SIMULATOR OPERATOR INSTRUCTIONS FOR 2021 NRC RE-EXAM SCENARIO #1

GENERAL REQUIREMENTS

- Recorders will be rolled prior to the scenario and paper from selected recorders will be retained for the examination team as requested.
- All procedures, flow charts, curves, graphs, etc. will be in their normal storage places.
- All markable procedures, boards, etc. will be erased.
- All paper used by the Crew will be retained for the examination team as requested.
- The simulator operators will keep a log of all communications during the scenario as requested by the examination team.

SCENARIO SOURCE HISTORY

- This scenario is a new scenario written for the 2021 NRC re-exam.

INITIAL SETUP

Initial Conditions

- Reset to IC-14, 100% power
- Lower Reactor Power to 95%
- 'B' Loop of RHR is in Torus Cooling
- Insert Control Rods 38-07 and 34-07 to position 34

Blocking Tags

- None

Event Triggers

- **ET5:** Mode Sw or Scram PB

Malfunctions

INSERTED

- **HPO04TO,** Includes K27, K28, K36, K57 Relays - **Override**
- **RPS062627,** Control Rod (26-27) Fails to Scram
- **RPS063839,** Control Rod (38-39) Fails to Scram
- **RPS061027,** Control Rod (10-27) Fails to Scram
- **RPS063819,** Control Rod (38-19) Fails to Scram
- **RPS065439,** Control Rod (54-39) Fails to Scram
- **RPS062251,** Control Rod (22-51) Fails to Scram
- **RPS062655,** Control Rod (26-55) Fails to Scram
- **CRM023807,** Control Rod (38-07) Stuck

TRG 2

- **HPC07,** HPCI Steam Supply Line Break – **3% SV**

TRG 3

- **MFS02B,** Reactor Feedwater Pump B High Vibes – **50% SV**

TRG 4

- **RRS20,** Recirculation Loop Rupture – **3% SV, 15 Min Ramp**

TRG 5

- **MSS01,** Steam Leakage Inside the Primary Containment – **30%, 20 Min Ramp**
- **PCS03A, Torus-Drywell Vacuum Breaker A Fails Open**

Overrides

TRG 1

- **ANO201RB13,** Inner Screen or Pump – **ALARM_ON**

TRG 6

- **ARI01TO,** ARIA 4-ARIA Relay Trip Override – **Override**
- **ARI02TO,** ARIA 4-ARIB Relay Trip Override – **Override**
- **RPS01TO,** RPS Auto Scram Ch A1 – **Override**
- **RPS02TO,** RPS Auto Scram Ch A2 – **Override**
- **RPS03TO,** RPS Auto Scram Ch B1 – **Override**
- **RPS04TO,** RPS Auto Scram Ch B2 – **Override**
- **RPS05TO,** RPS Manual Scram Ch A3 – **Override**
- **RPS06TO,** RPS Manual Scram Ch B3 – **Override**

Trip Overrides

None

Remote Functions

None

Turnover Procedures

None

SIMULATOR OPERATOR DIRECTIONS

EVENT 1 **Secure Torus Cooling**

Support crew actions for securing Torus cooling.

When directed to open HV-2-10-70B, wait 1 minute and toggle remote function **RHR02B, LPCI Line B Stayfull Valve HV-70B,** to **OPEN.**

EVENT 2 **Fire in 'D' HPSW Pump**

Prior to the crew securing the 'D' HPSW pump and when directed by the Lead Examiner, insert **TRG 1** and verify the following override activates:

- **ANO201RB13,** Inner Screen or Pump – **ALARM_ON**

When the Fire Brigade is dispatched, acknowledge as all required responders. Wait 1 minute and report as the Fire Brigade Leader that the 'D' HPSW Pump is on fire.

When the crew reports the 'D' HPSW pump has been secured, wait 1 minute and report the fire is out.

EVENT 3 **Withdrawal of Control Rods**

Support crew actions for withdrawing control rods.

EVENT 4 **Stuck Control Rod**

Support crew actions for withdrawing control rods.

EVENT 5 **HPCI Steam Leak**

When directed by the Lead Examiner, insert **TRG 2** and verify that the following events activate:

- **HPC07,** HPCI Steam Supply Line Break – **3% SV**

When directed to investigate high temperature in the HPCI room, report that steam is in the HPCI room.

When directed to remove power from the closed HPCI Steam Supply Valve, wait 2 minutes and insert malfunction **VED01_02 (HPCI MO-16)** or **VED01_03 (HPCI MO-15)**, as appropriate.

EVENT 6 **High Vibes on 'B' RFP**

Support crew actions for securing the 'B' RFP.

If dispatched to investigate high vibrations on the 'B' RFP, wait 3 minutes and report the pump is vibrating slightly.

EVENT 7 **Steam Leak in the Drywell**

When directed by the Lead Examiner, insert **TRG 4** and verify that the following events activate:

- **RRS20,** Recirculation Loop Rupture – **3% SV, 15 Min Ramp**

When directed to raise the current limiter setpoint for the C Drywell Chiller to 100% and to report DWCW Return Header Pressure, wait 2 minutes and report completion and DWCW Return Header Pressure is 2 psig.

