Facility: **Nine Mile Point 1** Scenario No.: **NRC-01** Op-Test No.: **NRC-01**

Examiners: _____ Operators: _____

Initial Conditions: *Low power with 4 bypass valves open ready to synchronize the main generator to the grid (approximately 19% based on thermal power; 355 mwth)*

Turnover: *Reactor power is ~19% (355 mwth). Drywell inerting is complete. A team is being briefed to inert the Torus per N1-OP-9. Maintenance is establishing a plan to work on 112 containment spray pump. Synchronize and load the main generator per N1-OP-43A section 5.0, N1-OP-32 section 3.0, and N1-OP-31 section E.6.0. Turbine over speed testing is not required. Transfer house loads from reserve to normal per N1-OP-30 section E.15.0. Withdraw control rods to continue the power ascension for start of the second FW pump.*

112 Containment Spray Pump removed from service. EPR in control.

| Event No. | Malf. No. | Event Type* | Event Description |
|---|---|---|---|
| 1 | - | N<br>BOP<br>SRO | *Synchronize the main generator to the grid, pick up minimum load (40-60 mwe), and transfer house service from reserve to normal.*<br>***OP-32; E.3.0, OP-31; E.6.0, OP-30; E.15.0*** |
| 2 | - | R<br>RO<br>SRO | *Withdraw control rods per control rod sequence sheets (and as recommended by the Reactor Engineer) to continue the power ascension.*<br>***OP-43A; E.5.5, OP-5; F.1.0, Rod Sequence Control Sheets*** |
| 3 | TC06, Electrical Pressure Regulator Fails – Oscillates | I<br>RO<br>SRO | EPR oscillations will cause small fluctuations in reactor power, reactor pressure, and reactor water level. The crew will place the MPR in service to control reactor pressure and raise the EPR out of the way. SRO determines a thermal limit penalty must be applied when reactor power is between 45% and 90% with no backup pressure regulator.<br>***ARP A2-2-4, SOP-31.2, SOP-2, Tech Specs*** |
| 4 | RR9E, RRP 15 MG Slot Temp Increase (35% ramp 3 min.) | C<br>BOP<br>SRO | The crew will respond to a RRP15 MG set high temperature that continues to degrade. The crew will remove RRP15 from service and take appropriate actions including those actions to support 4-loop operation.<br>***ARP F2-2-5, OP-1; F.4; H.2; H.3, TechSpecs*** |
| 5 | - | R<br>RO<br>SRO | *The crew maintains reactor power by control rod withdrawal or master recirc flow control as RRP15 is removed from service to maintain reactor power.*<br>***OP-43A; E.5.5, OP-5; F.1.0, Rod Sequence Control Sheets*** |
| 6 | ED18, AC Power Board Electrical Fault (PB 16 Section A) (TRUE) | C<br>BOP<br>SRO | Loss of PB16A and PB 161. The crew will recognize and respond to a reduction of drywell cooling and a loss of an IAC and RBCLC Pump.<br>***A4-3-1, A4-4-2*** |

| | | | |
|---|---|---|---|
| 7 | *PC04 seismic event*<br>*PC05 torus leak (10%; 1 min ramp)*<br>*PC05 torus leak (35%; 1 min ramp, TUA 6 min 30 sec)* | *M*<br>*ALL* | *Seismic event, Torus water leak. The crew will blow down when torus water level degrades beyond the capability of torus water makeup.* |
| 8 | *RR29*, Recirc Loop Rupture (15%, 10 min ramp, RELATIVE 10 min. until active 25% 1 min ramp) | M<br>ALL | After the reactor is scrammed, a gradually increasing coolant leak inside containment will occur. The crew must enter EOP-2, EOP-4, and eventually EOP-8. During and after the blowdown (torus water level low) the crew must maintain RPV water level using high pressure and low pressure systems including defeat of Core Spray IV interlocks to control/stop core spray injection.<br>***EOP-1; Att. 4 and 16, EOP-2, EOP-4*** |
| 9 | *FW03A, FWP11 Trip*<br>*FW28B, HPCI Mode Failure To Initiate 12* | *C*<br>*BOP*<br>*SRO* | *When the reactor is scrammed, HPCI injection mode will fail to initiate concurrent with a trip of FWP #11. FWP #12 FCV must be manually opened and adjusted to maintain reactor water level.*<br>***ARP F2-3-3; F1-1-3; F1-2-3; F4-1-6; F4-2-6*** |
| 10 | CT01A, Cont Spray Pump Trip 111 (TRUE) | C<br>BOP<br>SRO | After containment sprays are placed into service, containment spray pump 111 trips requiring that the other available containment spray pump be placed into service (Containment Spray Pump 112 is removed from service and not available).<br>***N1-EOP-4, N1-EOP-8, N1-EOP-1; Att. 17, EAL Matrix*** |

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

| TARGET QUANTITATIVE ATTRIBUTES (PER SCENARIO; SEE SECTION D.5.d) | ACTUAL ATTRIBUTES |
|---|---|
| 1. Total malfunctions (5-8) | 6 |
| 2. Malfunctions after EOP entry (1-2) | 2 |
| 3. Abnormal events (2-4) | 4 |
| 4. Major transients (1-2) | 2 |
| 5. EOPs entered/requiring substantive actions (1-2) | 3 2 |
| 6. EOP contingencies requiring substantive actions (0-2) | 1 |
| 7. Critical tasks (2-3) | 2 |

what are #6? Looks like 5

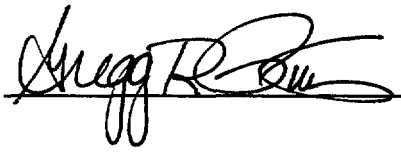
list

list

NMP SIMULATOR SCENARIO

**2004 NRC SCENARIO #1, REV. 0**

SYNCHRONIZE AND LOAD THE MAIN GENERATOR, TRANSFER HOUSE LOADS, WITHDRAW CONTROL RODS FOR POWER ASCENSION, ELECTRONIC PRESSURE REGULATOR OSCILLATIONS, REACTOR RECIRCULATION PUMP 15 HI TEMP, SEISMIC EVENT WITH LOSS OF PB16A AND TORUS LEAK, REACTOR COOLANT LEAK IN DRYWELL, FEED WATER PUMP #11 TRIP WITH HIGH PRESSURE COOLANT INJECTION FAILURE

| | | |
|---|---|---|
| PREPARER | P. Ballard/D.Wandschneider | DATE 9/01/2004 |
| VALIDATED | Sheehan, M. Restani, Barr | DATE 09/03/2004 |
| GEN SUPERVISOR OPS TRAINING |  | DATE 9/8/04 |
| OPERATIONS MANAGER | NA – EXAMINATION SECURITY | DATE |
| CONFIGURATION CONTROL | NA – EXAMINATION SECURITY | DATE |

