.)** | - When power is ≤ 4%, then insert SRMs and IRMs. |
| | | **Reactor Scram Feedwater Hardcard (Attachment 11 of PYBP-SITE-0052)** |
| | **NRC** | **Note: Only applicable Hardcard Actions will be discussed.** |
| | **NRC** | **Note: The intent of the following Caution is to prevent a Level 8 trip of the RFPTs and MFP.** |
| | | **Caution: RFPTs should be shifted to manual speed control prior to RPV pressure decreasing below 825 psig.** |

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**Event Description No. 6: Manual Reactor Scram Due to Increasing Drywell Pressure / ONI-C71-1, Reactor Scram / PEI-B13, RPV Control (Non-ATWS) / Increasing Containment Pressure Due to SDV Rupture / PEI-T23, Containment Control**

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | | **Following a Reactor Scram** |
| | **NRC** | **Note: Only applicable Hardcard Actions will be discussed.** |
| | **RO** | - Shift feedwater level control from 3E Level Control to 1E Level Control. |
| | **RO (cont.)** | - With RPV Level ≥ 178 inches, then perform the following: |
| | **RO (cont.)** | - Verify the MFP running. |
| | **RO (cont.)** | - MFP control switch is taken to START. |
| | **RO (cont.)** | **- Observes MFP fails to start. Observes ARI-H13-P680-3 (C8), MFP FAIL TO START. Informs SRO.** |
| | **RO (cont.)** | - Observes ARI-H13-P680-3 (A1), MFP DC OIL PUMP START FLOW LO and (A2), MFP DC OIL PUMP START PRESS LO. Informs SRO. |
| | **RO (cont.)** | - Dispatches Plant Operator (PO) to inspect MFP Lube Oil System. |
| | **RO (cont.)** | - PO reports severe MFP Lube Oil leak. Informs SRO. |
| | **NRC** | **Note: MFP failure to start will be discussed in Event 7 again.** |
| | **NRC** | **Note: RO exits this section of hardcard and proceeds to the next section.** |
| | **RO (cont.)** | **As Necessary to Control RPV Level** |
| | **NRC** | **Note: Only applicable Hardcard Actions will be discussed.** |
| | **RO (cont.)** | - Control RPV Level using RFPT MAN/AUTO STATION or RFPTs on manual speed control. |
| | **RO (cont.)** | - Fully open Recirc Flow Valves for operating Reactor Feed Pumps. |
| | **NRC** | **Note: If RPV Level reaches Level 8 (220 inches), then the operating Reactor Feed Pumps will trip. The RO will then have to proceed to the 'If Feedwater Pumps Tripped on Level 8' section of the hardcard.** |
| | **NRC** | **Note: PEI-B13, RPV Control (Non-ATWS) will have to be entered if RPV Level lowers to Level 3 (178 inches) or Drywell pressure exceeds 1.68 psig.** |
| | **NRC** | **Note: PEI-T23, Containment Control will have to be entered when Drywell pressure exceeds 1.68 psig.** |

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**Event Description No. 6: Manual Reactor Scram Due to Increasing Drywell Pressure / ONI-C71-1, Reactor Scram / PEI-B13, RPV Control (Non-ATWS) / Increasing Containment Pressure Due to SDV Rupture / PEI-T23, Containment Control**

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | **RO** | - Informs SRO when RPV Level lowers to Level 3 (178 inches) or Drywell pressure exceeds 1.68 psig. |
| | **SRO** | - Upon receiving report, enters PEI-B13, RPV Control (Non-ATWS). |
| | **NRC** | **Note: PEI-T23, Containment Control will be discussed on page 9 of 9.** |
| | | **PEI-B13, RPV Control (Non-ATWS)** |
| | **SRO** | - Determines that the reactor scrammed. |
| | **SRO (cont.)** | - Determines that the Reactor Mode Switch was placed in SHUTDOWN. |
| | **SRO (cont.)** | - Directs the BOP to start the Hydrogen Analyzers. |
| | **BOP** | - Starts the Hydrogen Analyzers per PYBP-SITE-0052, Attachment 13, Hydrogen Analyzer Startup Hardcard. Informs SRO. |
| | **SRO (cont.)** | - - Answers YES to the Override 'Is Reactor shutdown under all conditions without boron?' |
| | **SRO (cont.)** | - Directs RO to insert IRMs and SRMs. |
| | **RO** | - Inserts IRMs and SRMs. Informs SRO. |
| | **NRC** | **Note: The RPV Level Control leg and RPV Pressure Control leg are executed concurrently. The RPV Pressure Control leg actions will be discussed on page 7 of 9.** |
| | | **RPV Level Control Leg** |
| | **SRO** | - Directs BOP to initiate any of the following which should have initiated: HPCS / RCIC / LPCS / LPCI / DGs / MSL Isolation / RHR Isolation / RWCU Isolation / Reactor Sampling Isolation. |
| | **SRO (cont.)** | - Answers YES to the Override 'Can RPV level be determined?' |
| | **SRO (cont.)** | - Answers YES to the Override 'Can both Suppression Pool level and Containment pressure be maintained below PCL?' |
| | **SRO (cont.)** | - Directs RO and/or BOP to restore and maintain RPV level between 185 and 215 inches using one or more of the following systems: |
| | | - Condensate and Feedwater |
| | | - CRD |
| | | - RCIC (not available due to isolation) |
| | | - HPCS |

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**Event Description No. 6: Manual Reactor Scram Due to Increasing Drywell Pressure / ONI-C71-1, Reactor Scram / PEI-B13, RPV Control (Non-ATWS) / Increasing Containment Pressure Due to SDV Rupture / PEI-T23, Containment Control**

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | **SRO (cont.)** | - LPCS<br>- LPCI |
| | **RO/BOP** | - Restore and maintain RPV level between 185 and 215 inches (using the systems listed above). |
| | **RO/BOP (cont.)** | - If required, informs SRO when he CANNOT maintain the specified RPV level band. |
| | **SRO (cont.)** | - Determines RPV level can be restored and maintained greater than 185 inches. |
| | **SRO (cont.)** | - Determines that ONI-C71-1, Reactor Scram has NOT been entered from RPV Pressure Control in this flowchart. |
| | **SRO (cont.)** | - Continues to execute RPV Level Control leg in a loop. |
| | | **RPV Pressure Control Leg** |
| | **SRO** | - Answers YES to the Override 'Can RPV level be determined?' |
| | **NRC** | **Note: It is assumed that Drywell pressure has exceeded 1.68 psig at this point. If it has NOT, then the actions in the following will NOT have to be performed at this time.** |
| | **SRO (cont.)** | - Answers YES to the Override 'Is Drywell pressure greater than 1.68 psig?' |
| | **SRO (cont.)** | - Determines any Low Pressure ECCS is NOT required for adequate core cooling. |
| | **SRO (cont.)** | - Directs BOP to prevent injection per PEI-SPI 5.2, LPCS and LPCI Injection Prevention. |
| | **BOP** | - Prevents injection per PEI-SPI 5.2, LPCS and LPCI Injection Prevention. |
| | **SRO (cont.)** | - Answers NO to the Override 'Is Emergency Depressurization anticipated?' |
| | **SRO (cont.)** | - Answers NO to the Override 'Is Emergency Depressurization Required?' |
| | **SRO (cont.)** | - Determines any SRV is NOT cycling. |
| | **SRO (cont.)** | - Answers YES to the Override 'Can Suppression Pool Temperature be maintained below HCL?' |

**Op-Test No.: 2007-01** **Scenario No.: 2** 

**Event Description No. 6: Manual Reactor Scram Due to Increasing Drywell Pressure / ONI-C71-1, Reactor Scram / PEI-B13, RPV Control (Non-ATWS) / Increasing Containment Pressure Due to SDV Rupture / PEI-T23, Containment Control**

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | **NRC** | **Note: An initial RPV pressure band of 800 to 1000 psig using Bypass Valves is expected.** |
| | **SRO (cont.)** | - Directs RO to stabilize RPV pressure to less than or equal to 1000 psig using Main Turbine Bypass Valves. |
| | **RO** | - Maintains RPV pressure within specified band using Main Turbine Bypass Valves. Informs SRO. |
| | **RO (cont.)** | - Informs SRO when he CANNOT maintain the specified RPV pressure band. |
| | **NRC** | **Note: It is expected that the SRO will change (lower) the RPV pressure band once it is determined that Containment pressure is increasing due to the SDV rupture. (A lower RPV pressure reduces the driving head of the primary system leak).** |
| | **SRO (cont.)** | - Answers NO to the Override 'Is Steam Cooling being performed in RPV Level Control?' |
| | **SRO (cont.)** | - Directs RO to perform a controlled depressurization of the RPV. |
| | **RO** | - Commences a controlled depressurization of the RPV using the Main Turbine Bypass Valves not to exceed 100°F/hr. |
| | **SRO (cont.)** | - Answers NO to the Override 'Are SRVs being used to depressurize the RPV?' |
| | **NRC** | **Note: In the next step, Drywell pressure is expected to be above 1.68 psig (PEI Entry condition).** |
| | **SRO (cont.)** | - Answers YES to the Override 'Do any PEI entry conditions remain?' |
| | **NRC** | **Note: RPV pressure is NOT expected to be less than 135 psig before Emergency Depressurization is required in Event 8.** |
| | **SRO (cont.)** | - When Reactor pressure is less than 135 psig then proceed (Hold step). |
| | | |
| | **RO/BOP** | - Informs SRO when Drywell pressure exceeds 1.68 psig. |
| | **SRO** | - Upon receiving report, enters PEI-T23, Containment Control. |
| | **NRC** | **Note: All five (5) PEI-T23 legs are executed concurrently. ONLY the Drywell and Containment Pressure Control leg actions will be discussed since PSP is the critical limit that will require Emergency Depressurization.** |

**Op-Test No.: 2007-01** **Scenario No.: 2** 

**Event Description No. 6: Manual Reactor Scram Due to Increasing Drywell Pressure / ONI-C71-1, Reactor Scram / PEI-B13, RPV Control (Non-ATWS) / Increasing Containment Pressure Due to SDV Rupture / PEI-T23, Containment Control**

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | **NRC** | **Note: Additional PEI-T23, Containment Control actions will be discussed in Event 8 when Containment pressure can NOT be maintained below PSP.** |
| | **RO/BOP** | - Observe rising Containment pressure trend. Informs SRO |
| | **SRO** | - Acknowledges rising Containment pressure trend. |
| | **SRO (cont.)** | - Determines PSP is a critical limit |
| | **SRO (cont.)** | - Based on rising Containment pressure trend, establishes a limit on Containment pressure at which time the BOP will perform Emergency Depressurization. |
| | **RO/BOP** | - Continue to monitor rising Containment pressure and inform SRO. |
| | | |
| | | **PEI-T23, Containment Control** |
| | | **Drywell and Containment Pressure Control** |
| | **SRO** | - When either the following conditions exist then proceed. |
| | **SRO (cont.)** | - Drywell pressure CANNOT be maintained less than 1.68 psig. |
| | **SRO (cont.)** | - Containment pressure CANNOT be maintained less than 1.5 psig. |
| | **SRO (cont.)** | - Answers YES to the Override 'Can Containment pressure be maintained greater than 0 psig?' |
| | **SRO (cont.)** | - Determines Containment pressure can be maintained below PSP. |
| | | |
| | **NRC** | **Note: Additional PEI-T23, Containment Control actions will be discussed in Event 8 when Containment pressure can NOT be maintained below PSP.** |
| | **RO/BOP** | - Continue to monitor rising Containment pressure and inform SRO. |
| | | |
| | | |
| | | |
| | | |
| | | |

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**Event Description No. 7: Motor Feed Pump (MFP) Failure to Start / HPCS Injection Valve 1E22-F004 Failure to Auto Open**