When the reactor is scrammed, verify **TRG 5** activates:

- **MSS01,** Steam Leakage Inside the Primary Containment – **30%, 20 Min Ramp**

When directed to close HV-2-10-70A, wait 2 minutes and toggle remote function **RHR02A, LPCI Line A Stayfull Valve HV-70A,** to CLOSE, and report completion**.**

EVENT 8 **Low Power ATWS**

If directed to perform T-216, steps 4.1 and 4.2, wait 15 minutes and insert **TRG 6** and verify the following remotes activate:

- **ARI01TO,** ARIA 4-ARIA Relay Trip Override – **Override**
- **ARI02TO,** ARIA 4-ARIB Relay Trip Override – **Override**
- **RPS01TO,** RPS Auto Scram Ch A1 – **Override**
- **RPS02TO,** RPS Auto Scram Ch A2 – **Override**
- **RPS03TO,** RPS Auto Scram Ch B1 – **Override**
- **RPS04TO,** RPS Auto Scram Ch B2 – **Override**
- **RPS05TO,** RPS Manual Scram Ch A3 – **Override**
- **RPS06TO,** RPS Manual Scram Ch B3 – **Override**

Report completion of T-216, steps 4.1 and 4.2 to the Control Room.

TERMINATION The scenario may be terminated once drywell sprays are in service and RPV parameters are being controlled.

SHIFT TURNOVER

PLANT CONDITIONS:

A Unit 2 is at 95% power with no equipment out of service. 'B' loop of RHR is in Torus Cooling with the 'D' HPSW Pump. Control Rods 34-07 and 38-07 have been inserted to position 34 for a required retest.

INOPERABLE EQUIPMENT/LCOs:

None

SCHEDULED EVOLUTIONS:

Secure Torus Cooling
Withdraw control rods 34-07 and 38-07.

SURVEILLANCES DUE THIS SHIFT:

None

ACTIVE CLEARANCES:

None

GENERAL INFORMATION:

None

CRITICAL TASKS

1. Isolate the steam leak prior to a second area maximum safe temperature is exceeded in the Secondary Containment.

a. Given the plant experiencing a steam leak in the secondary containment, the crew will isolate the steam leak prior to a second area exceeding the maximum safe temperature in accordance with T-103, Secondary Containment Control. Failure to do so will result in a loss of the secondary containment due to an excessive heat load.

2. Insert all Control Rods to shutdown the reactor during a failure to scram.

a. Given a failure of all rods to insert during a scram, the crew will manually insert all control rods to establish shutdown conditions in accordance with T-117, ATWS RPV Control. Failure to do so can result in inadvertent criticality and damage to the fuel cladding.

3. Initiate containment sprays prior to drywell pressure exceeding the Pressure Suppression Pressure (PSP) limit.

a. Given the plant experiencing a steam leak into the primary containment, the crew will initiate containment sprays and control drywell pressure in accordance with T-102, Primary Containment Control. Failure to do so will result in exceeding the PSP limit and a loss of the primary containment.

Op Test No.: **2** **Scenario No.:** **1** **Event No.:** **1**

Event Description: Secure Torus Cooling

Cause: N/A

Effects: N/A

Time	**Position**	**Applicant's Actions or Behavior**
	CRS	Direct the PRO to secure Torus Cooling on the B RHR loop per SO 10.1.D-2, Residual Heat Removal System Torus Cooling, and SO 32.2.A-2, HPSW System Shutdown.
	PRO	1. Obtains a copy of SO 10.1.D-2 and performs the following: a. Verify both white lights are lit for CV-2-10-2677D. b. Verify alarm 219 G-5, RHR CV-2677D Not Aligned for LPCI, is clear. c. Direct operator to open HV-2-10-70B. d. Close MO-2-10-034B, Full Flow Test. e. Secure the 'D' RHR Pump. f. Close MO-2-10-039B, Torus Hdr 2. Obtains a copy of SO 32.2.A-2 and performs the following: a. Shutdown the 'D' HPSW Pump. b. Close MO-2-10-089D, RHR Hx 2D c. Verifies CHK-2-32-502D, HPSW 2D P042 Discharge Check Valve, is closed.

Op Test No.: 2 **Scenario No.: 1** **Event No.: 2**

Event Description: Fire in 'B' HPSW Pump

Cause: Short in 'B' HPSW pump motor.

Effects: Fire alarm in the Inner Screen Pump Area

Time	Position	Applicant's Actions or Behavior
	PRO	1. Recognize and report alarm 201 B-7A, Inner Screen or Pump Structure Heat/Smoke Det., alarm is in.
	CRS	1. Directs dispatching the Fire Brigade per the Rapid Response Card.
	PRO	1. Obtains RRC FF-01, Dispatch of Fire Brigade. 2. Sounds the Station Alert Tone. 3. Announces for Fire Brigade to respond to a fire alarm in the Inner Screen House. 4. Acknowledges reports of the Fire Brigade manning stations. 5. Acknowledges and reports that the fire is in the 'D' HPSW Pump.
	CRS	1. Directs PRO to secure the 'D' HPSW pump and report completion to the Fire Brigade Leader.
	PRO	1. Places the control switch for the 'D' HPSW Pump in STOP. 2. Reports to the Fire Brigade leader that the 'D' HPSW Pump has been secured. 3. Acknowledges and reports that the fire is out.
TS	CRS	1. Acknowledges report that the fire is out. 2. Declares the HPSW pump inoperable and enters a 7 day LCO per T.S. 3.7.1.A.