SCENARIO SUMMARY

Length: 60 minutes

The crew assumes the shift with a reactor startup and power ascension in progress. The main generator is ready to be synchronized to the grid and loaded to minimum load. Containment Spray Pump 112 removed from service for maintenance. The SRO will determine there are no additional Technical Specification (TS) implications with Containment Spray Pump 112 inoperable.

The crew will synchronize and load the main generator to above minimum loading and then transfer house service from reserve to normal per OP-30. When house loads are transferred the crew will continue the power ascension using control rod withdrawal.

After house service is transferred from reserve to normal, and several control rods are withdrawn, the crew will respond to fluctuations in reactor power, reactor pressure, and reactor water level. Plant conditions and annunciators will allow the crew to diagnose the cause is the Electronic Pressure Regulator (EPR) oscillating. The crew will place the Mechanical Pressure Regulator (MPR) in service and manually control reactor pressure and raise the EPR out of the way. The SRO reviews Technical Specifications/Core Operating Limits Report (COLR) and determines a thermal limit penalty must be taken when power is between 45% and 90% per the COLR.

When pressure control is transferred to the EPR and the SRO has completed the Tech Spec/COLR review, the crew will be required to respond to a Reactor Recirculation Pump (RRP)15 MG set high temperature that continues to degrade. The crew will be required to remove RRP15 from service. The RO must raise reactor power using control rods and/or recirc flow as directed by the Reactor Engineer as RRP 15 is removed from service. The crew will take appropriate actions including those actions to support 4-loop operation.

After RRP15 is isolated, a fault develops on powerboard 16A causing it to trip. The crew must diagnose the loss of PB16A. The power loss will result in reduced drywell cooling capability (loss of three drywell cooling fans). Additionally the loss of PB 16A will require the crew to respond to a loss of an instrument air compressor and Reactor Building Closed Loop Cooling (RBCLC) pump.

After the crew starts a RBCLC pump and an instrument air compressor, a seismic event will occur resulting in a torus water leak. Because of the lowering torus water level the crew will insert a manual reactor scram. When the reactor is scrammed a coolant leak develops in the drywell. The crew must recognize a trip of Feedwater Pump (FWP) #11 and the failure of High Pressure Coolant Injection (HPCI) to initiate resulting in a failure of FWP #12 to start. The crew must manually control FWP FCV#12 to control reactor water level.

The crew will makeup to the torus and determine that enough makeup is available to stabilize the lowering water level. As containment pressures and temperatures rise the crew will be considering containment spray however this will require securing torus water makeup. Before containment sprays are required, the torus water leak degrades beyond the makeup capacity and torus level lowers requiring an RPV Blowdown. During and after the blowdown the crew must maintain RPV water level using high pressure and low pressure systems. This requires overriding core spray injection valves so they can be closed to avoid reactor vessel overfill.

After the blowdown actions are complete, the crew will spray the containment when torus pressure reaches 13 psig. After containment sprays are placed into service, containment spray pump 111 trips requiring that another available containment spray pump be placed into service (Containment Spray Pump 112 is removed from service and not available).

Major Procedures: NI-OP-43A, N1-OP-5, N1-OP-32, N1-OP-31, N1-OP-30, N1-SOP-2, N1-SOP-31.2, N1-OP-01, N1-SOP-1, N1-EOP-2, N1-EOP-4, N1-EOP-1, N1-EOP-8, EAL MATRIX, TECH SPECS

EAL Classification: ALERT per 3.1.1, Failure to maintain Drywell pressure <3.5 psig.

Termination Criteria: RPV pressure less than 72 psi above torus pressure, RPV level is between 53 to 95 inches and plant conditions are stable and under control per EOP-2 and EOP-4. Containment sprays are in service.

I. SIMULATOR SET UP

A. IC Number: 07

***ENSURE 11 RBCLC Pump and 11 Instrument Air Compressor in service.***

***MPR set at 926 psig and EPR set at 918 psig***

B. Presets/Function Key Assignments

1. Malfunctions:

| | | |
|---|---|---|
| a. | CT01B, Containment Spray Pump Trip 112 (TRUE) | **(QUEUED)** |
| b. | FW28B, HPCI Mode Failure To Initiate 12 (TRUE) | **(QUEUED)** |
| c. | TC06, Electrical Pressure Regulator Fails – Oscillates | **(F3)** |
| d. | RR9E, Recirc Pump 15 MG Slot Temperature Increase (35% ramp 3 min.) | **(F4)** |
| e. | ED18, AC Power Board Electrical Fault (PB 16 Section A) (TRUE) | **(F5)** |
| f. | PC05, Seismic Event (remain active 30 seconds) | **(F6)** |
| g. | PC04, Torus Leak (8% ramp 5 minute) | **(F6)** |
| h. | PC04, Torus leak (35% ramp 1 minute, relative to F6, TUA is 6 min 30 sec (after the reactor is scrammed) | **(F7)** |
| i. | RR29 Recirculation Loop Rupture (15%, 10 minute ramp, TUA 1 min) | **(F7)** |
| j. | RR29 Recirc Loop Rupture (relative)(25%, 1 minute ramp, TUA 10 min) | **(F7)** |
| k. | FW03A, FW Pump Trip 11 (TRUE) | **(F7)** |
| l. | CT01A, Containment Spray Pump Trip 111 (TRUE) | **(F8)** |