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | **NRC** | **Note: The following component failures will be identified by the RO and/or BOP during execution of ONI-C71-1 and/or PEI-B13, RPV Control (Non-ATWS).** |
| | **NRC** | **Note: Following the scram, RPV pressure will decrease significantly due to the low initial reactor power level and post-scram decay heat level. If the RO does NOT shift the RFPTs to their manual speed control dials (and then lower RFPT speed) in a timely manner, the RFPTs will overfeed the RPV when RPV pressure decreases below 825 psig until RPV Level 8 (220 inches) is reached. At that time, the RFPTs will trip. In addition, the HPCS and RCIC Injection valves will NOT open** |
| | | **Reactor Scram Feedwater Hardcard (Attachment 11 of PYBP-SITE-0052)** |
| | | **Caution: RFPTs should be shifted to manual speed control prior to RPV pressure decreasing below 825 psig.** |
| | | **Following a Reactor Scram** |
| | **NRC** | **Note: Only applicable Hardcard Actions will be discussed.** |
| | **RO** | - Shift feedwater level control from 3E Level Control to 1E Level Control. |
| | **RO (cont.)** | - With RPV Level ≥ 178 inches, then perform the following: |
| | **RO (cont.)** | - Verify the MFP running. |
| | **RO (cont.)** | - MFP control switch is taken to START. |
| | **RO (cont.)** | **- Observes MFP fails to start. Observes ARI-H13-P680-3 (C8), MFP FAIL TO START. Informs SRO.** |
| | **RO (cont.)** | - Observes ARI-H13-P680-3 (A1), MFP DC OIL PUMP START FLOW LO and (A2), MFP DC OIL PUMP START PRESS LO. Informs SRO. |
| | **RO (cont.)** | - Dispatches Plant Operator (PO) to inspect MFP Lube Oil System. |
| | **RO (cont.)** | - PO reports severe MFP Lube Oil leak. Informs SRO. |
| | **NRC** | **Note: RO exits this section of hardcard and proceeds to the next section.** |
| | | |
| | | |

**Op-Test No.: 2007-01** **Scenario No.: 2** **Page 2 of 2**

**Event Description No. 7: Motor Feed Pump (MFP) Failure to Start / HPCS Injection Valve 1E22-F004 Failure to Auto Open**

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | **RO (cont.)** | **As Necessary to Control RPV Level** |
| | **NRC** | **Note: Only applicable Hardcard Actions will be discussed.** |
| | **RO (cont.)** | - Control RPV Level using RFPT MAN/AUTO STATION or RFPTs on manual speed control. |
| | **RO (cont.)** | - Fully open Recirc Flow Valves for operating Reactor Feed Pumps. |
| | **NRC** | **Note: If RPV exceeds Level 8 (220 inches), the RO exits this section of hardcard and proceeds to 'If Feedwater Pumps Tripped on Level 8' section.** |
| | **RO (cont.)** | **If Feedwater Pumps Tripped on Level 8** |
| | **NRC** | **Note: Only applicable Hardcard Actions will be discussed.** |
| | **RO (cont.)** | - When less than RPV L8, then depress the L8 trip reset pushbuttons. |
| | **RO (cont.)** | - If the MFP is not available: |
| | **RO (cont.)** | - Refer to ONI-N27 to perform Reactor Feed Pump Quick Restart. |
| | **RO (cont.)** | - Fully open Recirc Flow Valves for operating Reactor Feed Pumps. |
| | **NRC** | **Note: If RPV level lowers to Level 2 (130 inches), then the HPCS System will receive an automatic start signal. RCIC is NOT available due to isolation.** |
| | **BOP** | - When RPV level lowers to Level 2 (130 inches), verifies HPCS logic initiates and seals-in. Informs SRO. |
| | **BOP (cont.)** | - Verifies HPCS Pump automatically starts. |
| | **BOP (cont.)** | **- Observes the HPCS Injection Valve 1E22-F004 did NOT automatically open (if RPV level is less than Level 8 (220 inches)). Informs SRO.** |
| | **BOP (cont.)** | - Takes HPCS Injection Valve control switch to OPEN. |
| | **BOP (cont.)** | - Confirms HPCS Injection Valve opens. Informs SRO. |
| | **NRC** | **Note: If RPV level rises to Level 8 (220 inches), then the HPCS Injection Valve will receive an automatic closure signal.** |
| | **BOP (cont.)** | - Cycles the HPCS Injection Valve (closed and open) as required to maintain RPV level band as specified by the SRO. |

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**Event Description No. 8: Loss of Off-Site Power / ONI-R10, Loss of AC Power / PEI-T23, Containment Control / Total Loss of RHR Containment Spray Mode / Emergency Depressurization Performed Prior to Exceeding Pressure Suppression Pressure (PSP)**

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | **NRC** | **Event 8 Summary: A loss of Off-Site Power will occur. ONI-R10, Loss of AC Power will be entered. Division 1 and 3 Class 1E busses will be re-energized from their respective Diesel Generator. Division 2 Class 1E bus will fail to re-energize because the Division 2 Diesel Generator is in secured status resulting in the loss of RHR Pump B for the Containment Spray mode. Containment pressure continues to rise due to the SDV rupture. When RHR A is started in the Containment Spray mode, Containment Spray A First Shutoff Valve 1E12-F028A will fail to open. Prior to exceeding the Pressure Suppression Pressure, the SRO will direct Emergency Depressurization to be performed per PEI-B13, Emergency Depressurization. RPV and Containment parameters will be stabilized.** |
| | | |
| | **NRC** | **Note: SRO will have to prioritize ONI-R10, PEI-B13, and PEI-T23 actions.** |
| | | |
| | **NRC** | **Additional PEI-B13, RPV Control (Non-ATWS) actions will be discussed on page 6 of 9, page 7 of 9, and page 9 of 9.** |
| | | |
| | **NRC** | **Additional PEI-T23, Containment Control actions will be discussed on page 8 of 9.** |
| | | |
| | **RO/BOP** | - Recognize control panel for a loss of off-site power. Inform SRO. |
| | **SRO** | - Upon receiving report, enters ONI-R10, Loss of AC Power. |
| | | |
| | | **ONI-R10, Loss of AC Power** |
| | | - Immediate Actions: None |
| | | - Supplemental Actions: |
| | **NRC** | **Note: Only applicable Supplemental Actions will be discussed.** |
| | **SRO** | - Using ONI-R10 FLOWCHART Revision A, perform the actions. |

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**Event Description No. 8: Loss of Off-Site Power / ONI-R10, Loss of AC Power / PEI-T23, Containment Control / Total Loss of RHR Containment Spray Mode / Emergency Depressurization Performed Prior to Exceeding Pressure Suppression Pressure (PSP)**

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | | |
| | | **ONI-R10 FLOWCHART Revision A** |
| | **SRO** | - Verifies Initial Actions completed. |
| | **RO/BOP** | - Confirm evacuation of the Containment Building. Informs SRO. |
| | **BOP** | - Confirms RCIC System is NOT available. Informs SRO. |
| | **BOP** | - Confirms operation of Division 1 and 3 DGs. Informs SRO. |
| | **BOP (cont.)** | **- Confirms Division 2 DG is still in secured status.** |
| | **SRO** | - Records time of loss of off-site power |
| | **SRO (cont.)** | - Directs RO/BOP to make notifications per ONI-SPI H-1, Security Actions and ONI-SPI H-2, SCC Notification. |
| | **RO/BOP** | - Directs SAS Operator to perform ONI-SPI H-1 notification. Informs SRO. |
| | **RO/BOP** | - Performs ONI-SPI H-2, SCC Notification. Informs SRO |
| | **SRO (cont.)** | - Directs RO/BOP to maintain BOP Systems availability per ONI-SPI D-7, BOP System Preservation. |
| | **RO/BOP**<br><br>**NRC** | - Performs ONI-SPI D-7, BOP System Preservation. Informs SRO.<br><br>**Note: ONI-SPI D-7 actions will NOT be discussed due to manpower limitations.** |
| | **SRO (cont.)** | - Within 15 minutes, classify the event per EPI-A1, Emergency Action Levels. |
| | **SRO (cont.)** | - Within 1 hour, refer to: |
| | | - LCO 3.8.1, AC Sources-Operating |
| | | - LCO 3.8.2, AC Sources-Shutdown |
| | | |
| | | |
| | | |

**Op-Test No.: 2007-01** **Scenario No.: 2** **Page 3 of 9**

**Event Description No. 8: Loss of Off-Site Power / ONI-R10, Loss of AC Power / PEI-T23, Containment Control / Total Loss of RHR Containment Spray Mode / Emergency Depressurization Performed Prior to Exceeding Pressure Suppression Pressure (PSP)**

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | **SRO (cont.)** | - Perform the following steps concurrently. |
| | **NRC** | **Note: There are two (2) concurrent flowpaths leg:** |
| | **NRC (cont.)** | **- LOOP Leg (far left flowchart leg) (to be discussed now)** |
| | **NRC (cont.)** | **- When Sufficient Manpower is Available Then Proceed Leg (far right flowchart leg) (to be discussed on page 4 of 9).** |
| | | |
| | | **LOOP Leg (far left flowchart leg)** |
| | **SRO** | - Answers YES to the Override 'Is any Low Pressure ECCS available for injection?' |
| | **SRO (cont.)** | - Directs RO/BOP to verify closed 1G41-F100, CNTMT POOL SUPP ISOL. |
| | **RO/BOP** | - Verifies closed 1G41-F100, CNTMT POOL SUPP ISOL. |
| | **SRO (cont.)** | - Directs RO/BOP to verify RHR in Suppression Pool Cooling. |
| | **NRC** | **Note: RHR B is NOT available for SP Cooling** |
| | **NRC** | **Note: RHR A will be required for Containment Spray operation.** |
| | **RO/BOP** | - Starts up RHR A in Suppression Pool Cooling mode per PYBP-SITE-0052, Attachment 12, Suppression Pool Cooling Hardcard (if plant conditions permit). |
| | **NRC** | **Note: Attachment 12 Hardcard actions will NOT be discussed due to manpower limitations.** |
| | **SRO (cont.)** | - Determines Spent Fuel Pool temperature is less than 130°F. |
| | **SRO (cont.)** | - Determines greater than 22 hours has NOT elapsed since ONI-R10 entry. |
| | **SRO (cont.)** | - Determines ESW Screen Wash Differential Level monitoring NOT completed within last 24 hours. |
| | **SRO (cont.)** | - Directs RO/BOP to monitor ESW Screen Wash Differential Level. |
| | **RO/BOP** | - Directs Plant Operator (PO) to monitor ESW Screen Wash Differential Level. Informs SRO. |
| | **SRO (cont.)** | - Determines ESW Screen Differential Level is less than 6 inches. |
| | **SRO (cont.)** | - Continues to execute LOOP leg in a loop. |

**Op-Test No.: 2007-01** **Scenario No.: 2** 

**Event Description No. 8: Loss of Off-Site Power / ONI-R10, Loss of AC Power / PEI-T23, Containment Control / Total Loss of RHR Containment Spray Mode / Emergency Depressurization Performed Prior to Exceeding Pressure Suppression Pressure (PSP)**

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | | **When Sufficient Manpower is Available Leg (far right flowchart leg)** |
| | **SRO** | - When sufficient manpower is available, then proceed |
| | **SRO (cont.)** | - Perform the following steps concurrently. |
| | **NRC** | **Note: There are four (4) concurrent flowpath legs that will be discussed in order from left to right. They are:** |
| | **NRC (cont.)** | **- Far Left leg / Middle Left leg / Middle Right leg / Far Right leg** |
| | | |
| | | **Far Left Leg** |
| | **SRO** | - Determines NO Serv / Inst Air Compressors are running. |
| | **SRO (cont.)** | - Enters ONI-P52, Loss of Service and/or Instrument Air. |
| | **NRC** | **Note: ONI-P52 actions will NOT be discussed due to manpower limitations.** |
| | **SRO (cont.)** | - Determines less than 2 Service Water Pumps are running. |
| | **SRO (cont.)** | - Enters ONI-P41, Loss of Service Water. |
| | **NRC** | **Note: ONI-P41 actions will NOT be discussed due to manpower limitations.** |
| | **SRO (cont.)** | - Directs RO/BOP to restore Off-Site power to EH Busses per ONI-SPI F-1, Off-Site Power Restoration. |
| | **RO/BOP** | - Restores Off-Site power to EH Busses per ONI-SPI F-1, Off-Site Power Restoration. |
| | **NRC** | **Note: ONI-SPI F-1 actions will NOT be discussed due to manpower limitations.** |
| | **NRC** | **Note: Remainder of Far Left Leg actions will NOT be discussed due to manpower limitations.** |
| | | |

**Op-Test No.: 2007-01** **Scenario No.: 2** 

**Event Description No. 8: Loss of Off-Site Power / ONI-R10, Loss of AC Power / PEI-T23, Containment Control / Total Loss of RHR Containment Spray Mode / Emergency Depressurization Performed Prior to Exceeding Pressure Suppression Pressure (PSP)**