Op Test No.: **2** **Scenario No.:** **1** **Event No.:** **3**

Event Description: Withdrawing Control Rods to Full Out Position

Cause: None

Effects: None

Time	**Position**	**Applicant's Actions or Behavior**
	CRS	1. Directs URO to restore control rods 34-07 and 38-07 to the full out position.
	URO	1. Obtains a copy of SO 62.1.A-2, Withdrawing/Inserting a Control Rod, and performs the following for rod 34-07 and 38-07. a. Places the Rod Select Power Switch in ON. b. Depresses the pushbutton for rod 34-07. c. Verify rod 34-07 is selected on the Full Core Display and the Four Rod Display. d. Verifies the Rod Withdraw Permissive Light is lit. e. Places and holds the Emergency In/Notch Override Switch to the NOTCH OVERRIDE position. f. Places and holds the Rod Control Switch to the OUT NOTCH position. g. Releases both switches when the control rod reaches position 48. h. Performs a coupling check for the control rod.
	PRO	1. Provides a peer check for rod withdrawal.

Op Test No.: **2** **Scenario No.:** **1** **Event No.:** **4**

Event Description: Stuck Control Rod

Cause: Stuck Control Rod Blade

Effects: Cannot withdraw or insert control rod.

Time	**Position**	**Applicant's Actions or Behavior**
	URO	1. Recognize and reports that control rod 38-07 is stuck. 2. Throttles closed MO-2-03-022, Drive Water Press, to raise drive water pressure by 50 psig. 3. Attempts to withdraw the control rod. 4. Recognizes and reports the control rod is moving. 5. Throttles open MO-2-03-022 to return drive water pressure to between 260 psid and 280 psid.
	PRO	1. Provides peer checks for the component manipulations.
	CRS	1. Acknowledges report from the URO.

Operator Actions **ES-D-2**

Op Test No.: **2** **Scenario No.:** **1** **Event No.:** **5**

Event Description: HPCI Steam Leak

Cause: Rupture in HPCI Steam Supply Line

Effects: Rising temperatures in the HPCI room

Time	Position	Applicant's Actions or Behavior
	URO	1. Recognize and Report alarm 210 J-3, High Area Temp Alarm in.
	PRO	1. Investigates the cause of the high temperature alarm. 2. Recognizes and reports that HPCI room temperatures are above the alarm setpoint. 3. Updates the crew on entry into T-103, Secondary Containment Control, due to high area temperatures. 4. Recognizes and reports fire alarms in the Reactor building. 5. Dispatches the Fire Brigade to the HPCI Room. 6. Acknowledges report from the Fire Brigade Leader of steam in the HPCI room. 7. Recognizes and reports HPCI failed to isolate on high temperature.
CT1		8. Manually isolates HPCI by closing either the HPCI MO-15 or the HPCI MO-16 valves. 9. Reports that secondary containment temperatures are lowering.
	CRS	1. Directs URO to dispatch the Fire Brigade to the HPCI room. 2. Acknowledges report of steam in the HPCI room. 3. Acknowledges report of HPCI failing to isolate on high temperature. 4. Directs PRO to manually isolate HPCI.
TS		5. Declares HPCI inoperable and enters a 14 day LCO per T.S. 3.5.1.C.

Op Test No.: **2** **Scenario No.:** **1** **Event No.:** **6**

Event Description: 'B' RFP High Vibrations

Cause: Clog in 'B' RFP Oil line

Effects: Rising vibrations on the 'B' RFP

Time	Position	Applicant's Actions or Behavior
	PRO	1. Recognize and report alarm 202 E-2, B RFPT Vibration High, is in. 2. Checks the vibration monitoring screen of PPC to determine vibration levels. 3. Reports that both vibration probes have exceeded 8 mils and the B RFP is required to be secured.
	CRS	1. Acknowledges the report of high vibrations on the B RFP. 2. Determines that feedwater flow must be lowered below 85%. 3. Directs URO to perform a GP-9 power reduction to < 85% power. 4. Directs URO to secure the B RFP per SO 6D.2.A-2, Reactor Feedwater Pump Shutdown. 5. Acknowledges that the B RFP has been secured.
	URO	1. Depresses the A and B Recirc Pump Speed pushbuttons as necessary to lower reactor power. 2. Reports reactor power is below 85% and feedwater flow is less than 85%. 3. Performs SO 6D.2.A-2 as follows: a. Notifies Chemistry of securing B RFP. b. Opens AO-2139B, Feed Pump B Recirc. c. Closes AO-2147B, Feed Pump B Check. d. Places B RFP M/A Station in Manual. e. Closes MO-2149B, Feed Pump B Disch and verifies remaining RFPs respond. f. Lowers RFP speed demand to 0 rpm or Emergency Stops the B RFP. g. Depresses the Turbine Trip B pushbutton. 4. Reports that the B RFP is secured.

Op Test No.: **2** **Scenario No.:** **1** **Event No.:** **7/8**

Event Description: Recirc Water Leak/Low Power ATWS

Cause: Unisolable rupture in the A Recirc line

Effects: Lowering RPV water level and rising Drywell pressure

Time	Position	Applicant's Actions or Behavior
	Crew	1. Recognize and report rising drywell pressure.
	CRS	1. Enters and executes OT-101, High Drywell Pressure, and T-102, Primary Containment Control 2. Directs URO to maximize Drywell Cooling 3. Directs PRO to close RCIC MO-15 to attempt to isolate the leak. 4. Acknowledges report that drywell pressure is still rising and directs RCIC MO-15 open. 5. Directs URO to isolate RWCU.
	URO	1. Starts all Drywell Chill Water Pumps and Chillers. 2. Directs EO to raise the current limiter on the C DW Chiller to 100% 3. Directs EO to report DWCW Return Header pressure. 4. Isolates RWCU as follows: a. Secures the A RWCU Pump b. Closes MO-2-12-068, RWCU Outlet. c. Closes MO-2-12-015, RWCU Inboard Isol, and MO-2-12-018, RWCU Outboard Isol.
	PRO	1. Closes RCIC MO-15 and checks drywell pressure. 2. Recognizes and reports drywell pressure is continuing to rise. 3. Reopens RCIC MO-15. 4. Reports that drywell pressure is approaching 1.2 psig.