2. Remotes:

a. None

3. Overrides:

Training Composite (as required)

4. Annunciators:

Training Annunciator Composite (as required)

C. Equipment Out of Service

Containment Spray 112 – **Red Clearance**

D. Support Documentation

**Reactivity Maneuver Request Form**
**Control Rod Sequence Sheets marked off; starting at:**
**RWM GROUP *21: BANK INSERT LIMIT 08 BANK WITHDRAW LIMIT 12***
**Starting with control rod 30-47 at position 08.**

E. Miscellaneous – process computer LVD assignment

- ❑ A window – D373
- ❑ B window – B471
- ❑ C window – D320
- ❑ D window – H478
- ❑ E window - G358
- ❑ F window – J377
- ❑ G window – B470

- ❑ Lead examiner or designee must brief candidates respect to reactivity team expectations since this is a 3 person crew.
- ❑ The crew will have to brief in a secure room prior to the scenario due to the low power startup conditions. The brief could take 30 minutes. This should be done in advance of coming in the simulator.

II. **SHIFT TURNOVER INFORMATION**

OFF GOING SHIFT: □ N □ DATE: _____

**PART I: To be performed by the oncoming Operator before assuming the shift.**

- Control Panel Walkdown (all panels) (SSS, ASSS, STA, CSO, CRE)

**PART II: To be reviewed by the oncoming Operator before assuming the shift.**

- Shift Supervisor Log (SSS, ASSS, STA)
- CSO Log (CSO)
- Lit Control Room Annunciators (SSS, ASSS, STA, CSO, CRE)
- Shift Turnover Checklist (ALL)
- LCO Status (SSS, ASSS, STA)
- Computer Alarm Summary (CSO)

Evolutions/General Information/Equipment Status:

Reactor Power = 19% (4 Bypass Valves open)

#112 Containment Spray Pump OOS for repair. TS 3.3.7.b (declared inop 1 hour ago).

Control Rod Sequence Sheets RWM GROUP-21

A team is being briefed to inert the Drywell and Torus per N1-OP-9.

LPRM downscale alarms are intermittent due to power conditions

**PART III: Remarks/Planned Evolutions:**

Maintenance establishing a plan to work on Containment Spray Pump 112.

Synchronize and load the Generator Per N1-OP-43A Section 5.0, N1-OP-32 Section, 3.0 and N1-OP-31 Section E6.0

Transfer house service from reserve to normal per OP-30 E.15.0.

Continue control rod withdrawal for power ascension for start second FW pump.

**PART IV: To be reviewed/accomplished shortly after assuming the shift:**

- Review new Clearances (SSS)
- Shift Crew Composition (SSS/ASSS)
- Test Control Annunciators (CRE)

| TITLE | NAME | TITLE | NAME |
|---|---|---|---|
| SSS | | CRE/OATC | |
| ASSS | | E | |
| STA | | E | |
| CSO | | Other | |

| Scenario ID# | 2004 NRC SCENARIO #1 |
|---|---|

INSTRUCTOR COMMENTS (Strengths, Areas for Improvement, Open Items etc.)

| |
|---|
| |
| |
| |
| |
| |
| |

| What Happened? | What we did? | Why? (Goals) | Other Options? |
|---|---|---|---|
| | | | |

If Level drops below TAF do this CT Failure Criteria?

III. PERFORMANCE OBJECTIVES

A. Critical Tasks:

01 ***Maintain RPV water level above TAF using high and low pressure systems.***
BASIS: With an RPV leak, failure of HPCI to initiate results in a loss of high pressure injection. If manual action is not taken to adjust FCV#12, reactor water level will lower below TAF requiring a RPV blow down. Crew must control RPV level manually to maintain adequate core cooling to prevent fuel damage.

02 ***Depressurize the reactor when it is determined torus water level cannot be maintained above 8 feet.***
BASIS: With the loss of Primary Containment approaching, ERVs must be opened before reaching torus water level of 8 feet. At 8 feet the ERV diacharged become uncovered and the ERVs can no longer be used. Opening an ERV below 8 feet will result in a direct discharge to the torus air space and a loss of the pressure suppression function.

B. Performance Objectives:

| EVENT | PERFORMANCE OBJECTIVE |
|---|---|
| 01 | Given the reactor at rated temperature and pressure, the crew will place the turbine generator unit in service IAW N1-OP-43A, N1-OP-31 and N1-OP-32. |
| 01 | Given the plant with the turbine and generator in service, the crew will transfer house service from reserve to normal IAW N1-OP-30. |
| 02 | Given the plant in a condition to support power ascension to 100% power, the crew will increase station output IAW N1-OP-43A. |
| 03 | Given the plant in a condition to support power ascension the crew will respond to oscillations of the EPR and place the MPR in control per N1-SOP-31. |
| 04 | Given a Recirculation pump with rising slot temperatures, while the plant is operating at power in five loop operation, the crew will take action to remove the pump from service and continue power ascension with 4 loop operation IAW respective ARPs N1-OP-1. |
| 05 | Given the condition above requiring removal a Recirculation Pump from service, the crew will maintain reactor power using control rod withdrawl and recirculation flow control IAW N1-OP-43A, N1-OP-5, N1-OP-1 |
| 06 | Given a loss of powerboard 16A while operating at power the crew will respond to the loss of powerboard and restore loads or otherwise mitigate the impact due to lost loads in accordance with N1-ARP-A4-3-1, Powerboard 16 R-1041 Trip. |
| 07 | Given a seismic event that occurs while the plant is operating at power the crew will respond to the event and take actions to mitigate the event IAW N1-SOP-28 and ARP H2-1-6 |
| 07 | Given the plant operating at power when a Torus leak occurs, the crew will take action for a lowering Torus water level and blowdown the vessel in accordance with N1-EOP-4 |