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | | **Middle Left Leg** |
| | **SRO** | - Answers NO to the Override 'Is EH12 Energized?' |
| | **SRO (cont.)** | - Directs RO/BOP to place Div 2 D/G in Pull to Lock. |
| | **RO/BOP** | - Places Div 2 D/G in Pull to Lock. |
| | **SRO (cont.)** | - Directs RO/BOP to prepare Bus EH12 per ONI-SPI B-1, Bus EH12 Preparation. |
| | **RO/BOP** | - Prepares Bus EH12 per ONI-SPI B-1, Bus EH12 Preparation. |
| | **NRC** | **Note: ONI-SPI B-1 actions will NOT be discussed due to manpower limitations.** |
| | **SRO (cont.)** | - When EH12 Transfer Failure is Corrected then proceed. |
| | **NRC** | **Note: EH12 Transfer Failure will NOT be corrected because the Division 2 DG is in secured status.** |
| | | |
| | | **Middle Right Leg** |
| | **SRO** | - Answers YES to the Override 'Is EH11 Energized?' |
| | **SRO (cont.)** | - Directs RO/BOP to restore Low Pressure Injection per ONI-SPI A-3, Division 1 ECCS Restoration. |
| | **RO/BOP** | - Restores Low Pressure Injection per ONI-SPI A-3, Division 1 ECCS Restoration. |
| | **SRO (cont.)** | - Directs RO/BOP to verify EH11 System Operation per ONI-SPI A-4, EH11 System Operation. |
| | **RO/BOP** | - Verifies EH11 System Operation per ONI-SPI A-4, EH11 System Operation. |
| | **SRO (cont.)** | - Directs RO/BOP to verify XH11 System Operation per ONI-SPI A-2, Restoration of XH11 After LOOP. |
| | **RO/BOP** | - Verifies XH11 System Operation per ONI-SPI A-2, Restoration of XH11 After LOOP. |
| | **NRC** | **Note: ONI-SPI A-3, ONI-SPI A-4, and ONI-SPI A-2 actions will NOT be discussed due to manpower limitations.** |

**Op-Test No.: 2007-01** **Scenario No.: 2** **Page 6 of 9**

**Event Description No. 8: Loss of Off-Site Power / ONI-R10, Loss of AC Power / PEI-T23, Containment Control / Total Loss of RHR Containment Spray Mode / Emergency Depressurization Performed Prior to Exceeding Pressure Suppression Pressure (PSP)**

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | | **Far Right Leg** |
| | **SRO** | - Answers YES to the Override 'Is EH13 Energized?' |
| | **SRO (cont.)** | - Directs RO/BOP to verify EH13 System Operation per ONI-SPI C-4, EH13 System Operation. |
| | **RO/BOP** | - Verifies EH13 System Operation per ONI-SPI C-4, EH13 System Operation. |
| | **NRC** | **Note: ONI-SPI C-4 actions will NOT be discussed due to manpower limitations.** |
| | **NRC** | **Note: Remainder of When Sufficient Manpower is Available Leg (far right flowchart leg) actions will NOT be discussed due to manpower limitations.** |
| | | |
| | | **PEI-B13, RPV Control (Non-ATWS)** |
| | **NRC** | **Note: Following LOOP, the Feedwater System is NOT available. In addition, RCIC is still NOT available. HPCS System is available.** |
| | | **RPV Level Control Leg** |
| | **NRC** | **Note: Only the applicable RPV Level Control steps will be discussed at this point** |
| | **RO** | - Recognizes loss of Feedwater System. Informs US. |
| | **SRO** | - Directs RO/BOP to restore and maintain RPV level between 185 and 215 inches using HPCS (and CRD per PEI-SPI 4.1). |
| | **RO/BOP** | - Restore and maintain RPV level between 185 and 215 inches using HPCS (and CRD per PEI-SPI 4.1). Informs SRO. |
| | **RO/BOP (cont.)** | - If required, informs SRO when he CANNOT maintain the specified RPV level band. |
| | **SRO (cont.)** | - Determines RPV level can be restored and maintained greater than 185 inches. |
| | **SRO (cont.)** | - Determines that ONI-C71-1, Reactor Scram has NOT been entered from RPV Pressure Control in this flowchart. |
| | **SRO (cont.)** | - Continues to execute RPV Level Control leg in a loop. |
| | | |

**Op-Test No.: 2007-01** **Scenario No.: 2** **Page 7 of 9**

**Event Description No. 8: Loss of Off-Site Power / ONI-R10, Loss of AC Power / PEI-T23, Containment Control / Total Loss of RHR Containment Spray Mode / Emergency Depressurization Performed Prior to Exceeding Pressure Suppression Pressure (PSP)**

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | **NRC** | **Note: Following LOOP, the Main Turbine Bypass Valves are NOT available because the MSIVs closed.** |
| | | **RPV Pressure Control Leg** |
| | **NRC** | **Note: Only the applicable RPV Pressure Control steps will be discussed at this point** |
| | **RO/BOP** | - Recognizes loss of MSIVs. Informs US. |
| | **RO**<br>**NRC** | - Recognizes loss of Main Turbine Bypass Valves. Informs US.<br>**Note: An initial RPV pressure band of 700 to 900 psig using SRVs is expected.** |
| | **SRO (cont.)** | - Directs RO/BOP to maintain RPV pressure between 700 and 900 psig using SRVs. |
| | **RO/BOP** | - Maintains RPV pressure within specified band using Main Turbine Bypass Valves. Informs SRO. |
| | **RO/BOP (cont.)** | - Informs SRO when he CANNOT maintain the specified RPV pressure band. |
| | **NRC** | **Note: It is expected that the SRO will change (lower) the RPV pressure band once it is determined that Containment pressure is increasing due to the SDV rupture. (A lower RPV pressure reduces the driving head of the primary system leak).** |
| | **NRC** | **Note: Additional RPV Pressure Control actions will be discussed when SRO determines Emergency Depressurization is required due to PSP on page 9 of 9.** |
| | | |
| | **RO/BOP** | - Observe rising Containment pressure trend. Informs SRO |
| | **SRO** | - Acknowledges rising Containment pressure trend. |
| | **SRO (cont.)** | - Determines PSP is a critical limit |
| | **SRO (cont.)** | - Based on rising Containment pressure trend, establishes a limit on Containment pressure at which time the BOP will perform Emergency Depressurization. |
| | **RO/BOP** | - Continue to monitor rising Containment pressure and inform SRO. |
| | | |

**Op-Test No.: 2007-01** **Scenario No.: 2** **Page 8 of 9**

**Event Description No. 8: Loss of Off-Site Power / ONI-R10, Loss of AC Power / PEI-T23, Containment Control / Total Loss of RHR Containment Spray Mode / Emergency Depressurization Performed Prior to Exceeding Pressure Suppression Pressure (PSP)**

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | | **PEI-T23, Containment Control** |
| | | **Drywell and Containment Pressure Control** |
| | **NRC** | **Note: Only the applicable Drywell and Containment Pressure Control steps will be discussed at this point** |
| | **SRO** | - Determines Containment pressure CANNOT be maintained below PSP. |
| | **SRO (cont.)** | - Determines Containment pressure is greater than 2.25 psig. |
| | **SRO (cont.)** | - Directs BOP to spray Containment per PEI-SPI 3.1. |
| | **NRC** | **Note: RHR B is NOT available because Bus EH12 is de energized.** |
| | **BOP** | - Sprays Containment using RHR A per PEI-SPI 3.1. |
| | **BOP (cont.)** | **- Recognizes 1E12-F028A Containment Spray A First Shutoff Valve failed to open and lost all position indication. Informs SRO.** |
| | **BOP (cont.)** | **- Dispatches Plant Operator to check fuses for valve.** |
| | **SRO (cont.)** | - Determines that Containment Sprays are NOT available. |
| | **SRO (cont.)** | - Based on rising Containment pressure trend, establishes a limit on Containment pressure at which time the RO/BOP will insert emergency depressurize the RPV. |
| | **RO/BOP** | - Informs SRO when Containment pressure limit has been reached. |
| | **SRO (cont.)** | - Determines that Containment pressure CANNOT be maintained below PSP. |
| | **SRO (cont.)** | - Determines that Reactor is shutdown under all conditions without boron. |
| | **SRO (cont.)** | - Concurrently executes PEI-B13, RPV Control (Non-ATWS) at Point Z |
| | **NRC** | **Note: Additional Drywell and Containment Pressure Control actions will NOT be discussed since the SRO has determined Emergency Depressurization is required due to PSP.** |

**Op-Test No.: 2007-01** **Scenario No.: 2** 

**Event Description No. 8: Loss of Off-Site Power / ONI-R10, Loss of AC Power / PEI-T23, Containment Control / Total Loss of RHR Containment Spray Mode / Emergency Depressurization Performed Prior to Exceeding Pressure Suppression Pressure (PSP)**

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | | **RPV Pressure Control Leg** |
| | **NRC** | **Note: Only the applicable RPV Pressure Control steps will be discussed at this point** |
| | **SRO (cont.)** | - Enters RPPV Pressure Control Leg at Point Z. |
| | **SRO (cont.)** | - Answers YES to the Override 'Is Emergency Depressurization Required?' |
| | **SRO (cont.)** | - Concurrently exits RPV Pressure Control Leg to PEI-B13, Emergency Depressurization. |
| | | |
| | | **PEI-B13, Emergency Depressurization** |
| | **SRO** | - Answers YES to the Override 'Can RPV level be determined?' |
| | **SRO (cont.)** | - Answers NO to the Override 'Is Containment Water Level expected to exceed 45 ft.?' |
| | **SRO (cont.)** | - Determines that Reactor is shutdown under all conditions without boron. |
| | **SRO (cont.)** | - Answers YES to the Override 'Is Drywell pressure greater than 1.68 psig?' |
| | **SRO (cont.)** | - Determines any Low Pressure ECCS is NOT required for adequate core cooling. |
| | **SRO (cont.)** | - Directs RO/BOP to prevent injection per PEI-SPI 5.2, LPCS and LPCI Injection Prevention. |
| | **RO/BOP** | - Prevents injection per PEI-SPI 5.2, LPCS and LPCI Injection Prevention. |
| | **SRO (cont.)** | - Determines eight or more SRVs are NOT open. |
| | **SRO (cont.)** | - Determines Suppression Pool level is greater than 5.25 ft. |
| | **SRO (cont.)** | - Directs RO/BOP to depressurize the RPV rapidly by opening all ADS valves. |
| | **RO/BOP** | - Open all ADS valves. Informs SRO. |
| | **NRC** | **Note: Additional Emergency Depressurization actions will NOT be discussed.** |
| | **SRO/RO/BOP** | - Continue to monitor RPV and Containment parameters. |

**Op-Test No.: 2007-01** **Scenario No.: 2** **Page 1 of 1**

**Event Description: Scenario Termination Criteria**

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | | |
| | | 1. Control Rods are fully inserted |
| | | |
| | | 2. The reactor has been emergency depressurized prior to PSP |
| | | |
| | | 3. Feedwater or ECCS Systems are being used to maintain RPV level 150 to 215 inches. |
| | | |
| | | 4. Containment and Drywell parameters are being restored per PEI-T23, Containment Control |
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**Op-Test No.: 2007-01** **Scenario No.: 2** **Page 1 of 4**

**Event Description: Critical Task 1**

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | | Critical Task 1 – Upon initiating a Reactor Scram place the MODE Switch in Shutdown |
| | | |
| | | 1. Safety Significance: |
| | | - Precludes pressure control on SRV's and additional Containment challenges. |
| | | |
| | | 2. Cues: |
| | | - MSIV's remain open when RPV pressure lowers to 800 psig. |
| | | - Procedural compliance |
| | | |
| | | 3. Measured by: |
| | | - Observation – Mode Switch in Shutdown |
| | | - Observation – MSIV's open with RPV pressure less than 800 psig |
| | | |
| | | 4. Feedback: |
| | | - Pressure Control on Bypass valves. |
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**Op-Test No.: 2007-01** **Scenario No.: 2** **Page 2 of 4**