Op Test No.: **2** **Scenario No.:** **1** **Event No.:** **7/8 (cont'd)**

Event Description: Recirc Water Leak/Low Power ATWS

Time	Position	Applicant's Actions or Behavior
	CRS	1. Directs URO and PRO to perform a GP-4 Shutdown. 2. Updates and enters T-101, RPV Control. 3. Acknowledges that power is downscale, and 7 control rods are stuck out. 4. Updates and enters T-117, ATWS RPV Control. 5. Directs URO to initiate ARI. 6. Directs URO to perform T-220, Driving Control Rods during a Failure to Scram. 7. Directs PRO to inhibit ADS. 8. Directs establishing RPV water level between +5 and +35". 9. Directs controlling RPV pressure between 800-1000 psig with DEHC. 10. Directs PRO to spray the Torus per T-204, Initiation of Containment Sprays using RHR. 11. Verifies operation is on the safe side of the Drywell Spray Curve. 12. Directs PRO to spray the Drywell with A RHR loop. (Crew may B Loop)
CT2	URO	1. Depresses the Scram Pushbuttons. 2. Places the Mode Switch in Shutdown. 3. Reports control rods are inserting, the mode switch is in shutdown and power is downscale. 4. Report that 7 control rods did not insert. 5. Emergency stops all RFPs. 6. Closes all RFP discharge valves. 7. Open C RFP Discharge bypass valve. 8. Establish RPV water level control with feedwater between +5 and +35". 9. Verify SDV vents and drains are closed. 10. Initiates ARI. 11. Performs steps of T-220, Driving Control Rods during a Failure to Scram as follows: a. Places the CRD Flow Controller in Manual and raises flow to maximum. b. Fully closes MO-2-03-22, Drive Water Press. c. Places the RWM Bypass Keylock Switch in BYPASS. d. Inserts the remaining 7 controls rods. 12. Reports to the CRS that all control rods are inserted.

Op Test No.: **2** **Scenario No.:** **1** **Event No.:** **7/8 (cont'd)**

Event Description: Recirc Water Leak/Low Power ATWS

Time	Position	Applicant's Actions or Behavior
	CRS	1. Updates exiting T-117, ATWS RPV Control, and enters T-101, RPV Control. 2. Directs depressurizing the RPV to 500-600 psig with DEHC. 3. Verifies Instrument Air pressure is greater than Drywell pressure
	URO	1. Initiates an RPV depressurization to 500-600 psig with DEHC.
	PRO	1. Closes the 11 and 22 breakers using the sync key. 2. Verifies the 1 and 2 breakers open. 3. Removes the 12 and 21 breakers from PTL. 4. Green flags the 1 and 2 breakers 5. Trips the Main Turbine when generator loading is less than 50kw. 6. Starts all Turbine Lift Pumps. 7. Verifies Group II and III isolations. 8. Verifies HWC has tripped. 9. Verifies Recirc Pumps are at minimum. 10. Reports Instrument Air pressure is greater than Drywell pressure. 11. Bypasses and restores Drywell Instrument Nitrogen as follows: a. Place AO-3969A and B control switches in CLOSE. b. Place D/W Inst. N2 keylock switches in BYPASS. c. Verifies alarm 319 G-1, Drywell Inst. N2 Valves Isolation Bypass is in. d. Place AO-3969A and B control switches in AUTO/OPEN. 12. Places ADS Inhibit keylock switches in INHIBIT. 13. Sprays the Torus as follows: a. Place keylock switch 10A-S185A, Ctmt Spray Override 2/3 Core Coverage, in MANUAL OVERRD. b. Momentarily places 10A-S17A, Ctmt Spray Vlv Cont. switch in MAN. c. Opens MO-2-10-39A, Torus Hdr. d. Opens MO-2-10-89A or C, HPSW Hx Out. e. Starts the associated HPSW pump (A or C). f. Starts the associated RHR pump (A or C). g. Throttle open MO-2-10-39A, Torus Spray.

Op Test No.: **2** **Scenario No.:** **1** **Event No.:** **7/8 (cont'd)**

Event Description: Recirc Water Leak/Low Power ATWS

Time	**Position**	**Applicant's Actions or Behavior**
CT3	PRO	1. Sprays the Drywell as follows: a. Verifies both Recirc pumps are tripped. b. Verifies all Drywell Cooling fans are in OFF. c. Opens MO-2-10-031A, D/W Spray Inboard. d. Opens MO-2-10-026A, D/W Spray Outboard. e. Adjusts spray flow as necessary to control pressure. f. Directs EO to close HV-2-10-70A, RHR Pressurizing Line Block Valve to RHR Loop A.

TERMINATION CRITERIA:

The scenario may be terminated once drywell sprays are in service and RPV parameters are being controlled.