| EVENT | PERFORMANCE OBJECTIVE |
|---|---|
| 08 | Given the requirement to defeat the Core Spray IV interlocks, the crew will insert the Core Spray jumpers IAW with EOP-1 Att.4. |
| 08 | Given a leak in the drywell accompanied by a torus leak, the crew will take action necessary to mitigate the accident IAW with EOP-2 and EOP-4. |
| 08 | Given Torus Water level less than 10.5 feet and lowering uncontrollably, the crew will open 3 ERVs per EOP-4 and in accordance with EOP-8 before Torus Water level reaches 8 feet. |
| 08 | Given a High Drywell Temperatures or Torus Pressures the crew will initiate containment spray IAW EOP-1 att. 17 |
| 09 | Given a trip of the running Feedwater pump and failure of HPCI mode for the starting Feedwater pump, the crew will take actions necessary to accomplish the manual action for HPCI that did not occur in order to control water level IAW with the ARPs. |
| 10 | Given a trip of a running containment spray, the crew will start an additional pump IAW with EOP-1 att. 17 |
| Generic | Given the plant in a condition requiring emergency classifications, the crew shall classify the events properly, complete initial notification forms and discuss the bases for the classification in accordance with the emergency plan procedure.<br><br>Given the plant or plant system in a condition requiring Technical Specification action, identify the deviation and any required actions/notifications. |

## EVENT 01& 02: Generator Synchronization and Loading, Transfer House Service from Reserve to Normal

*INSTRUCTOR ACTIVITIES:*

Take the simulator out of freeze before the crew enters for the pre-shift walk down and briefing. Allow no more than 5 minutes to walk down panels and perform annunciator checks.

INITIATION POINT: The initiation point for this event is when the SRO directs the crew to synchronize and load the main generator and transfer house loads from reserve to normal. The crew will continue with power ascension by pulling control rods. There are NO instructor activities related to this normal evolution.

- If asked, acknowledge request to complete Attachment 12 of N1-OP-43A to confirm Auto transfer capability

*SYMPTONS/CUES VISIBLE TO THE CREW:*

Not applicable.

**EVENT 01& 02: Generator Synchronization and Loading, Transfer House Service from Reserve to Normal**

| Time | SRO: Applicant Actions Or Behavior |
|---|---|

- ❑ Walk down panels prior to assuming shift.
- ❑ Conduct shift turnover brief.
- ❑ Assume the shift.
- ❑ Direct continuing with power ascension by pulling control rods, N1-OP-43A, E.6.0 Power Ascension to Rated; N1-OP-05, F.1.0 – Control Rod Withdrawl; Rod Sequence Control Sheets.
- ❑ Direct operator to perform N1-OP-32, E.3.0, Generator Synchronization.
- ❑ Direct operator to perform N1-OP-31, E.6.0, Loading Turbine Generator.
- ❑ Direct operator to perform N1-OP-30, E.15.0, Transfer House Service from Reserve to Normal.
- ❑ Direct continuing with power ascension by pulling control rods, N1-OP-43A, E.6.0 – Power Ascension to Rated; N1-OP-05, F.1.0 – Control Rod Withdrawl; Rod Sequence Control Sheets.
- ❑ Brief crew on event impact.

NOTE: The SRO may chose to carry out the actions to Syncronize the Generator, Load and Transfer House Service prior to raising power.

**EVENT 01& 02: Generator Synchronization and Loading, Transfer House Service from Reserve to Normal**

| Time | **RO/BOP:** Applicant Actions Or Behavior |
|---|---|

- ❑ Walk down panels prior to assuming shift.
- ❑ Participate in and ensure understanding of shift turnover brief.
- ❑ Acknowledge direction to perform N1-OP-32, E.3.0, Generator Synchronization.
- ❑ Acknowledge direction to perform N1-OP-31, E.6.0, Loading Turbine Generator.
- ❑ Acknowledge direction to perform N1-OP-30, E.15.0, Transfer House Service from Reserve to Normal.
- ❑ Acknowledge direction to continuing with power ascension by pulling control rods, N1-OP-43A, E.6.0 – Power Ascension to Rated; N1-OP-05, F.1.0 – Control Rod Withdrawl; Rod Sequence Control Sheets.

## N1-OP-32 E.3.0; Generator Synchronization

- ❍ Notify Power Control of estimated time generator will be synchronized to line.
- ❍ Verify open R925
- ❍ Verify open R915
- ❍ Verify open SW18
- ❍ Close SW 18 GENERATOR 1
- ❍ Insert key into R915 (R925) SYNCHRONIZING Switch, AND place R915 SYNCHRONIZING Switch to ON
- ❍ Verify INCOMING and RUNNING voltages matched; voltage may be matched manually with the EXCITER RHEOSTAT
- ❍ Adjust GOVERNOR Switch UNTIL synchroscope is rotating slowly in the FAST direction
- ❍ WHEN INCOMING and RUNNING voltages are matched, AND synchroscope is indicating 3 to 5 degrees lead time, close R915 (R925)
- ❍ Immediately load generator to 40-60 MWe OR UNTIL all Turbine Bypass Valves close

**- continued on next page -**

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- ❍ Place R915 (R925) SYNCHRONIZING Switch to OFF and remove key
- ❍ Adjust EXCITER RHEOSTAT Switch at E Panel to supply between 25 and 75 MVARS TO BUS reactive load
- ❍ Insert key into R925 (R915) SYNCHRONIZING Switch AND place
- ❍ R925 (R915) SYNCHRONIZING Switch to ON
- ❍ Verify synchronization, AND close R925 (R915)
    - ❍ Place R925 (R915) Synchronizing switch to OFF and remove key
- ❍ To place amplidyne in service, perform the following:
    - ❍ Verify VOLTAGE REG TRANSFER switch in TEST . . . . (__)
    - ❍ Adjust VOLTAGE REG ADJUSTMENT Switch to 0 Volts on VOLTAGE REG AMPLIDYNE Meter at E Panel OR Meter 1M at Excitation Cubicle
    - ❍ Place VOLTAGE REG TRANSFER Switch to RUN at E Panel
    - ❍ Adjust VOLTAGE REG adjustment to MVAR loading as directed by Power Control
    - ❍ Adjust EXCITER RHEOSTAT switch at E Panel to establish and maintain between 10 and 20 volts Boost on the VOLTAGE REG AMPLIDYNE meter
- ❍ WHEN directed by Power Control, place AUTO RECLOSING R915, AND AUTO RECLOSING R 925 to ON
- ❍ Transfer House Service from Reserve to Normal per N1-OP-30, 4.16Kv, 600V, and 480V House Service System

## Transfer House Service from Reserve to Normal per N1-OP-30

- ❍ Confirm Main Generator load stable.
- ❍ Confirm Voltage Regulator in service.