**Event Description: Critical Task 2**

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | | Critical Task 2 – With Containment pressure exceeding 2.25 psig, |
| | | and prior to exceeding the Pressure Suppression Pressure, attempt |
| | | to initiate Containment Spray |
| | | |
| | | 1. Safety Significance: |
| | | - Precludes an unrequired Emergency Depressurization |
| | | |
| | | 2. Cues: |
| | | - Containment pressure increase |
| | | - Procedural compliance |
| | | |
| | | 3. Measured by: |
| | | - Observation – With Containment pressure at least |
| | | 2.25 psig, Containment Spray is manually initiated |
| | | prior to exceeding the Pressure Suppression |
| | | Pressure |
| | | |
| | | 4. Feedback: |
| | | - "Containment Spray Start Signal Received" alarm status |
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**Op-Test No.: 2007-01** **Scenario No.: 2** **Page 3 of 4**

**Event Description: Critical Task 3**

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | | Critical Task 3 – When Containment pressure cannot be maintained below the |
| | | Pressure Suppression Pressure, initiate Emergency depressurization of the |
| | | RPV prior to exceeding PSP. |
| | | |
| | | 1. Safety Significance: |
| | | - Precludes degradation of a fission product barrier |
| | | |
| | | 2. Cues: |
| | | - Increasing Containment pressure |
| | | - Procedural compliance |
| | | |
| | | 3. Measured by: |
| | | - Observation – At least 5 SRVs must be open prior to |
| | | exceeding the Pressure Suppression Pressure |
| | | |
| | | 4. Feedback: |
| | | - RPV pressure decreasing |
| | | - SRV status indications |
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**Op-Test No.: 2007-01** **Scenario No.: 2** 

**Event Description: Critical Task 4**

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | | Critical Task 4 – RPV Level Maintained greater than top of active fuel (0 inches). |
| | | |
| | | 1. Safety Significance: |
| | | - Maintain adequate core cooling |
| | | |
| | | 2. Cues: |
| | | - Procedural compliance |
| | | - Level lowering with adequate high pressure injection available |
| | | |
| | | 3. Measured by: |
| | | -Establishing injection with HPCS or Feedwater. |
| | | |
| | | 4. Feedback: |
| | | - Reactor level trend |
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**Facility: Perry** **Scenario No.: 3** **Op-Test No.: 2007-01**

**Examiners:** _____ **Operators:**_____
_____ _____
_____ _____

**Initial Conditions:** Reactor Power 56%, power ascension in progress IOI-3, 4.5.22. Rods at step 57 gang 44 at 12. P43 B is OOS for Oil change. P41B is OOS for Seal Line blockage. P47C is OOS, work is complete and package with Shift Engineer. SVI-E31-T083A prereqs in progress. RFPT A has a small oil leak. Feedwater leak on B FW venturi is degrading, Team Inc investigating sealing. OPRM's are Operable. OPRM Enabled alarm is in fast flash and has been evaluated.

**Turnover:** Shut RFPT A down per SOI-N27 section 7.39 for oil leak repair. Continue Power Ascension with rods to 62% power and hold for IOI-3 actions.

| Event No. | Malf. No. | Event Type* | Event Description |
|---|---|---|---|
| 1 | | R(atc) | Withdraw control rods to 62% power, ensure load line is greater than 75% |
| 2 | | N (bop) | Shutdown RFPT A. |
| 3 | cb01:p41d trg 1 | I/C (bop) | Trip of Service Water Pump D, ONI-P41, Start Service Water Pump C |
| 4 | nm04a to 125%, trg 2 | I/C (atc) | APRM A fails upscale, AFDL in Control. Lock up FCV's. TS 3.3.1.1. |
| 5 | | R(atc) | Load line 75% and flow less than 42 mlbm/hr insert cram rods per ONI-C51 |
| 6 | trg 3, cu04 aux leak, cu05 stm tunnel leak | M (all) | RWCU Leak, G33F0004 and G33F001 fail to isolate, Scram on primary system discharge per PEI-N11. ATWS on scram, Level Feed, Pressure Bypass until MSIV's close on steam tunnel temperature. Tech Spec call after scenario. |
| 7 | ior e22f004 auto | I/C (bop) | HPCS Injection valve fails to close stops HPCS pump to prevent injection. |
| 8 | | | Emergency Depressurize two Max Safe Temperatures. |
| 9 | ior 41e and 47h auto | I/C (atc) | Two ADS SRV's failed to open. Open two additional SRV's. |
| * | (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor | | |

**Op-Test No.: 2007-01** **Scenario No.: 3** **Page 1 of 24**

**Event Description: Event 1** Withdraw control rods to 62% power, ensure load line is greater than 75%.

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | **SRO** | If necessary, then withdraw control rods to increase reactor power to the desired loadline. |
| | **ATC** | Withdraw control rods to 62% power. Complete step 57 in middle of life pull sheets. |
| | **SRO** | During power ascension will direct IOI-3 steps 4.5.26 and 4.5.29, these are field actions by NLO's. |
| | **ATC** | Selects correct Rod or Gang depresses withdraw or continuos withdraw pushbuttons. Rod will stop at withdraw limit. Gang 44 Rods 06-23, 22-55, 54-39, and 38-07. Gang 43 Rods 22-07, 06-39, 38-55 and 54-23. |
| | | Deselects Control Rod and Reselects to clear Rod Block. Withdraws Rod or Gang |
| | | When at position 48 performs a coupling check, depresses withdraw pushbutton for control rod and verifies no Over Travel Alarm. |
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| | **NRC** | Gang 44 at 48 will be greater than 75% load line |
| | **NRC** | when ready proceed to next event service water pump trip trigger 1 |

**Op-Test No.: 2007-01** **Scenario No.: 3** **Page 2 of 24**

**Event Description: Event 2** Shutdown RFPT A

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | **BOP** | Complete shutdown of RFPT A per SOI-N27 section 7.39. Performs step 1 through 7 and waits at step 8 for RFPT to go on gear. |
| | | 7.39.1 HOLD the off-going RFP DISCH VALVE in CLOSE UNTIL closed at P680. 1N27-F100A |
| | | 7.39.2 PLACE the following off-going drain valves in OPEN at P870: |
| | | RFPT HP STOP BELOW SEAT DRAIN 1N22F240A |
| | | RFPT HP STOP ABOVE SEAT DRAIN 1N22F245A |
| | | RFPT FIRST STAGE DRAIN 1N22F260A |
| | | RFPT LP STOP BELOW SEAT DRAIN 1N22F250A |
| | | RFPT LP STOP ABOVE SEAT DRAIN 1N22F255A |
| | | 7.39.3 DEPRESS the off-going RFPT TRIP pushbutton 1N27-S24 |
| | | 7.39.4 TURN the RFPT MANUAL SPEED CONTROL dial fully counterclockwise. 1N27-R425A |
| | | 7.39.5 CONFIRM the off-going RFPT HP Stop valve is closed |
| | | 7.39.6 CONFIRM the off-going RFPT LP Stop valve is closed |
| | | 7.39.7 VERIFY the off-going RFPT RCIRC FLOW CONTROLLER is set at 0%. 1N27-R087A. |
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| | **NRC** | when ready proceed to next event service water pump trip trigger 1 |

**Op-Test No.: 2007-01** **Scenario No.: 3** **Page 3 of 24**

**Event Description: Event 3** Trip of Service Water Pump D, ONI-P41, Start Service Water Pump C

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | **BOP** | Investigate P970 alarms and report trip of Service water D pump. |
| | **SRO** | Enter ONI-P41, direct start of Standby Service Water Pump C |
| | **BOP** | Start standby P41C Pump per SOI-P41. |
| | | Take SW PUMP C DISCH VLV, P41-F040C control switch to OPEN. Press the STOP button when the blue light comes on. |
| | | Take SW PUMP C, P41-C001C control switch to START. |
| | | When SW PUMP C AMPS stabilize, take SW PUMP C DISCH VLV, P41-F040C control switch to OPEN. |
| | | Take SW PUMP D DISCH VLV, P41-F040D control switch to CLOSE. |
| | | Throttle NCC HX SW BYPASS VLV, P41-F400, as necessary to maintain the discharge pressure of all operating SW Pumps at 55-60 psig on SERVICE WATER PUMP DISCHARGE PRESSURE (A,B,C,D), P41-R051 (A,B,C,D). |
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| | **NRC** | When Ready initiate trigger 2, APRM A upscale and AFDL in Control |

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**Event Description: Event 4** APRM A fails upscale, AFDL in Control. Lock up FCV's. TS 3.3.1.1.

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | **ATC** | **APRM A fails upscale,** AFDL in control immediate actions to Lock RR FCV's. per ARI P680-E9. |
| | | ARI-P680-E9 ARM and DEPRESS HPU A and B Shutdown Pushbuttons. |
| | **SRO** | Concur with HPU shutdown, Enter ONI-C51 for unplanned power change. |
| | **BOP** | Support ATC with annunciator response Half scram, Failed APRM A and others. |
| | **SRO** | Direct monitoring for Power Oscillation |
| | **ATC** | Monitor for Power Oscillation. |
| | **SRO** | Nuclear instrumentation is failed, direct BOP to bypass APRM A and reset half scram. Evaluate Tech Spec 3.3.1.1 and ORM 6.2.1 |
| | **BOP** | Bypass APRM A |
| | | PLACE the NEUTRON MONITOR BYPASS, APRM joystick on 1H13-P680, in the BYPASS position for the APRM Channel being bypassed 1C51B-S3 |
| | | CONFIRM that the APRM Bypass status light comes on at the selected APRM's Power Range Neutron Mon Panel. |
| **NRC** | | APRM A backpanel light **ON** |
| | **BOP** | Reset Half Scram |
| | | Momentarily Depress the appropriate RPS division pushbuttons on P680: 1C71-S5A and 1C71-S5C. |
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| | **SRO** | Tech Spec entry for 3.3.1.1 and ORM 6.2.1 is not required still have minimum channels. PLCO required. |
| | | |

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**Event Description: Event 5** Load line 75% and flow less than 42 mlbm/hr insert cram rods per ONI-C51

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | **ATC** | Immediate actions of ONI-C51, Loadline >75% and flow <42 mlbm/hr, **insert cram rods** to 35% power. Insert Cram Rods perform step 57 and possibly step 56. |
| | **SRO** | Direct Cram rods per ONI-C51 Flowchart if failed to recognize immediate action. |
| | **ATC** | CRAM RODS |
| | | Gang Motion is recommended. |
| | | Select the control rods listed in the current step of the Control Rod Movement Sheet and continuously insert to position between 04 and 00. |
| | | Selects Rods in step 57 and inserts to 00. Gang 43 Rods 22-07, 06-39, 38-55 and 54-23. Step 56 if required is Gang 44 Rods 06-23, 22-55, 54-39, and 38-07. |
| | | |
| | | |
| | **SRO** | Directs BOP to restart HPU's |
| | **BOP** | Commences restart of HPU's per SOI-B33 section 4.2 and 4.3. |
| **NRC** | | **Note HPU Restart is not required for scenario.** |
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| | **SRO** | Works through middle column of ONI-C51 decision diamonds. Evaluates additional ONI's for entry and references IOI-3 actions needed for power change. |
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| | **NRC** | When ready initiate trigger 3, RWCU leak. |

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**Event Description: Event 6** RWCU Leak, G33F0004 and G33F001 fail to isolate. Scram on primary system discharge per PEI-N11. ATWS on scram, Level Feed, Pressure Bypass until MSIV's close on steam tunnel temperature. Tech Spec call after scenario.