SIMULATOR OPERATOR INSTRUCTIONS FOR 2021 NRC RE-EXAM SCENARIO #2

GENERAL REQUIREMENTS

- Recorders will be rolled prior to the scenario and paper from selected recorders will be retained for the examination team as requested.
- All procedures, flow charts, curves, graphs, etc. will be in their normal storage places.
- All markable procedures, boards, etc. will be erased.
- All paper used by the Crew will be retained for the examination team as requested.
- The simulator operators will keep a log of all communications during the scenario as requested by the examination team.

SCENARIO SOURCE HISTORY

- This scenario is a new scenario written for the 2021 NRC re-exam.

INITIAL SETUP

Initial Conditions

- Reset to IC-9, 10% power
- Lower Reactor Power to 4-5%

Blocking Tags

- None

Event Triggers

- **ET3:** DMF CAS01

Malfunctions

INSERTED

- **MSS08K,** Reactor Pressure Relief Valve K Fail – **0%**
- **EHH04B,** EHC Hydraulic Pump B Trip

TRG 2

- **CAS01,** Loss of Instrument A Air – **1%**

TRG 5

- **SLC02B,** Squib Vlv B Fails to Fire

TRG 6

- **APR01D,** APRM Ch 4 Failure – **130%**

TRG 7

- **PCS07,** Break in Torus Water Space – **100%, 25 Min Ramp**

TRG 9

- **EHH04A,** EHC Hydraulic Pump A Trip

Overrides

TRG 1

- **ZGI02A4S03,** Emerg In Notch Override Switch – **OFF**
- **ZGI02A4S09,** Rod Movement Control Switch – **OFF**
- **ANO205RF5,** RWM Rod Block – **ALARM_ON**

TRG 4

- **ZGI13A2S80B,** RCIC Man Initiation Pushbutton – **ARMED**
- **ZGI13A2S80A,** RCIC Man Initiation Pushbutton – **ON, 2 Sec Delete Time**
- **ANO204CA2,** RCIC Turb or Logic in Test – **ALARM_OFF**

Trip Overrides

INSERTED

- **RPS01TO,** RPS Auto Scram Ch A1 – **Override**
- **RPS02TO,** RPS Auto Scram Ch A2 – **Override**
- **RPS03TO,** RPS Auto Scram Ch B1 – **Override**
- **RPS04TO,** RPS Auto Scram Ch B2 – **Override**
- **RPS05TO,** RPS Manual Scram Ch A3 – **Override**
- **RPS06TO,** RPS Manual Scram Ch B3 – **Override**

Remote Functions

TRG 2

- **IAS03A,** A Air Compressor Reset - **TRIP**

TRG 3

- **IAS01,** HV-45988 A Instrument Air Comp Cross-Tie **– OPEN**
- **IAS02,** HV-45989 B Instrument Air Comp Cross-Tie **– CLOSE, 5 Sec Delay**

TRG 8

- **RHR25,** MO-176 Power Supply Breaker **- CLOSE**

Turnover Procedures

None

SIMULATOR OPERATOR DIRECTIONS

EVENT 1 **Scram Discharge Volume Vent and Drain Surveillance**

Support crew actions for testing the SDV Vents and Drains.

EVENT 2 **Withdrawing Control Rods**

Support crew actions for withdrawing control rods.

EVENT 3 **Rod Worth Minimizer Rod Block**

After the crew has withdrew 2 control rods and at the direction of the lead examiner, insert **TRG 1** and verify that the following events activate:

- **ZGI02A4S03,** Emerg In Notch Override Switch – **OFF**
- **ZGI02A4S09,** Rod Movement Control Switch – **OFF**
- **ANO205RF5,** RWM Rod Block – **ALARM_ON**

When the crew attempts to initialize the RWM, delete the above malfunctions.

EVENT 4 **Instrument Air Compressor Trip**

When directed by the lead examiner, insert **TRG 2** and verify that the following events activate:

- **CAS01,** Loss of Instrument A Air – **1%**
- **IAS03A,** A Air Compressor Reset – **TRIP**

When directed to investigate trip of the 'A' Instrument Air Compressor, wait 3 minutes and report there is an acrid odor coming from the compressor.

When directed to perform step 2.7.3 of ON-119, Loss of Instrument Air, wait 1 minute and insert **TRG 3**:

- **IAS01,** HV-45988 A Instrument Air Comp Cross-Tie **– OPEN**
- **IAS02,** HV-45989 B Instrument Air Comp Cross-Tie **– CLOSE, 5 Sec Delay**

Report completion to the Control Room.

EVENT 5 **RCIC Spurious Start**

When directed by the lead examiner, insert **TRG 4** and verify that the following events activate:

- **ZGI13A2S80B,** RCIC Man Initiation Pushbutton – **ARMED**
  ZGI13A2S80A, RCIC Man Initiation Pushbutton – **ON, 2 Sec Delete Time**
- **ANO204CA2,** RCIC Turb or Logic in Test – **ALARM_OFF**

When directed to investigate RCIC spurious start, wait 5 minutes and report no obvious indications of why RCIC started.

EVENT 6 **Squib Valve B Loss of Continuity**

When directed by the Lead Examiner, insert **TRG 5** and verify that the following events activate:

- **SLC02B,** Squib Vlv B Fails to Fire

When directed to investigate failure of the B Squib Valve, wait 2 minutes, and report no obvious signs of why it failed.