**- continued on next page -**

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- ❍ Insert Sync. Key in Breaker R113 and perform the following:
  - ❍ Turn Sync. Key ON
  - ❍ Confirm incoming voltage slightly above running (board) voltage
  - ❍ Make voltage adjustment with Tap Changer on Transformer 10.
- ❍ Close Breaker R113 AND immediately open R112.
- ❍ Leave R112 control switch in neutral position.
- ❍ Place Sync. Key in OFF position.
- ❍ Remove Sync. Key from R113
- ❍ Insert Sync. Key in Breaker R122 and perform the following:
  - ❍ Turn Sync. Key ON
  - ❍ Confirm incoming voltage slightly above running (board) voltage
  - ❍ Make voltage adjustment with Tap Changer on Transformer 10.
- ❍ Close Breaker R122 AND immediately open R123.
- ❍ Leave R123 control switch in neutral position.
- ❍ Place Sync. Key in OFF position.
- ❍ Remove Sync. Key from R122.
- ❍ Adjust Power Boards 11 and 12 voltages to 4160 volts using Tap Changer.
- ❍ Verify Transformer 10, TAP POS SEL TRANS 10 switch in MANUAL.
- ❍ Notify EM to complete Attachment 12 of N1-OP-43A to confirm Auto transfer capability.

## N1-OP-31 E.6.0, Loading Turbine Generator

- ❍ NOTE: Load (40-60 Mwe) must be applied to the unit within 30 seconds of synchronization to prevent a reverse power turbine trip.

**- continued on next page -**

**- continued from previous page -**

- ❍ Immediately load generator to 40-60 MWe OR UNTIL all Turbine Bypass Valves close
- ❍ NOTE: "HIGH STOP" for the Governor is indicated by both of the following: "High" (left) yellow governor light lit and GOVERNOR indication stops raising on E Panel Selsyn.
- ❍ WHEN Bypass Valves are closed AND turbine on EPR, raise GOVERNOR to HIGH STOP
- ❍ Verify closed, the following valves (panel N):
  - ❍ 02-05, BELOW SEAT DRAIN VALVE
  - ❍ 02-06, ABOVE SEAT DRAIN VALVE
  - ❍ 02-03, DRAIN VALVE TO CONDENSER
  - ❍ 02-01, ABOVE SEAT VENT VALVE
  - ❍ 10-39, (MOV-6) HOT REHEAT LINE DRAIN VALVE
  - ❍ 10-41, (MOV-5) HOT REHEAT LINE DRAIN VALVE
  - ❍ 24-46/24-48, DRAIN VALVE E/W
  - ❍ 24-45/24-47, DRAIN VALVE E/W
  - ❍ 09-34, DRAIN VALVE
  - ❍ 25-36, DRAIN VALVE
  - ❍ 09-35, DRAIN VALVE
  - ❍ 25-37, DRAIN VALVE
- ❍ Verify open the following valves:
  - ❍ IN101 (51.1-3), 111 MSDT FCV
  - ❍ 1N102 (51.1-8), 112 MSDT FCV
  - ❍ 1N103 (51.1-18), 121 MSDT FCV
  - ❍ 1N104 (51.1-13), 122 MSDT FCV

## EVENT 03: EPR Oscillations

***Instructor Activities:***

- **INITIATION POINT:** When directed by the lead evaluator, insert malfunction: TC06, Electrical Pressure Regulator Fails – Oscillates (F3)
  **(AFTER IN FOR 30 SECONDS – REMOVE AND REINSERT – oscillations continue to get worse if not reinserted.)**

- If asked to investigate the EPR failure, acknowledge the request.

- If informed of the EPR failure, acknowledge the report.

***Symptons/Cues Visible To The Crew:***

- Fluctuations in reactor pressure, reactor power, and reactor water level.
- A2-4-4 TURBINE MECHANICAL PRESS. REG. IN CONTROL

***Critical Task(s) and Justification:***

- *NONE*

**EVENT 03: EPR Oscillations**

| Time | **SRO:** Applicant Actions Or Behavior |
|---|---|

❑ Acknowledge report of reactor power and reactor pressure oscillations.

❑ Recognize/Interpret/ Diagnose EPR failure.

❑ Acknowledge report reactor power changed by more than 2%, SOP-2 if required.

❑ Direct actions of SOP-2 (if required)

❑ Direct RO to place the MPR in control per N1-SOP-31.2.

❑ Acknowledge report MPR in control per N1-SOP-31.2.

❑ Direct RO to adjust the MPR to establish reactor pressure 1000 - 1030 psig.

❑ Contact I&C Supervisor to investigate the EPR failure.

## TECH SPEC DETERMINATION

- Determine the inoperable automatic pressure regulator
  - Reference COLR1-16, page 2 of 15, section 2.1, 3.1. Determine thermal limit penalty applies for MCPR and LHGR when reactor power is between 45% and 90%. Determines no penalty is required at this time.

## SOP-2 ACTIONS (if required)

Directs the operators to:

- Monitor LPRMs and APRMs for Thermal Hydraulic Instabilities (THI).
- For reactor pressure oscillations, check for mis-operation of TCVs, TBVs, EPR, MPR, ERVs, Recirc Flow.

❑ Brief crew on event impact.

## EVENT 03: EPR Oscillations

| Time | **RO/BOP:** Applicant Actions Or Behavior |
|---|---|

❑ Recognize/report reactor power and reactor pressure oscillations.