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | **Crew** | **Respond to Aux Bldg. Airborne Monitor Radiation Alarms, RWCU Delta Flow, and High Temperature RWCU Pump Rooms.** |
| | **BOP** | Report Trend on Aux Bldg Rad Monitor, monitor delta flows on backpanels, and monitor Temperatures on NUMACs, report PEI-N11 Entry conditions. |
| | **BOP/ATC** | **1G33F0004 and 1G33F0001 fail to isolate.** |
| | **SRO** | Enter PEI-N11, direct BOP to verify IB, AUX, Steam Tunnel and FHB HVAC |
| | **BOP** | Dispatches NLO to verify IB, AUX, and Steam Tunnel HVAC, checks FHB HVAC |
| | **SRO** | PEI-N11, proceeds thru stop sign for any temperature greater than entry condition. Primary system is discharging, enters PEI-B13 and scrams reactor. **Critical Task 1 Reactor Scram on Primary system discharge.** |
| | **SRO** | Stops and directs monitoring for two MAX safe temperatures. |
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| **NRC** | | **Request Tech Spec call after scenario** for failure of 1G33F001 and 1G33F004 to isolate. Tech Spec 3.6.1.3 condition B, isolate penetration within 1 hour. |
| | | |
| | **Driver** | Auxiliary Building Supply Fans tripped on High Radiation |

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**Event Description: Event 6** Reactor Scram

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | **SRO** | Directs Reactor Scram, **Critical Task 1 Reactor Scram on Primary system** |
| | **ATC** | Scram the reactor Arm and Depress RPS pushbuttons, Mode switch to shutdown, Arm and Depress ARI pushbuttons on the ATWS. |
| | **SRO** | Verify RPS, ARI and Mode Switch to shutdown. Direct ATC to stabilize level and pressure. Direct BOP to start Hydrogen Analyzers. |
| | **ATC** | Stabilize level and pressure. Level on Feedwater and Pressure on Bypass. |
| | **BOP** | Start Hydrogen Analyzers. |
| | | IF ESW PUMP is NOT running, THEN TAKE ESW PUMP, 1P45C001 control switch to START. |
| | | IF ECC PUMP is NOT running, THEN TAKE ECC PUMP, 1P42-C001 control switch to START. |
| | | PLACE the COMB GAS H2 ANAL SAMPLE VALVES keylock switch in OPEN. |
| | | VERIFY the MODE & FUNCTION SELECTOR, 1M51-HS3 is in SAMPLE. |
| | | PLACE the SYSTEM FUNCTION SW, 1M51-HS1 in ON |
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| | **BOP/SRO** | Continue to monitor PEI-N11 temperatures for two Max Safes. |
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| **NRC** | **Information** | The Two areas for greater than Max Safe will be RWCU Pump Rooms and the Steam Tunnel. |
| | | Monitor RWCU on NUMACS Column A2 lines 1 and 2 |
| | | Monitor Steam Tunnel on NUMACS Column A6 lines 2 and 3 |
| | | MAX SAFE TEMPS are 284 for RWCU and 310 for Steam Tunnel |
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**Event Description: Event 6** ATWS Power Leg

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | **SRO** | Turbine greater than 90 MW, Power above 4%, Recirc pumps in slow speed, FCV's are locked up, directs ATC to trip Recirc Pumps. |
| | **ATC** | Trips Recirc Pumps Opens Reactor Recirc Pump 1 and 2 Breakers. |
| | **SRO** | Direct BOP to inject SLC and inhibit ADS. |
| | **BOP** | Inhibit ADS, places both keylock switches for ADS to inhibit. **Critical Task 3.** |
| | | Inject Boron prior to 110 in pool, places PLACE both of the following keylock switches to ON: SLC PUMP A 1C41C001A and SLC PUMP B 1C41C001B **Critical Task 4.** |
| | | CONFIRM the following: Both SLC Pump suction valves open. |
| | | Both SLC Pumps start. |
| | | Both SQUIB CONTINUITY indicating lights deenergize. |
| | | SLC Pump discharge pressures are slightly above reactor pressure as indicated on SLC PUMP DISCH PRESS. |
| | **SRO** | Direct Rod Insertion per PEI-SPI section 1 |
| | **ATC** | Inserts Control Rods per PEI-SPI 1.3. **Critical Task 2.** |
| | | **Have Bop Operator PLACE** LO POWER SET PT DIV 1 BYPASS C11A-S4 keylock switch in BYPASS. |
| | | **Have BOP Operator PLACE** LO POWER SET PT DIV 2 BYPASS C11A-S3 keylock switch in BYPASS. |
| | | **VERIFY** CRD HYDRAULICS FLOW CONTROL C11-R600 is in MANUAL. |
| | | **ADJUST** CRD HYDRAULICS FLOW CONTROL C11-R600 output to 100. |
| | | **CLOSE** CRD DRIVE PRESS CONTROL VALVE C11-F003. |
| | | **DEPRESS** and **HOLD** the IN TIMER SKIP pushbutton. |
| | | **SELECT** the desired Control Rod. |
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| | **ATC** | Inserts IRM's and SRM's when power is less than 4%. |

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**Event Description: Event 7** ATWS Level Leg. HPCS Injection valve fails to close stops HPCS pump to prevent injection.

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | **SRO** | Directs Terminate and Prevent per 5.1 and 5.2. directs preps per 6.1 and 6.2, and directs MSIV open per 2.3 and 2.8. Directs bypass of low power setpoint. |
| | **BOP/ATC** | Terminate and Prevent per 5.1 and 5.2. |
| | | **TERMINATE** and **PREVENT** HPCS injection as follows:<br>**HOLD** HPCS INJECTION VALVE E22-F004 switch in CLOSE. |
| | | **THEN ARM** and **DEPRESS** HPCS MANUAL INITIATION E22A-S2 pushbutton to obtain white HPCS SEAL IN RESET light. |
| | | **THEN RELEASE** HPCS INJECTION VALVE E22-F004 control switch. |
| | | **IF** HPCS INJECTION VALVE E22-F004 **CANNOT** be verified closed, **THEN OVERRIDE** HPCS PUMP E22-C001 off. **Critical Task 9** |
| | | **TERMINATE** and **PREVENT** LPCS and LPCI A injection as follows: **PLACE** BUS XH11 LOCA BYPASS keylock switch in BYPASS.<br>**HOLD** the following switches in CLOSE: LPCS INJECTION VLV E21-F005 and LPCI A INJECTION VALVE E12-F042A |
| | | **ARM** and **DEPRESS** LPCS & LPCI A MANUAL INITIATION E21A-S9 pushbutton to obtain the white LPCS & LPCI A SEAL IN RESET light. |
| | | **Terminate** and **PREVENT** LPCI B and LPCI C injection as follows: **PLACE** BUS XH12 LOCA BYPASS keylock switch in BYPASS. **HOLD** the following switches in CLOSE: LPCI B INJECTION VALVE E12-F042Band LPCI C INJECTION VALVE E12-F042C |
| | | **ARM** and **DEPRESS** LPCI B & C MANUAL INITIATION E12A-S21 pushbutton to obtain the white LPCI B & C SEAL IN RESET Light |
| | **BOP** | Preps per 6.1 and 6.2 |
| | | **VERIFY** RHR ISOL BYPASS E12-F053A keylock switch is in BYPASS. |
| | | **VERIFY** RHR ISOL BYPASS E12-F053B keylock switch is in BYPASS. |
| | **BOP** | Maintains MSIV's open per 2.3 and 2.8. |
| | | **DEFEAT** MSIV low RPV level isolation as follows: |
| | | **PLACE** MSIV ISOL LO LEVEL BYPASS CH A, B, C, and D B21H-S76A, B, C and D keylock switches in BYP. |
| | | **OPEN** INST AIR DRYWELL ISOL P52-F646. |
| | | **OPEN** INST AIR CNTMT ISOL P52-F200. |

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**Event Description: Event 6** ATWS Level Leg and Pressure Leg

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | **SRO** | Answer No to 4 question override, Power above 4%. Directs a Level Band of 50 to 100 inches. |
| | **ATC** | Terminates Feedwater injection until level in band of 50 to 100 inches. Once in band maintains level band with feedwater. |
| | | **Level Band <130"** |
| | | Verify MFP AUTO XFER disabled. |
| | | Verify the MFP running. |
| | | Verify RFPTs tripped. |
| | | Verify MFP FCV MAN/AUTO STATION in manual. |
| | | CONTROL RPV Level using MFP FCV MAN/AUTO STATION. |
| | **ATC/BOP** | Verifies RCIC operation at Level 2 or RCIC trip due to high room temperature. |
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| | | **ATWS PRESSURE LEG** |
| | **SRO** | Pressure Band of 800 to 1000 psig. |
| | **ATC** | Maintain pressure with Bypass valves. |
| | | |
| | **SRO** | When MSIV's isolate, SRV Cycling answer remains No, Below HCL is Yes and Boron required and MSIV closed is Yes. MSIV's can not be opened pressure band 800 to 1000 psig or 700 to 900 psig. |
| | **ATC** | Maintain directed pressure band on SRV's. |
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| | **BOP/SRO** | Continue to monitor PEI-N11 temperatures for two Max Safes. 284 in RWCU Room and 310 in Steam Tunnel. |

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**Event Description: Event 6** MSIV's close on steam tunnel temperature.

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | **ATC/BOP** | MSIV isolation on High Temperature in Steam Tunnel. |
| | **BOP** | Monitor NUMAC for Steam Tunnel Temperature |
| | **ATC** | Pressure Control on SRV's in directed pressure band. |
| | **ATC** | If pressure exceeds 1083, Feedwater control will not be available for 30 seconds. FWRB red box on digital screen. Yellow light illuminates near bottom of 680 when control is available. Restores Reactor Level with Feedwater 50 to 100 if FWRB occurred. **Critical Task to restore level 5**. |
| | | **Level Band <130"** |
| | | Verify the MFP running. |
| | | Verify MFP FCV MAN/AUTO STATION in manual. |
| | | CONTROL RPV Level using MFP FCV MAN/AUTO STATION. |
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| | **SRO** | Second area with temperature problem. Two Max Safes exceeded ED required. |
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| | **BOP/SRO** | Continue to monitor PEI-N11 temperatures for two Max Safes. 284 in RWCU Room and 310 in Steam Tunnel. |
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**Event Description: Event 6** PEI-T23

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | **SRO** | Enter PEI T23 on Drywell Temperature or Suppression Pool Temperature. Enter all legs. |
| | **SRO** | Direct BOP to operate all available Drywell Cooling and perform PEI-SPI 2.1. |
| | **BOP** | Starts all Drywell Cooling Fans and performs PEI-SPI 2.1. |
| | | **VERIFY** only one of the following is running: NCC PUMP A P43-C001A, NCC PUMP B P43-C001B, NCC PUMP C P43-C001C |
| | | **PLACE** NCC LOCA BYPASS P43-BS2 keylock switch in BYPASS. **OPEN** the following valves: NCC CNTMT RETURN INBD ISOL P43-F215, and NCC DW RETURN INBD DW ISOL P43-F400. |
| | | **PLACE** NCC LOCA BYPASS P43-BS1 keylock switch in BYPASS. **OPEN** the following valves: NCC DW SUPPLY OTBD DW ISOL P43-F355, NCC DW RETURN OTBD DW ISOL P43-F410, NCC CNTMT RETURN OTBD ISOL P43-F140, and NCC CNTMT SUPPLY OTBD ISOL P43-F055. |
| | | |
| | **SRO** | Suppression Pool Temperature greater than 95. Direct BOP to establish pool cooling with RHR A and/or B. |
| | **BOP** | Establish Suppression Pool Cooling. |
| | | CLOSE RHR HX'S BYPASS VALVE, 1E12F048, by holding its control switch in CLOSE. |
| | | THROTTLE RHR HX'S OUTLET VALVE, 1E12F003, by holding its control switch in CLOSE for 18 to 20 seconds. |
| | | TAKE RHR TEST VALVE TO SUPR POOL, 1E12-F024, control switch to OPEN. Time Opened: A - _____ B - _____ |
| | | WHEN RHR PUMP FLOW, 1E12R603, is greater than 1650 gpm, THEN VERIFY CLOSED RHR PUMP MIN FLOW VALVE, 1E12F064. |
| | | THROTTLE RHR HX'S OUTLET VALVE, 1E12F003, UNTIL RHR PUMP FLOW, 1E12R603, is 7100-7300 gpm. |
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**Event Description: Event 8** Emergency Depressurize two Max safe Temperatures. Two ADS SRV's failed to open. Open two additional SRV's.