When the operator goes to check squib valve current, inform the operator that current is reading 0 amps.

EVENT 7 **D APRM Fails Upscale**

When directed by the Lead Examiner, insert **TRG 6** and verify that the following events activate:

- **APR01D,** APRM Ch 4 Failure – **130%**

EVENT 8 **Torus Water Leak**

When directed by the Lead Examiner, insert **TRG 7** and verify that the following events activate:

- **PCS07,** Break in Torus Water Space – **100%, 25 Min Ramp**

When directed to investigate lowering Torus water level, wait 3 minutes and report that there is water collecting in the Torus room.

When directed to close the circuit breaker for MO-176, wait 2 minutes and insert **TRG 8** and verify the following event activates:

- **RHR25,** MO-176 Power Supply Breaker **- CLOSE**

When directed to close HV-2-10-70B, wait 2 minutes and toggle remote function **RHR02B, LPCI Line B Stayfull Valve HV-70B,** to CLOSE, and report completion**.**

EVENT 9 **ATWS/ARI Functions**

Verify the following overrides have been inserted:

- **RPS01TO,** RPS Auto Scram Ch A1 – **Override**
- **RPS02TO,** RPS Auto Scram Ch A2 – **Override**
- **RPS03TO,** RPS Auto Scram Ch B1 – **Override**
- **RPS04TO,** RPS Auto Scram Ch B2 – **Override**
- **RPS05TO,** RPS Manual Scram Ch A3 – **Override**
- **RPS06TO,** RPS Manual Scram Ch B3 – **Override**

EVENT 10 **EHC Pumps Trip**

Once ARI has been initiated and control rods have been inserted, insert **TRG 9** and verify the following event activates:

- **EHH04A**, EHC Hydraulic Pump A Trip

If directed to investigate EHC pump trips, acknowledge the direction.

EVENT 11 **ADS Valve Fails to Open**

Verify the following malfunction has been inserted:

- **MSS08A,** Reactor Pressure Relief Valve A Fail – **0%**

TERMINATION The scenario may be terminated when an RPV blowdown is in progress and plant parameters are being controlled.

SHIFT TURNOVER

PLANT CONDITIONS:

A Unit 2 is at 4-5% power with no equipment out of service during a reactor startup.

INOPERABLE EQUIPMENT/LCOs:

None

SCHEDULED EVOLUTIONS:

Scram Discharge Vent and Drain Vale Functional Test of AO-2-03-32A.
Continue Reactor Startup

SURVEILLANCES DUE THIS SHIFT:

ST-O-003-450-2, Scram Discharge Vent and Drain Vale Functional Test

ACTIVE CLEARANCES:

None

GENERAL INFORMATION:

None

CRITICAL TASKS

1. Initiate ARI to shutdown the reactor within 10 minutes of the failure to scram.

a. Given the plant experiencing a failure of the scram circuit, the crew will initiate ARI to shutdown the reactor in accordance with T-117, ATWS RPV Control. Failure to do so will result in thermal hydraulic instabilities and damage to the fuel cladding.

2. Perform an RPV Blowdown prior to Torus water level reaching 7'.

a. Given a rupture in the Torus and a lowering Torus water level, the crew will perform an emergency blowdown prior to Torus water level reaching 7', in accordance with T-102, Primary Containment Control. Failure to do so will result in a loss of suppression capability and possible loss of the primary containment.

Op Test No.: **2** **Scenario No.:** **2** **Event No.:** **1**

Event Description: SDV Functional Test

Cause: N/A

Effects: N/A

Time	**Position**	**Applicant's Actions or Behavior**
	CRS	Direct the URO to perform the functional test of AO-2-03-032A, Scram Disch Vol Isolation Vent.
	URO	1. Obtains a copy of ST-O-003-450-2 and performs the following: a. Places the Inboard Scram Disch Vol Isolation Switch in CLOSE and records the closure time of AO-2-03-032A. b. Verifies AO-2-03-032A is closed. c. Places the Inboard Scram Disch Vol Isolation Switch in OPEN and records the opening time of AO-2-03-032A. d. Verifies AO-2-03-036A is open. e. Reports completion of the surveillance to the CRS.

Op Test No.: 2 **Scenario No.: 2** **Event No.: 2**

Event Description: Continue Reactor Startup

Cause: N/A

Effects: N/A

Time	Position	Applicant's Actions or Behavior
	CRS	1. Directs URO to continue the reactor startup per the startup sequence.
	URO	1. Obtains a copy of SO 62.1.A-2, Withdrawing/Inserting a Control Rod, and performs the following for withdrawing control rods. a. Places the Rod Select Power Switch in ON. b. Depresses the pushbutton for the rods per the startup sequence. c. Verify rod is selected on the Full Core Display and the Four Rod Display. d. Verifies the Rod Withdraw Permissive Light is lit. e. Places and holds the Emergency In/Notch Override Switch to the NOTCH OVERRIDE position. f. Places and holds the Rod Control Switch to the OUT NOTCH position. g. Releases both switches when the control rod reaches position 16. h. Single notch withdraws control rod from position 16 to position 22. i. Places and holds the Emergency In/Notch Override Switch to the NOTCH OVERRIDE position. j. Places and holds the Rod Control Switch to the OUT NOTCH position until the control rod is fully withdrawn. 2. Performs a coupling check for the control rod. 3. Reperforms the above steps for subsequent control rods.
	PRO	1. Provides a peer check for rod withdrawal.