❑ Acknowledge direction to perform actions of A2-4-4.

### A2-4-4 ACTIONS

- ❍ Observe reactor pressure recorders (ID75, ID77) and indicators 36-31A, 36-32A on F panel.
- ❍ Lower MPR setpoint (MECHANICAL PRESS REG C/S on E panel rotated CW to lower) until MPR is in control (MPR IN CONTROL light ON, A2-4-4 alarmed).
- ❍ Reference SOP 31.2

❑ Recognize/Interpret/Diagnose failure of the EPR.

❑ Acknowledge direction to place the MPR in control per N1-SOP-31.2, .

### N1-SOP -31.2

- ❍ Lower MPR setpoint (MECHANICAL PRESS REG C/S on E panel rotated CW to lower) until MPR is in control (MPR IN CONTROL light ON, ELECTRONIC PRESS REG % indicator on E panel goes to zero).
- ❍ Raise EPR continuously to high stop, 1010 psig (ELECTRONIC PRESS REG C/S on E panel rotated CCW to raise and held until ELECTRONIC PRESS REG (PSIG) indicator on E panel at 1010 psig).
- ❍ Confirm Reactor pressure steady on MPR. Observe reactor pressure recorders (ID75, ID77) and indicators 36-31A, 36-32A on F panel.
- ❍ Report MPR in control per N1-SOP-31.2.

❑ If directed, adjust the MPR control pressure as indicated on MPR SETPOINT PSIG digital indicator until reactor pressure is at the pre-transient pressure as determined by Recorder at F panel

❑ Refer to N1-OP-31, Section H.3.0 Operation With One Pressure Requlator Inoperable

## N1-OP-31

- IF operating without a backup pressure regulator, see the Core Operating Limits Report (COLR) section for operation without a backup pressure regulator for applicable MFLPD and MFLCPR thermal limit restrictions
- IF unable to meet the COLR thermal limit restrictions,THEN perform the following:
  - Enter applicable Tech Spec LCO for Fuel Rod Thermal Limits
  - Notify Reactor Engineering to obtain direction to achieve compliance with the applicable thermal limit restrictions

❑ Report reactor power changed by more than 2%, SOP-2 (if required)

## SOP-2 ACTIONS (if required)

⇨ Concurrent with other actions:

- Monitor LPRMs and APRMs for Thermal Hydraulic Instabilities
- For reactor pressure oscillations, check for mis-operation of TCVs, TBVs, EPR, MPR, ERVs, Recirc Flow.

## EVENT 04 & 05 - 15 MG Set High Temperature

***Instructor Activities:***

- **INITIATION POINT:** When directed by the lead evaluator, insert malfunction: RR9E, Recirc Pump 15 MG Slot Temperature Increase **(35% ramp 3 min) (F4)**
- If asked to investigate the MG Set high temperature, acknowledge the request.
- If directed as AO to check MG Set area ventilation and Turbine Bldg track bay and roll door positions, wait one (1) minute then report ventilation lineup is normal.
- If informed of the MG Set high temperature and removal of RRP 15 from service, acknowledge the report.

***Symptons/Cues Visible To The Crew:***

- F2-2-5, REACT RECIRC M-G SET 15
- Computer point A130 RRMG 15 GEN SLOT TEMP

***Critical Task(s) and Justification:***

- *NONE*

## EVENT 04 & 05 - 15 MG Set High Temperature

| Time | **SRO:** Applicant Actions Or Behavior |
|---|---|

- ❑ Acknowledge report F2-2-5, REACT RECIRC M-G SET 15, in alarm.
- ❑ Direct actions of F2-2-5, REACT RECIRC M-G SET 15..
- ❑ Direct a power reduction per SOP-1.1, Emergency Power Reduction.
- ❑ Direct initial response using N1-OP-1, section F.4.0.
- ❑ When SRO determines RR MG set temp cannot be corrected directs removal of RRP 15 from service (4 loop operation) per OP-1 H.2.0 and H.3.0.
- ❑ Determines that RRP 15 does NOT require isolation.
  - ❑ Verifies 4 Loop thermal limits
  - ❑ Verifies P/F Map on E Panel updated to 4 Loop requirements.

### TECH SPEC DETERMINATION

- ❍ TS 3.6.2.a (1) and (7) for APRM flow biased rod blocks and scrams until RRP 15 discharge valve is closed.

*Only applies if pump tripped before closing discharge valve*

- ❑ Brief crew on event impact.
- ❑ Reference TS 3.1.7 and determine that it does NOT apply (100% power good)

| Time | **RO/BOP:** Applicant Actions Or Behavior |
|---|---|

❑ Recognize/report F2-2-5, REACT RECIRC M-G SET 15, in alarm.

❑ Perform F2-2-5 actions.

F2-2-5 and N1-OP-1 Section F. ACTIONS

- ❍ Confirm computer point A130, RRMG 15 GEN SLOT TEMP in alarm.
- ❍ Direct AO to check MG Set area ventilation and Turbine Bldg track bay and roll door positions.
- ❍ Reduce loading on affected RRMG (see below).
- ❍ Verifies total recirculation flow is evenly balanced between all operating RRPs.
- ❍ Remove RRP 15 from service if cannot correct condition (see below)

❑ Perform power reduction per SOP-1.1, Emergency Power Reduction.

SOP-1.1, EMERGENCY POWER REDUCTION

- ❍ No action

❑ Remove RRP 15 from service (4 loop operation) per OP-1 H.2.0 and H.3.0.

REMOVE RRP 15 FROM SERVICE (OP-1 H.2.0)

- ❍ With RRECIRC PUMP 15 SPEED CONTROL in BAL null deviation meter by rotating potentiometer until 0 indicated.
- ❍ Place RRECIRC PUMP 15 SPEED CONTROL AUTO/BAL/MAN to MAN.
- ❍ Verify open REACTOR R PUMP 15 BYPASS VALVE.

**NOTE:** Any speed changes performed on individual controllers will require re-adjusting the MASTER controller to maintain desired total recirc flow.