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | **BOP** | Two Max Safes exceeded, ED required. 284 in RWCU Room and 310 in Steam Tunnel. |
| | **SRO** | Enter PEI-B13 ED |
| | **SRO** | Terminate prevent verification and terminate prevent feedwater PEI-SPI 5.3. Terminate Prevent PEI-SPI 5.1, 5.2 and 5.3 complete prior to ED **Critical Task 6** |
| | **ATC** | Terminate prevent feedwater. |
| | | **VERIFY** the following valves are closed: |
| | | MFP FLOW CONTROL VALVES N27-F010 and N27-F110 |
| | | RFP A DISCH VALVE N27-F100A |
| | | RFP B DISCH VALVE N27-F100B |
| | | FDW PUMPS BYPASS VALVE N27-F200 |
| | **ATC** | Verify 5.1 |
| | | Verifies HPCS Pump is stopped |
| | **ATC** | Verify 5.2 |
| | | **VERIFY** the following valves are closed: |
| | | SHUTDOWN COOLING TO FDW SHUTOFF Valves E12-F053A and B |
| | | RHR A HEAD SPRAY ISOL E12-F023 |
| | | LPCI A INJECTION VALVE E12-F042A |
| | | LPCS INJECTION VLV E21-F005 |
| | | LPCI B INJECTION VALVE E12-F042B |
| | | LPCI C INJECTION VALVE E12-F042C |
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**Event Description: Event 8** Emergency Depressurize two Max safe Temperatures. Two ADS SRV's failed to open. Open two additional SRV's.

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | **SRO** | Direct 8 SRV's open. Emergency Depressurization **Critical Task 7** |
| | **ATC** | **Two ADS SRV's fail to open**, open additional SRV's to obtain 8. |
| | **SRO** | Restore level 50 – 100 when MSCP is reached at 140 psig. Restore level after MSCP is reached **Critical Task 8**. |
| | **ATC** | Restore level 50 – 100" with feedwater. |
| | | **Level Band <130"** |
| | | Verify the MFP running. |
| | | Verify MFP FCV MAN/AUTO STATION in manual. |
| | | CONTROL RPV Level using MFP FCV MAN/AUTO STATION. |
| | | |
| | | |
| | **Crew** | Enters PEI-M51/56 on Level 1 |
| | **SRO** | Works down flowchart and directs H2 igniters started |
| | **BOP** | Starts H2 igniters |
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**Op-Test No.: 2007-01** **Scenario No.: 3** 

**Event Description: Scenario Termination Criteria**

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | | 1. Control Rods are being inserted and SLC is injecting. |
| | | |
| | | 2. RPV level is being restored and maintained in the directed band using: |
| | | - Feedwater or Low Pressure ECCS |
| | | |
| | | 3. SRVs have been opened to Emergency Depressurized the RPV. |
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**Op-Test No.: 2007-01** **Scenario No.: 3** 

**Event Description: Critical Task 1**

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | | Critical Task #1 – Per PEI-N11, Containment Leakage Control, with a primary system discharging into the area the Reactor is scrammed. |
| | | |
| | | |
| | | 1. Safety Significance: |
| | | - Take manual action that would prevent a challenge to |
| | | plant safety by shutting down the reactor and |
| | | stabilizing plant parameters. |
| | | |
| | | 2. Cues |
| | | - Rising Temperatures |
| | | - Failed isolation valves |
| | | |
| | | 3. Measured by: |
| | | - The operator inserts a manual reactor scram. |
| | | |
| | | 4. Feedback: |
| | | - Ability to stabilize plant parameters post scram using |
| | | normal level and pressure control systems. |
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**Event Description: Critical Task 2**

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | | Critical Task 2 – With a reactor scram required and the reactor not |
| | | shutdown, initiate action to reduce power by inserting control rods |
| | | |
| | | 1. Safety Significance: |
| | | - Shutting down the reactor can preclude failure of |
| | | Containment or equipment necessary for the safe |
| | | shutdown of the plant |
| | | |
| | | |
| | | 2. Cues: |
| | | - Procedural compliance |
| | | |
| | | 3. Measured by: |
| | | - Control Rod insertion before the end of the scenario |
| | | |
| | | 4. Feedback: |
| | | - Reactor power trend |
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**Event Description: Critical Task 3**

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | | Critical Task 3 – With a reactor scram required and the reactor |
| | | not shutdown, to prevent an uncontrolled RPV depressurization |
| | | and subsequent power excursion, inhibit ADS |
| | | |
| | | 1. Safety Significance: |
| | | - Precludes core damage due to an uncontrolled reactivity addition. |
| | | |
| | | 2. Cues: |
| | | - Procedural compliance |
| | | |
| | | |
| | | 3. Measured by: |
| | | - ADS logic inhibited prior to an automatic initiation of |
| | | the ADS System unless all required injection |
| | | systems are terminated and prevented |
| | | |
| | | 4. Feedback: |
| | | - RPV pressure and level trends |
| | | - ADS "Out of Service" annunciator status |
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**Event Description: Critical Task 4**

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | | Critical Task 4 – During an ATWS with power greater than 4%, Standby Liquid Control is initiated prior to 110 degrees in suppression pool. |
| | | |
| | | 1. Safety Significance: |
| | | - Additional method to shutdown Reactor |
| | | - Must inject prior to BITT |
| | | |
| | | 2. Cues: |
| | | - Procedural compliance |
| | | |
| | | 3. Measured by: |
| | | - Observation – Standby Liquid Control pumps started. |
| | | -Observation - Discharge pressure above RPV pressure. |
| | | -Observation – Suppression pool temperature. |
| | | |
| | | 4. Feedback: |
| | | - Reactor power trend |
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**Event Description: Critical Task 5**

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | | Critical Task 5 – Restore and maintain RPV level greater than top of active fuel or zero inches. |
| | | |
| | | 1. Safety Significance: |
| | | - Maintain adequate core cooling |
| | | |
| | | 2. Cues: |
| | | - Procedural compliance |
| | | - Level lowering with adequate high pressure injection available |
| | | |
| | | 3. Measured by: |
| | | - Injection established after directed level band is reached. |
| | | |
| | | 4. Feedback: |
| | | - Reactor level trend |
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**Event Description: Critical Task 6**

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | | Critical Task 6 – When two or more areas are greater than there Maximum Safe |
| | | Operating Conditions value, initiate Emergency Depressurization |
| | | |
| | | 1. Safety Significance: |
| | | - Preclude failure of equipment necessary for the safe |
| | | shutdown of the plant |
| | | |
| | | 2. Cues: |
| | | - Procedural compliance |
| | | - Two or more areas greater than there Maximum Safe Operating Conditions value. |
| | | |
| | | 3. Measured by: |
| | | - Observation – at least 5 SRVs open. |
| | | |
| | | 4. Feedback: |
| | | - Reactor pressure trend |
| | | - Suppression Pool temperature trend |
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**Event Description: Critical Task 7**

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | | Critical Task 7 – During an ATWS with Emergency Depressurization required |
| | | terminate and prevent injection, with the exception of RCIC, SLC and CRD, into |
| | | the RPV until reactor pressure is below MSCP. |
| | | |
| | | 1. Safety Significance: |
| | | - Prevention of fuel damage due to uncontrolled feeding |
| | | |
| | | 2. Cues: |
| | | - Procedural compliance |
| | | |
| | | 3. Measured by: |
| | | - Observation – no injection into the RPV except for RCIC, |
| | | SLC and CRD prior to reaching the MSCP. |
| | | |
| | | 4. Feedback: |
| | | - Reactor power trend, power spikes, reactor short period alarms. |
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**Event Description: Critical Task 8**

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | | Critical Task 8 – During an ATWS, when RPV pressure is below the MSCP, |
| | | increase and control injection into the RPV to restore and maintain RPV level |
| | | to the directed level band. |
| | | |
| | | 1. Safety Significance: |
| | | - Establish adequate core cooling |
| | | |
| | | 2. Cues: |
| | | - RPV pressure trend |
| | | - Procedural compliance |
| | | |
| | | 3. Measured by: |
| | | - RPV level is established and controlled above –25" |
| | | |
| | | 3. Measured by: |
| | | - RPV level is being restored and maintained in the directed band. |
| | | |
| | | 4. Feedback: |
| | | - Lack of power excursion |
| | | - RPV level and pressure indications |
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**Event Description: Critical Task 9**

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | | Critical Task 9 – During an ATWS terminate and prevent injection from HPCS |
| | | |
| | | 1. Safety Significance: |
| | | - Prevention of fuel damage due to uncontrolled feeding |
| | | |
| | | 2. Cues: |
| | | - Procedural compliance |
| | | |
| | | 3. Measured by: |
| | | - Observation – no injection into the RPV from HPCS |
| | | |
| | | 4. Feedback: |
| | | - Reactor power trend, power spikes, reactor short period alarms |
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**Facility: Perry** **Scenario No.: 4** **Op-Test No.: 2007-01**

**Examiners:** _____ **Operators:**_____
_____ _____
_____ _____

**Initial Conditions:** **Reactor Power 80%, operating per IOI-3 attachment 3 power increase to 100%. Rods are at step 62. RFPT B has been returned to service. LH-2-A Transformer is out of service and EH21 outage is in progress, scheduled to complete later today. Chemistry investigating possible tube leak on D train. SVI-C61-T1104 is in progress. OPRM's are Inoperable.**

**Turnover:** **Shutdown Motor Feed Pump to Standby and continue power ascension with flow to 100%.**

| Event No. | Malf. No. | Event Type* | Event Description |
|---|---|---|---|
| ~~1~~ | | ~~N (bop)~~ | ~~Shutdown Motor Feed Pump to standby~~ |
| 2 | | R (atc) | Raise Reactor Power with flow |
| 3 | trg 1, rd13a, 22-31, 34-03, 50-31, rd05 | I/C (bop) | CRD suction filter clog, CRD pump trip, ONI-C11-1, 3 accumulator faults 20 minutes to restore TS 3.1.5 |
| 4 | trg 10 | I/C (atc) | RFBP A trips, RFBP D fails to auto start |
| 5 | pt01:1c34n004b, trg 2 | I/C (atc) | Reactor Narrow Range Instrument C34N004B fails upscale, Bypass instrument, ORM 6.2.13 |
| 6 | trg 5, mc01a, rd15 atws | M(all) | Vacuum Leak, Reactor Scram, ATWS, MSIV's B, C and D isolate on degrading vacuum. |
| 7 | ms01a/e | I/C (bop) | MSIV Line A fails to isolate, inboard valve will isolate with switch. |
| ~~8~~ | ~~ior arm to disarm~~ | ~~I/C (bop)~~ | ~~Terminate/Prevent for HPCS fails, will need to perform at level 2 initiation.~~ |
| 9 | | | Emergency Depressurize on HCL |
| | | | |
| | | | |

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

**Op-Test No.: 2007-01** **Scenario No.: 4** **Page 1 of 24**

~~**Event Description: Event 1** Shutdown Motor Feed Pump to Standby.~~

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | ~~**BOP**~~ | ~~Shutdown Motor Feed Pump to Standby, SOI N27 section 6.1.~~ |
| | | ~~6.1.1 IF automatic control of FDW is desired, THEN VERIFY one or both of the following: -RFPT A operating with the RFPT A MANUAL/AUTO STATION in AUTO. RFPT B operating with the RFPT B MANUAL/AUTO STATION in AUTO~~ |
| | | ~~6.1.2 VERIFY the MFP FCV MAN/AUTO STATION is in MANUAL~~ |
| | | ~~6.1.3 VERIFY the following valves are closed, Motor Feed Pump Flow Control Valves 1N27F010 and 1N27F110~~ |
| | | ~~6.1.4 PLACE the MFP in OFF on P680.~~ |
| | | ~~6.1.5 VERIFY the MFP RCIRC FLOW CONTROLLER at 0%.~~ |
| | | ~~6.1.6 PLACE the MFP in AUTO.~~ |
| | | ~~6.1.7 VERIFY the MFP AUTO XFER is ENABLED.~~ |
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| | **Driver** | Remote Function FW72 for Motor Feed pump casing warmup valves. |
| | | |

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**Event Description: Event 2** Raise Reactor Power with flow.

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | **SRO** | IOI-3 Attachment 3 Power Maneuvering, step 1.8.3 raise power with flow. |
| | **ATC** | Raise Power with flow. |
| | | Opens Flow Control Valve A or B with Slide Switch to raise power. |
| | | Maintains Loop flows balanced |
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| **NRC** | | When ready initiate trigger 1 control rod drive pump trip |

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**Event Description: Event 4** RFBP A trips, RFBP D fails to auto start

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | **ATC** | Report trip of RFBP A, verify RFBP D starts. D pump fails to start. |
| | **ATC** | Start RFBP D when pump fails to auto start, monitor Reactor Level. |
| | **BOP** | Assist with Alarm response instructions, RFBP A Trip and RFBP D Failure to Start, and Breaker Trip H11. |
| | **BOP/ATC** | Dispatch Operators to investigate trip and to monitor start of RFBP D |
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| **NRC** | | When ready trigger 2 can be initiated at any time, Feedwater level instrument fails high. |

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**Event Description: Event 3** CRD suction filter clog, CRD pump trip, ONI-C11-1, 3 accumulator faults 20 minutes to restore TS 3.1.5.