Op Test No.: **2** **Scenario No.:** **2** **Event No.:** **3**

Event Description: RWM Rod Block

Cause: None

Effects: None

Time	**Position**	**Applicant's Actions or Behavior**
	URO	1. Recognizes and reports alarm 211 F-5, RWM Rod Block, is in alarm. 2. Performs alarm response as follows: a. Verifies power is below the LPSP setpoint. b. Verifies no indicated rod block on the RWM display. c. Verifies Rod by Rod sequence is not active. d. Verifies that BPWS enforcement is not active. e. Attempts to re-initiate the RWM. 3. Initializes the RWM per SO 62A.1.A-2, Rod Worth Minimizer System Initialization, as follows: a. Presses and holds the “System Initialize” pushbutton on the RWM panel. b. Depresses “Fullcore Display”. c. Verifies no substitute rod positions. d. Depresses “RWM Main”. e. Depress and hold “System Diagnostic” pushbutton and verify light stays lit. f. Verifies indicator lights operate as expected. g. Depress and hold “System Diagnostic” pushbutton and verify light goes out. 4. Recognize and report that the RWM alarm has cleared.
	CRS	1. Acknowledges report from the URO.

Operator Actions **ES-D-2**

Op Test No.: 2 Scenario No.: 2 Event No.: 4

Event Description: Instrument Air Compressor Trip

Cause: Failed contactor in the compressor

Effects: Air compressor trip and lowering air pressure

Time	Position	Applicant's Actions or Behavior
	Crew	1. Recognize and reports alarm 216 B-1 is in.
	PRO	1. Recognizes and reports the A Instrument Air Compressor has tripped. 2. Dispatches EO to investigate trip of the A Instrument Air Compressor. 3. Recognizes and reports alarm 216 D-3, A Instrument Air Header Lo Press, is in. 4. Updates and enters ON-119, Loss of Instrument Air. 5. Acknowledges the report of an acrid odor from the A Instrument Air Compressor.
	CRS	1. Acknowledges report from the PRO. 2. Directs PRO to perform step 2.7 of ON-119.
	PRO	1. Places the Backup Instrument Air Compressor in RUN. 2. Places control switch for AO80250D in OPEN. 3. Directs EO to perform step 2.7.3 of ON-119. 4. Acknowledges completion of step 2.7.3. 5. Reports the backup compressor is in service and Instrument Air Header A pressure has returned to normal.

Operator Actions

ES-D-2

Op Test No.: **2** **Scenario No.:** **2** **Event No.:** **5**

Event Description: RCIC Spurious Start

Cause: Short in the starting circuit for RCIC

Effects: RCIC turbine starts and injects into the RPV.

Time	Position	Applicant's Actions or Behavior
	Crew	1. Recognize and reports multiple RCIC alarms are in.
	PRO	1. Recognizes and reports that RCIC has started and is injecting into the RPV. 2. Directs EO to investigate spurious start of RCIC.
	CRS	1. Updates and enters OT-104, Positive Reactivity Addition. 2. Directs PRO to trip RCIC per the hard card.
	PRO	1. Depresses the TRIP pushbutton for RCIC. 2. Closes MO-2-13-021, To Feed Line. 3. Closes MO-2013-131, Supply. 4. Verify closed MO-2013-030, Full Flow Test.
	TS	1. Enters a 14 day LCO for RCIC being inoperable per T.S. 3.5.3.A.

Op Test No.: **2** **Scenario No.:** **2** **Event No.:** **6**

Event Description: B Squib Valve Loss of Continuity

Cause: Open in the circuit to the valve.

Effects: Indicating light goes out

Time	Position	Applicant's Actions or Behavior
	URO	1. Recognize and report alarm 211-H-3, Standby Liquid Squib Valve Loss of Continuity 2. Reports that the B Squib valve indicating light is out. 3. Checks the ammeter for the B squib valve and reports that current is reading 0 amps. 4. Dispatches an operator to investigate loss of squib valve B continuity. 5. Acknowledges report from the EO and informs the CRS.
TS	CRS	1. Declares the B SBLC subsystem inoperable and enters a 7 day LCO per T.S. 3.1.7.B.

Op Test No.: **2** **Scenario No.:** **2** **Event No.:** **7**

Event Description: D APRM Fails Upscale

Cause: Failure of the Monitoring circuit

Effects: Multiple high power alarms

Time	Position	Applicant's Actions or Behavior
	URO	1. Recognize and report alarm 211 A-3, APRM/OPRM Hi-Hi Inop, is in. 2. Recognizes and reports the D APRM has failed upscale. 3. Recognizes that only the D APRM is reading upscale.
	CRS	1. Acknowledges the report of the failed D APRM. 2. Directs URO to bypass the D APRM.
	URO	1. Acknowledges direction to bypass the D APRM. 2. Places the APRM Selector Switch to the 'D' position.

Op Test No.: **2** **Scenario No.:** **2** **Event No.:** **8/9**

Event Description: Torus Water Leak/ATWS

Cause: Unisolable rupture in the Torus

Effects: Lowering Torus water level and rising Torus Room level.