**- continued on next page -**

## EVENT 04 & 05 - 15 MG Set High Temperature

| Time | **RO/BOP:** Applicant Actions Or Behavior |
|---|---|

**- continued from previous page -**

- ❍ Slowly reduce Recirculation pump 15 flow to 6 to $8x10^6$ lb/hr. Other RO adjusts master recirc flow control to maintain desired total flow.
- ❍ Rotate and hold in Close REACTOR R PUMP 15 DISCHARGE VALVE (throttle valve).
- ❍ Place REACTOR RP MOTOR 15 MG SET to STOP.
- ❍ Hold in OPEN 2-3 seconds, REACTOR R PUMP 15 DISCHARGE VALVE.
- ❍ AFTER 30 minutes, close REACTOR R PUMP 15 DISCHARGE VALVE.
- ❍ Align system for 4 Loop Operation (see below)

### 4 LOOP OPERATION (OP-1 H.3.0)

- ❍ Inform SRO to check 4 loop thermal limits.
- ❍ Verify RRP 15 suction valve and discharge bypass valves are open.
- ❍ Verify P/F map on E Panel updated for 4 loop operation and within limits.

## EVENT 06: Loss of PB 16A

***Instructor Activities:***

- **INITIATION POINT:** When directed by the lead evaluator, insert malfunction: ED18, AC Power Board Electrical Fault (PB 16 Section A) (TRUE) **(F5)**

- If directed as AO to check PB 16A for faults report that there is a smokey smell near the PB but no other fault indications.

- If asked as EM to check PB 16A for faults acknowledge the request but delay any response.

- Acknowledge all RBCLC heat exchanger are in service if requested.

- Reposition Instrument Air compressor loading switches as directed.

***Symptons/Cues Visible To The Crew:***

Annunciators A4-3-1, A4-4-2 and also (but less important) L1-4-5, L4-3-6
Possibly H1-4-1 Until start of RBCLC 13

***Critical Task(s) and Justification:***

- *NONE*

**EVENT 06: Loss of PB 16A**

| Time | **SRO:** Applicant Actions Or Behavior |
|---|---|

- ❑ Acknowledge report A4-3-1, POWER BOARD 16 R1041 TRIP, in alarm.
- ❑ Direct actions of A4-3-1, POWER BOARD 16 R1041 TRIP, in alarm.
- ❑ Acknowledge report A4-4-2, POWER BOARD LOW BUS VOLTAGE, in alarm.
- ❑ Direct actions of A4-4-2, POWER BOARD LOW BUS VOLTAGE, in alarm.
- ❑ Interpret/Diagnose the effects of the loss of three drywell coolers on the Primary Containment
- ❑ Directs starting alternate equipment; Air Compressor and RBCLC Pump.
- ❑ Based on reports from the area of PB 16A does NOT authorize re-energizing PB 16A.
- ❑ Brief crew on event impact.

**EVENT 06: Loss of PB 16A**

| Time | **RO/BOP:** Applicant Actions Or Behavior |
|---|---|

- ❑ Recognize/report A4-3-1, POWER BOARD 16 R1041 TRIP, in alarm.
- ❑ Recognize/report A4-4-2, POWER BOARD LOW BUS VOLTAGE, in alarm.
- ❑ Diagnose loss of power to PB 16A caused by tripping of R1041.
- ❑ Starts alternate equipment as directed; Air Compressor, RBCLC Pump.
- ❑ Monitor Primary Containment parameters.

### A4-3-1 Actions

- ○ Confirm alarm on computer point E138, TRIP.
- ○ Verify tripped R1041.
- ○ Dispatch an operator or EM to check for faults on PB16A.

### A4-4-2 Actions

- ○ Confirm alarm on computer point E152, LOW.
- ○ Determine PB 11 not tripped.
- ○ Dispatch an operator or EM to check for faults on PB16A.

- ❑ Notifies SRO of report that there is a smokey smell near PB16A but no other fault indications.

**EVENT 06: Loss of PB 16A**

| Time | **RO/BOP:** Applicant Actions Or Behavior |
|---|---|

## N1-OP-11 Actions

- ❍ Start selected standby pump
- ❍ Venting IS NOT required
- ❍ Confirm system pressure AND pump amps indicate system is stable

## N1-OP-20 Actions

- ❍ Verify backup compressor 11 Loading Selector Switches (2 switches) in the number 1 position
- ❍ Place the standby compressor 12 Loading Selector Switches (2 switches) in OFF
- ❍ Monitor compressor motor current during compressor startup
- ❍ Start standby compressor 12
- ❍ WHEN starting current has decayed, place standby compressor 12 Loading Selector Switches (2 switches) in the number 2 position

## EVENT 07: Seismic Event with Torus Water Leak

***Instructor Activities:***

- **INITIATION POINT:** When directed by the lead evaluator, insert malfunction:
  PC05, Seismic Event (remain active 30 seconds)**(F6)**
  PC04, Torus Leak (8% ramp 5 minute) **(F6)**

- When directed, acknowledge request to walkdown Core Spray; ECs, Batteries 11 & 12, Containment Spray, CRD/FW, EDGs

- If requested, wait 3 minutes and report that water can be heard through the torus watertight door.