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | **BOP** | CRD suction filter DP high, ARI H13-P601-22-H3, shift per SOI-C11(CRDH) |
| | **BOP** | **CRD Pump Trip** |
| | **BOP** | Dispatch NLO and direct NLO to Shift Suction filters or bypass filters |
| | **SRO** | Enter ONI-C11-1 on CRD Pump Trip, directs pump trip recovery SOI-C11, 7.6 |
| | **ATC** | Reports Accumulator Faults, dispatch operator to check HCU pressure. |
| | **BOP** | After suction filter shift or bypass valve open, can recover either CRD A or B, if fail to wait for new filters pump will trip upon start. |
| | **SRO** | TS 3.1.5 or ONI-C11-1, upon second accumulator fault, start 20 minute clock for mode switch to shutdown. Per step 4.2 on second accumulator fault. |
| | **ATC** | Reports the 3 accumulator faults and marks time. 20 minute clock starts on second fault. |
| | **BOP** | Recovers CRD Pump per SOI-C11 section 7.6. |
| | | 7.6.2 TAKE the oncoming CRD AUX OIL PUMP to START. |
| | | 7.6.3 CONFIRM the CRD PUMP TRIP OIL PRESS LOW alarm clears. |
| | | 7.6.4 PLACE the CRD HYDRAULICS FLOW CONTROL in Manual. |
| | | 7.6.5 LOWER the CRD HYDRAULICS FLOW CONTROL output UNTIL the inservice CRD FLOW CONTROL VALVE is closed. |
| | | 7.6.6 TAKE the oncoming CRD PUMP to START. |
| | | 7.6.7 SLOWLY THROTTLE the inservice CRD FLOW CONTROL VALVE UNTIL flow is restored on the CRD HYDRAULICS FLOW CONTROL. |
| | | 7.6.8 PLACE the CRD HYDRAULICS FLOW CONTROL in AUTO. |
| | **ATC** | Report accumulator faults reset |
| | | |
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| | | |
| | **Driver** | Delete accumulator fault malfunctions on CRD pump start. |
| **NRC** | | When ready initiate trigger 10, RFBP A trip and D failure to start |

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**Event Description: Event 5** Reactor Narrow Range Instrument C34N004B fails upscale, Bypass instrument, ORM 6.2.13

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | **ATC** | Report Reactor Narrow Range Instrument **C34N004B failure high**, ARI's 680-3 A8, B6 and C5. Refer to SOI-C34 to attachment 3 for actions. |
| | **SRO** | ORM 6.2.13, 7 days to restore, Direct bypass of failed instrument. |
| | **ATC** | Bypass instrument per SOI-C34 section 7.9 |
| | | 7.9.1 Select the transmitter to be bypassed. |
| | | 7.9.2 Select the Bypass button. |
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| | **NRC** | When ready initiate trigger 5 vacuum leak. |

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**Event Description: Event 6** Vacuum Leak, Reactor Scram, ATWS, MSIV's B, C and D isolate on degrading vacuum.

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | **ATC/BOP** | High Off Gas flowrates, respond to a number of H13P845 alarms. |
| | **BOP** | Report Off Gas Flow is high and rising steadily. It will go to high peg on recorder, N64R620 both pens. |
| | **ATC** | Reports degrading vacuum |
| | **SRO** | Enter ONI-N62 |
| | **SRO** | Direct Power Reduction or Reactor Scram |
| | **ATC** | Reduce power with flow to 58 mlbm/hr or as directed by Unit Supervisor. |
| | **SRO** | Vacuum continues to degrade, direct **scram reactor** prior to turbine trip at 8.1" |
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| | **NRC** | at 8.1" turbine trips, at 11.5" RFPT's trip, at 20" bypass valves shut, at 21.5" MSIV's close. |

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**Event Description: Event 6** Reactor Scram, ATWS, MSIV's B, C and D isolate on degrading vacuum.

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | **ATC** | Scram Reactor, Arm and Depress RPS, Mode Switch to shutdown, and Arm and Depress ARI. Reports actions taken and Reactor Power to SRO. |
| | **SRO** | Direct Level and pressure stabilized. Enter PEI-B13 Non ATWS and ATWS. |
| | **SRO** | Verifies Mode Switch in Shutdown, RPS and ARI, Directs Hydrogen Analyzers started. |
| | **ATC** | Stabilize level and pressure. Level on Feedwater and Pressure on Bypass. |
| | **BOP** | Start Hydrogen Analyzers. |
| | | IF ESW PUMP is NOT running, THEN TAKE ESW PUMP, 1P45C001 control switch to START. |
| | | IF ECC PUMP is NOT running, THEN TAKE ECC PUMP, 1P42-C001 control switch to START. |
| | | PLACE the COMB GAS H2 ANAL SAMPLE VALVES keylock switch in OPEN. |
| | | VERIFY the MODE & FUNCTION SELECTOR, 1M51-HS3 is in SAMPLE. |
| | | PLACE the SYSTEM FUNCTION SW, 1M51-HS1 in ON |
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**Event Description: Event 6** ATWS Power Leg

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | **SRO** | Turbine Load greater than 90 MW, Power greater than 4%, FCV's to minimum, Trip Reactor recirc pumps. |
| | **ATC** | Closes FCV's to minimum, trips RR pumps by opening 1 and 2 breakers. |
| | **SRO** | Direct BOP to inject SLC and inhibit ADS. |
| | **BOP** | Inhibit ADS, places both keylock switches for ADS to inhibit. **Critical Task 2.** |
| | | Inject Boron prior to 110 in pool, places PLACE both of the following keylock switches to ON: SLC PUMP A 1C41C001A and SLC PUMP B 1C41C001B **Critical Task 3.** |
| | | CONFIRM the following: Both SLC Pump suction valves open. |
| | | Both SLC Pumps start. |
| | | Both SQUIB CONTINUITY indicating lights deenergize. |
| | | SLC Pump discharge pressures are slightly above reactor pressure as indicated on SLC PUMP DISCH PRESS. |
| | **SRO** | Direct Rod Insertion per PEI-SPI section 1 |
| | **ATC** | Inserts Control Rods per PEI-SPI 1.3. **Critical Task 1.** |
| | | **Have Bop Operator PLACE** LO POWER SET PT DIV 1 BYPASS C11A-S4 keylock switch in BYPASS. |
| | | **Have BOP Operator PLACE** LO POWER SET PT DIV 2 BYPASS C11A-S3 keylock switch in BYPASS. |
| | | **VERIFY** CRD HYDRAULICS FLOW CONTROL C11-R600 is in MANUAL. |
| | | **ADJUST** CRD HYDRAULICS FLOW CONTROL C11-R600 output to 100. |
| | | **CLOSE** CRD DRIVE PRESS CONTROL VALVE C11-F003. |
| | | **DEPRESS** and **HOLD** the IN TIMER SKIP pushbutton. |
| | | **SELECT** the desired Control Rod. |
| | | |
| | **ATC** | When power is less than 4%, insert IRM's and SRM's. |
| | | |
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| | | |

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~~**Event Description: Event 8** Terminate/Prevent for HPCS fails, will need to perform at level 2 initiation. ATWS Level Leg~~

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | ~~**SRO**~~ | ~~Directs Terminate and Prevent per 5.1 and 5.2. directs preps per 6.1 and 6.2, and directs MSIV open per 2.3 and 2.8. Directs bypass of low power setpoint.~~ |
| | ~~**BOP/ATC**~~ | ~~Terminate and Prevent per 5.1 and 5.2.~~ |
| | | ~~**TERMINATE** and **PREVENT** HPCS injection as follows:~~<br>~~**HOLD** HPCS INJECTION VALVE E22-F004 switch in CLOSE.~~ |
| | | ~~**THEN ARM** and **DEPRESS** HPCS MANUAL INITIATION E22A-S2 pushbutton to obtain white HPCS SEAL IN RESET light. **SWITCH is FAILED**~~ |
| | | ~~When Level reaches Level 2 130 inches, HPCS will initiate. Will need to terminate and prevent HPCS at this time. Close 1E22F004 or stop Pump. **Critical Task 4**~~ |
| | | ~~**TERMINATE** and **PREVENT** LPCS and LPCI A injection as follows: **PLACE** BUS XH11 LOCA BYPASS keylock switch in BYPASS.~~<br>~~**HOLD** the following switches in CLOSE: LPCS INJECTION VLV E21-F005 and LPCI A INJECTION VALVE E12-F042A~~ |
| | | ~~**ARM** and **DEPRESS** LPCS & LPCI A MANUAL INITIATION E21A-S9 pushbutton to obtain the white LPCS & LPCI A SEAL IN RESET light.~~ |
| | | ~~**Terminate** and **PREVENT** LPCI B and LPCI C injection as follows: **PLACE** BUS XH12 LOCA BYPASS keylock switch in BYPASS. **HOLD** the following switches in CLOSE: LPCI B INJECTION VALVE E12-F042Band LPCI C INJECTION VALVE E12-F042C~~ |
| | | ~~**ARM** and **DEPRESS** LPCI B & C MANUAL INITIATION E12A-S21 pushbutton to obtain the white LPCI B & C SEAL IN RESET Light~~ |
| | ~~**BOP**~~ | ~~Preps per 6.1 and 6.2~~ |
| | | ~~**VERIFY** RHR ISOL BYPASS E12-F053A keylock switch is in BYPASS.~~ |
| | | ~~**VERIFY** RHR ISOL BYPASS E12-F053B keylock switch is in BYPASS.~~ |
| | ~~**BOP**~~ | ~~Maintains MSIV's open per 2.3 and 2.8.~~ |
| | | ~~**DEFEAT** MSIV low RPV level isolation as follows:~~ |
| | | ~~**PLACE** MSIV ISOL LO LEVEL BYPASS CH A, B, C, and D B21H-S76A, B, C and D keylock switches in BYP.~~ |
| | | ~~**OPEN** INST AIR DRYWELL ISOL P52-F646.~~ |
| | | ~~**OPEN** INST AIR CNTMT ISOL P52-F200.~~ |
| | | |

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**Event Description: Event 7** MSIV Line A fails to isolate, inboard valve will isolate with switch. ATWS Level and Pressure Leg,

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | **SRO** | Answer No to 4 question override, Power above 4%. Directs a Level Band of 50 to 100 inches. |
| | **ATC** | Terminates Feedwater injection until level in band of 50 to 100 inches. Once in band maintains level band with feedwater. |
| | | **Level Band <130"** |
| | | Verify MFP AUTO XFER disabled. |
| | | Verify the MFP running. |
| | | Verify RFPTs tripped. |
| | | Verify MFP FCV MAN/AUTO STATION in manual. |
| | | CONTROL RPV Level using MFP FCV MAN/AUTO STATION. |
| | | **ATWS PRESSURE LEG** |
| | **SRO** | Directs a pressure band of 800 to 1000, on bypass valves. |
| | **ATC** | Maintains Pressure in Band on bypass, bypass valves will close at 20" vacuum. |
| | **SRO** | When bypass valves are lost direct 800 to 1000 psig or 700 to 900 psig on SRV's. |
| | **ATC** | Maintain Pressure in directed band on SRV's. |
| | **Crew** | **MSIV A Line Fails to Isolate at 21 inches of vacuum.** |
| | **BOP/ATC** | Isolates MSIV A Inboard Valve, take switch to close. **Critical Task 9.** |
| | **ATC** | If pressure exceeds 1083, Feedwater control will not be available for 30 seconds. FWRB red box on digital screen. Yellow light illuminates near bottom of 680 when control is available. Restores Reactor Level with Feedwater if FWRB occurred. **Critical Task 5 to restore level**. |
| | | |
| | **SRO** | With pressure control on SRV's, will eventually answer no to question can suppression pool temperature be maintained less than HCL. Directs Pressure be maintained less than HCL. |
| | **BOP/ATC** | Maintain pressure less than HCL with SRV's. **Critical Task 6.** |
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**Event Description: Event 6** T23 Containment Control