Time	Position	Applicant's Actions or Behavior
	PRO	1. Recognize and report alarm 226 A-4, Torus Water Level out of Normal Range. 2. Reports Torus water level is lowering. 3. Directs EO to investigate lowering Torus water level.
	CRS	1. Acknowledges report of lowering Torus water level. 2. Updates and enters T-102, Primary Containment Control. 3. Directs PRO to perform T-231, HPSW Injection into the Torus, and T-233, CST Makeup to the Tours via HPCI Minimum Flow Line.
	PRO	1. Performs the following for T-233: a. Verifies open MO-2-23-017, Cond Tank Suction. b. Throttle open MO-2-23-025, Min Flow. 2. Performs the following for T-231: a. Dispatches an EO to close breaker E324-R-B for MO-2-10-176. b. Verifies MO-2-10-154B, Outboard Disch. c. Verifies RHR pumps are secured. d. Verifies HPSW pumps are secured. e. Verify MO-2-10-89B and D are closed. f. Verifies MO-2-32-2344 HPSW Loop Cross Tie, is closed. g. Opens MO-2-10-174 and 176. h. Opens MO-2-10-39B, Torus Hdr. i. Starts the B or D HPSW pump. j. Throttle open MO-2-10-034B, Full Flow Test. k. Starts the second HPSW pump (B or D). l. Establishes 10,600 gpm flowrate on HPSW. 3. Reports that HPSW is injecting into the Torus. 4. Reports that Torus water level is still lowering.
	CRS	Updates the crew on performing a GP-4 Shutdown.

Op Test No.: **2** **Scenario No.:** **2** **Event No.:** **8/9 (cont'd)**

Event Description: Torus Water Leak/ATWS

Time	Position	Applicant's Actions or Behavior
	CRS	1. Directs URO and PRO to perform a GP-4 Shutdown. 2. Updates and enters T-101, RPV Control. 3. Acknowledges that power is not downscale. 4. Updates and enters T-117, ATWS RPV Control. 5. Directs ROs to perform their ATWS Rapid Response Cards. 6. Acknowledge reports that ARI is depressurizing the Scram Air Header. 7. Acknowledges all rods are inserted. 8. Updates exiting T-117 and enters T-101, RPV Control. 9. Directs ROs to perform normal scram actions. (NOTE: Scram actions may vary depending on if RPV water level lowers below +1")
CT1	URO	1. Depresses the Scram Pushbuttons. 2. Places the Mode Switch in Shutdown. 3. Reports control rods are not inserting, and power is not downscale. 4. Initiates ARI. 5. Reports that the scram air header is depressurizing. 6. Reports all control rods are inserted. 7. Emergency stops all RFPs. 8. Closes all RFP discharge valves. 9. Open C RFP Discharge bypass valve. 10. Establish RPV water level control with feedwater between +5 and +35". 11. Verify SDV vents and drains are closed.

Op Test No.: **2** **Scenario No.:** **2** **Event No.:** **8/9 (cont'd)**

Event Description: Torus Water Leak/ATWS

Time	Position	Applicant's Actions or Behavior
	CRS	1. Directs depressurizing the RPV to 500-600 psig with DEHC. 2. Verifies Instrument Air pressure is greater than Drywell pressure
	URO	1. Initiates an RPV depressurization to 500-600 psig with DEHC.
	PRO	1. Verifies Group II and III isolations. 2. Verifies HWC has tripped. 3. Verifies Recirc Pumps are at minimum. 4. Reports Instrument Air pressure is greater than Drywell pressure. 5. Bypasses and restores Drywell Instrument Nitrogen as follows: a. Place AO-3969A and B control switches in CLOSE. b. Place D/W Inst. N2 keylock switches in BYPASS. c. Verifies alarm 319 G-1, Drywell Inst. N2 Valves Isolation Bypass is in. d. Place AO-3969A and B control switches in AUTO/OPEN. 6. Places ADS Inhibit keylock switches in INHIBIT.
	CRS	1. Updates that Torus water level continues to lower, and the crew will be performing an RPV blowdown. 2. Updates and enters T-112, RPV Blowdown.

Op Test No.: **2** **Scenario No.:** **2** **Event No.:** **10**

Event Description: EHC Pump Trip

Cause: Failed contactor in EHC pump control circuit.

Effects: Bypass valves will close as EHC pressure is lost.

Time	Position	Applicant's Actions or Behavior
	URO	1. Recognize and report trip of the A EHC pump. 2. Attempts to start the B EHC pump. 3. Recognize failure of B EHC pump to start. 4. Report that a loss of EHC has occurred and bypass valves are going closed. 5. Dispatches EO to investigate trip of EHC pumps.
	CRS	1. Acknowledge report of tripped EHC pump. 2. Direct pressure control with SRVs.
	URO	1. Operates SRVs to control RPV pressure.

Operator Actions **ES-D-2**

Op Test No.: **2** **Scenario No.:** **2** **Event No.:** **11**

Event Description: ADS Valve Fails to Open

Cause: Failed Control Switch

Effects: SRV does not open when taken to Open.

Time	Position	Applicant's Actions or Behavior
	CRS	1. Directs URO to prevent uncontrolled condensate injection. 2. Verifies Torus water level is above 7 feet. 3. Directs PRO to open the 5 ADS valves.
CT2	PRO	1. Places the control switches for the 5 ADS valves to OPEN. 2. Recognizes and reports the A SRV failed to open. 3. Opens an additional SRV.
	CRS	1. Acknowledges that the A SRV failed to open. 2. Directs PRO to open an additional SRV.

TERMINATION CRITERIA:

The scenario may be terminated when an RPV Blowdown is in progress and plant parameters are being controlled.