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | **SRO** | Enter PEI T23 on Drywell Temperature or Suppression Pool Temperature. Enter all legs. |
| | **SRO** | Direct BOP to operate all available Drywell Cooling and perform PEI-SPI 2.1. |
| | **BOP** | Starts all Drywell Cooling Fans and performs PEI-SPI 2.1. |
| | | **VERIFY** only one of the following is running: NCC PUMP A P43-C001A, NCC PUMP B P43-C001B, NCC PUMP C P43-C001C |
| | | **PLACE** NCC LOCA BYPASS P43-BS2 keylock switch in BYPASS. **OPEN** the following valves: NCC CNTMT RETURN INBD ISOL P43-F215, and NCC DW RETURN INBD DW ISOL P43-F400. |
| | | **PLACE** NCC LOCA BYPASS P43-BS1 keylock switch in BYPASS. **OPEN** the following valves: NCC DW SUPPLY OTBD DW ISOL P43-F355, NCC DW RETURN OTBD DW ISOL P43-F410, NCC CNTMT RETURN OTBD ISOL P43-F140, and NCC CNTMT SUPPLY OTBD ISOL P43-F055. |
| | **SRO** | Suppression Pool Temperature greater than 95. Direct BOP to establish pool cooling with RHR A and/or B. |
| | **BOP** | Establish Suppression Pool Cooling. |
| | | CLOSE RHR HX'S BYPASS VALVE, 1E12F048, by holding its control switch in CLOSE. |
| | | THROTTLE RHR HX'S OUTLET VALVE, 1E12F003, by holding its control switch in CLOSE for 18 to 20 seconds. |
| | | TAKE RHR TEST VALVE TO SUPR POOL, 1E12-F024, control switch to OPEN. Time Opened: A - _____ B - _____ |
| | | WHEN RHR PUMP FLOW, 1E12R603, is greater than 1650 gpm, THEN VERIFY CLOSED RHR PUMP MIN FLOW VALVE, 1E12F064. |
| | | THROTTLE RHR HX'S OUTLET VALVE, 1E12F003, UNTIL RHR PUMP FLOW, 1E12R603, is 7100-7300 gpm. |
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| | **SRO** | Will eventually answer no to can Reactor Pressure and Pool Temperature be maintained less than HCL. Enter PEI-B13 Emergency Depressurization. Maintain pressure less than HCL. **Critical Task 6.** |
| | | |

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**Event Description: Event 6 ATWS** Level Leg, Four Question Override YES

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | **SRO** | When power is >4%, Level is above 0", Suppression Pool Temp is >110, and an SRV is open. Direct Feedwater terminated and prevented per PEI-SPI 5.3 |
| | **ATC** | Terminate prevent feedwater. |
| | | **VERIFY** the following valves are closed: |
| | | MFP FLOW CONTROL VALVES N27-F010 and N27-F110 |
| | | RFP A DISCH VALVE N27-F100A |
| | | RFP B DISCH VALVE N27-F100B |
| | | FDW PUMPS BYPASS VALVE N27-F200 |
| | **SRO** | When power is less than 4% or level reaches 0", establish a level band of –25" to level to which level was lowered. |
| | **ATC** | Maintain new level band with feedwater. |
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**Event Description: Event 9** Emergency Depressurize on HCL

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | **SRO** | Enter PEI-B13 ED on HCL. |
| | **SRO** | Direct Terminate and Prevent feedwater PEI-SPI 5.3. Verify terminate and prevent PEI-SPI 5.1, 5.2 and 5.3. **Critical Task 7** |
| | **ATC** | Terminate prevent feedwater. |
| | | **VERIFY** the following valves are closed: |
| | | MFP FLOW CONTROL VALVES N27-F010 and N27-F110 |
| | | RFP A DISCH VALVE N27-F100A |
| | | RFP B DISCH VALVE N27-F100B |
| | | FDW PUMPS BYPASS VALVE N27-F200 |
| | **BOP** | Verify 5.1 |
| | | Verifies HPCS Pump is stopped or 1E22F004 closed. |
| | **BOP** | Verify 5.2 |
| | | **VERIFY** the following valves are closed: |
| | | SHUTDOWN COOLING TO FDW SHUTOFF Valves E12-F053A and B |
| | | RHR A HEAD SPRAY ISOL E12-F023 |
| | | LPCI A INJECTION VALVE E12-F042A |
| | | LPCS INJECTION VLV E21-F005 |
| | | LPCI B INJECTION VALVE E12-F042B |
| | | LPCI C INJECTION VALVE E12-F042C |
| | | |
| | **SRO** | Direct 8 SRV's open. Emergency Depressurization prior to exceeding HCL |
| | **BOP** | Opens 8 ADS SRV's |
| | | |

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**Event Description: Event 9** ATWS Level Leg after Emergency Depressurization

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | **SRO** | Enter Level Leg at X, following Emergency Depressurization. |
| | **SRO** | Direct Level be restored and maintained greater than minus 25 inches using feedwater, and / or LPCI A and B outside the shroud once pressure is less than MSCP at 140 psig. |
| | **ATC** | Restores and maintains level greater than minus 25 inches after MSCP. **Critical Task 8.** |
| | | **Level Band <130"** |
| | | Verify the MFP running. |
| | | Verify MFP FCV MAN/AUTO STATION in manual. |
| | | CONTROL RPV Level using MFP FCV MAN/AUTO STATION. |
| | **ATC** | If Operator uses RHR A or B per PEI-SPI 6.1 or 6.2 |
| | | **THROTTLE** SHUTDOWN COOLING A TO FDW SHUTOFF E12-F053A to establish desired injection flowrate. |
| | | **THROTTLE** SHUTDOWN COOLING B TO FDW SHUTOFF E12-F053B to establish desired injection flowrate. |
| | | Monitors SRM's for power spikes. |
| | | |
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| | | |
| | **Crew** | Enters PEI-M51/56 on Level 1 |
| | **SRO** | Works down flowchart and directs H2 igniters started |
| | **BOP** | Starts H2 igniters |
| | | |
| | | |

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**Event Description: Scenario Termination Criteria**

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | | 1. Control Rods are being inserted and SLC is injecting |
| | | |
| | | 2. RPV level is being restored and maintained in the directed band using: |
| | | - Feedwater or Low Pressure ECCS |
| | | |
| | | 3. SRVs have maintained pressure less than HCL. |
| | | |
| | | 4. SRV's have been opened to Emergency Depressurize the RPV, prior to exceeding HCL. |
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**Event Description: Critical Task 1**

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | | Critical Task 1 – With a reactor scram required and the reactor not |
| | | shutdown, initiate action to reduce power by inserting control rods |
| | | |
| | | 1. Safety Significance: |
| | | - Shutting down the reactor can preclude failure of |
| | | Containment or equipment necessary for the safe |
| | | shutdown of the plant |
| | | |
| | | 2. Cues: |
| | | - Procedural compliance |
| | | |
| | | 3. Measured by: |
| | | - Control Rod insertion before the end of the scenario |
| | | |
| | | 4. Feedback: |
| | | - Reactor power trend |
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**Event Description: Critical Task 2**

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | | Critical Task 2 – With a reactor scram required and the reactor |
| | | not shutdown, to prevent an uncontrolled RPV depressurization |
| | | and subsequent power excursion, inhibit ADS |
| | | |
| | | 1. Safety Significance: |
| | | - Precludes core damage due to an uncontrolled |
| | | reactivity addition |
| | | |
| | | 2. Cues: |
| | | - Procedural compliance |
| | | |
| | | 3. Measured by: |
| | | - ADS logic inhibited prior to an automatic initiation of |
| | | the ADS System unless all required injection |
| | | systems are terminated and prevented |
| | | |
| | | 4. Feedback: |
| | | - RPV pressure and level trends |
| | | - ADS "Out of Service" annunciator status |
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**Event Description: Critical Task 3**

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | | Critical Task 3 – During an ATWS with power greater than 4%, Standby Liquid Control is initiated prior to 110 degrees in suppression pool. |
| | | |
| | | 1. Safety Significance: |
| | | - Additional method to shutdown Reactor |
| | | - Must inject prior to BITT |
| | | |
| | | 2. Cues: |
| | | - Procedural compliance |
| | | |
| | | 3. Measured by: |
| | | - Observation – Standby Liquid Control pumps started. |
| | | -Observation - Discharge pressure above RPV pressure. |
| | | -Observation – Suppression pool temperature. |
| | | |
| | | 4. Feedback: |
| | | - Reactor power trend |
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**Event Description: Critical Task 4**

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | | Critical Task 4 – During an ATWS terminate and prevent injection from HPCS |
| | | |
| | | 1. Safety Significance: |
| | | - Prevention of fuel damage due to uncontrolled feeding |
| | | |
| | | 2. Cues: |
| | | - Procedural compliance |
| | | |
| | | 3. Measured by: |
| | | - Observation – no injection into the RPV from HPCS |
| | | |
| | | 4. Feedback: |
| | | - Reactor power trend, power spikes, reactor short period alarms |
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**Event Description: Critical Task 5**

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | | Critical Task 5 – Restore and maintain RPV level greater than top of active fuel or zero inches. |
| | | |
| | | 1. Safety Significance: |
| | | - Maintain adequate core cooling |
| | | |
| | | 2. Cues: |
| | | - Procedural compliance |
| | | - Level lowering with adequate high pressure injection available |
| | | |
| | | 3. Measured by: |
| | | - Injection established after directed level band is reached. |
| | | |
| | | 4. Feedback: |
| | | - Reactor level trend |
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**Event Description: Critical Task 6**

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | | Critical Task 6 – Maintain RPV pressure and Suppression Pool temperature less than HCL, If RPV pressure and Suppression Pool temperature cannot be |
| | | maintained below the Heat Capacity Limit (HCL), then initiate Emergency |
| | | Depressurization prior to exceeding HCL. |
| | | |
| | | 1. Safety Significance: |
| | | - Precludes failure of Containment |
| | | |
| | | 2. Cues: |
| | | - Procedural compliance |
| | | 3. Measured by: |
| | | 3. Measured by: |
| | | - At least 5 SRVs are open before HCL is exceeded |
| | | |
| | | 4. Feedback: |
| | | - RPV pressure trend |
| | | - SRV open status indications |
| | | - Suppression Pool temperature rate of increase |
| | | - Reactor pressure trend |
| | | - Suppression Pool temperature trend |
| | | |
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**Event Description: Critical Task 7**

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | | Critical Task 7 – During an ATWS with Emergency Depressurization required |
| | | terminate and prevent injection, with the exception of RCIC, SLC and CRD, into |
| | | the RPV until reactor pressure is below MSCP. |
| | | |
| | | 1. Safety Significance: |
| | | - Prevention of fuel damage due to uncontrolled feeding |
| | | |
| | | 2. Cues: |
| | | - Procedural compliance |
| | | |
| | | 3. Measured by: |
| | | - Observation – no injection into the RPV except for RCIC, |
| | | SLC and CRD prior to reaching the MSCP. |
| | | |
| | | 4. Feedback: |
| | | - Reactor power trend, power spikes, reactor short period alarms. |
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**Event Description: Critical Task 8**

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | | Critical Task 8 – During an ATWS, when RPV pressure is below the MSCP, |
| | | increase and control injection into the RPV to restore and maintain RPV level |
| | | to the directed level band. |
| | | |
| | | 1. Safety Significance: |
| | | - Establish adequate core cooling |
| | | |
| | | 2. Cues: |
| | | - RPV pressure trend |
| | | - Procedural compliance |
| | | |
| | | 3. Measured by: |
| | | - RPV level is established and controlled above –25" |
| | | |
| | | 3. Measured by: |
| | | - RPV level is being restored and maintained in the directed band. |
| | | |
| | | 4. Feedback: |
| | | - Lack of power excursion |
| | | - RPV level and pressure indications |
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**Event Description: Critical Task 9**

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | | Critical Task 9 – Failure of a Main Steam Line automatic isolation, take action |
| | | to manually isolate the Main Steam Line. |
| | | |
| | | 1. Safety Significance: |
| | | - Take action to restore a fission product barrier |
| | | |
| | | 2. Cues: |
| | | - Valve position indication shows Main Steam Line is not isolated |
| | | - Procedural compliance |
| | | |
| | | 3. Measured by: |
| | | - Inboard MSIV 1B21F0022A is taken to close |
| | | |
| | | 4. Feedback: |
| | | - 1B21F0022A indicates closed |
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