***Symptons/Cues Visible To The Crew:***

Annunciators H2-1-6 Seismic Detection Equipment Event
K3-3-1 Torus Water Level High-Low

***Critical Task(s) and Justification:***

**NONE**

**NOTE:** Due to the size of the torus leak, the SRO may enter EOP-4 (Torus level) prior to scramming the reactor and provide makeup to the torus using EOP-1 attachment 18.

| Time | **SRO:** Applicant Actions Or Behavior |
|---|---|

- ❑ Acknowledge report of Annunciator , H2-1-6 Seismic Detection Equipment Event
- ❑ Direct actions of SOP-28
- ❑ Directs action of, H2-1-6 Seismic Detection Equipment Event
- ❑ Enter and execute EOP-4, Primary Containment Control (see below).
- ❑ Evaluate EAL Classification (UE 8.4.1 earthquake based on concensus of operators and confirmation)

## EOP-4, PRIMARY CONTAINMENT CONTROL

- ❍ Direct lockout of all containment spray pumps.
- ❍ **TORUS TEMP -**
  - ❍ (NOT CHALLENGED)
- ❍ **DRYWELL TEMP**
  - ❍ (NOT CHALLENGED)
- ❍ **PRIMARY CONTAINMENT PRESSURE**
  - ❍ (NOT CHALLENGED)
- ❍ **TORUS WATER LEVEL**
  - ❍ Attempt to Maintain torus water level 10.5 to11.25 feet using EOP-1 attachment 18
    - ❍ IF Determine level cannot be maintained above 10.5 feet
    - ❍ Maintain Torus Level above 8 feet (ERV discharges)
    - ❍ IF you cannot maintain level above 8 feet THEN:
      - ❍ Verify Reactor Scram
      - ❍ ENTER RPV CONTROL (EOP-2) and continue
      - ❍ BLOW DOWN (EOP-8)

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**EVENT 07: Seismic Event with Torus Water Leak**

| Time | **SRO:** Applicant Actions Or Behavior |
|---|---|
| | **- continued from previous page -** |
| | ○ **HYDROGEN** |
| | ○ (NOT CHALLENGED) |

## EMERGENCY EVENT CLASSIFICATION

Evaluate EAL matrix for reportability (8.4.1 earthquake based on concensus of operators and confirmation)

❑ Brief crew on event.

| Time | **RO/BOP:** Applicant Actions Or Behavior |
|---|---|

❑ Recognize H2-1-6 SEISMIC DETECTION EQUIPMENT EVENT in alarm.

## N1-SOP-28

- ❍ Get consensus that earthquake has occurred
- ❍ Confirm event indication is WHITE on Seismic Detector (J Panel)
- ❍ Contact Unit 2 and JAF to confirm
- ❍ Notify I&C to dispatch Tech to interpret tapes from J Panel
- ❍ Did event cause and auto system(s) response?
  - ❍ Answer should be NO at this time
- ❍ Suspend all activities and transient initiations NOT essential for safe operation UNTIL inspection are completed
- ❍ Dispatch operator to check the following:
  - ❍ Core Spray
  - ❍ ECs
  - ❍ Batteries 11 & 12
  - ❍ Containment Spray
  - ❍ CRD/FW
  - ❍ EDGs
- ❍ Monitor Drywell instrumentation to determine abnormal trends
- ❍ Dispatch operators as necessary to inspect for:
  - ❍ Building damage violating integrity
  - ❍ Damage to pipes
  - ❍ Damage to tanks
  - ❍ Damage to cable trays

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**EVENT 07: Seismic Event with Torus Water Leak**

| Time | **RO/BOP:** Applicant Actions Or Behavior |
|---|---|

**continued from previous page**

- ❍ Verify all actions of H2-1-6, SEISMIC DETECTION EQUIPMENT EVENT have been completed

## H2-1-6 Actions

- ❍ Notify SM.
- ❍ Confirm Event Indication Flag is White on Seismic Det. Panel J.
- ❍ Enter N1-SOP-11, Seismic Event.
- ❍ IF confirmed seismic event, THEN initiate a DER to Engineering for evaluation of Core Shroud repair.

- ❑ Identify lowering torus water level
- ❑ Monitor containment parameters
- ❑ Carry out action of EOP-1 Attach 18

## EOP-1 Attach 18

- ❍ Close 80-35, CONT SPRAY DISCH IV 122
- ❍ Close 80-40, CONT SPRAY BYPASS BV 111
- ❍ Verify closed the following valves:
  - ❍ 80-41, CONT SPRAY BYPASS BV 121
  - ❍ 80-44, CONT SPRAY BYPASS BV 112
  - ❍ 80-118, CONT SPRAY TEST TO TORUS FCV
  - ❍ 80-114, CONT SPRAY TO RAD WASTE IV 11
  - ❍ 80-115, CONT SPRAY TO RAD WASTE IV 12

**- continued on next page -**

| Time | **RO/BOP:** Applicant Actions Or Behavior |
|---|---|

**- continued from previous page -**

- ❍ Place CONT SPRAY RAW WTR 112 INTERTIE control switch to CNT SPR 122 position
  - ❍ Confirm open 93-72, CNT SPR 122
  - ❍ Confirm closed 93-28, DIS VLV 112
- ❍ Confirm open 80-45, CONT SPRAY BYPASS BV 122
- ❍ Start makeup to Torus as follows:
  - ❍ Start CONTAINMENT SPRAY RAW WATER PUMP 112
  - ❍ Immediately open 80-118 AND monitor torus water level rise
- ❍ WHEN desired level is reached, stop CONTAINMENT SPRAY RAW WATER PUMP 112
- ❍ Close 80-118 CONT SPRAY TEST TO TORUS FCV
- ❍ Place CONT SPRAY RAW WATER 112 INTERTIE control switch to DIS VLV 112 position
  - ❍ Confirm closed 93-72, CNT SPR 122
  - ❍ Confirm open 93-28, DIS VLV 112
- ❍ Open 80-40, CONT SPRAY BYPASS BV 111
- ❍ Open 80-35, CONT SPRAY DISCH IV 122
- ❍ Provide Raw Water System 121 makeup as follows:
  - ❍ IF operating, place in STOP, CONTAINMENT SPRAY PUMP 111
  - ❍ IF operating, place in STOP CONTAINMENT SPRAY RAW WATER PUMP 121
  - ❍ Close 80-16, CONT SPRAY DISCH IV 111
  - ❍ Close 80-45, CONT SPRAY BYPASS BV 122

**- continued on next page -**

| Time | **RO/BOP:** Applicant Actions Or Behavior |
|---|---|

**- continued from previous page -**

- ❍ Verify closed the following valves:
  - ❍ 80-41, CONT SPRAY BYPASS BV 121
  - ❍ 80-44, CONT SPRAY BYPASS BV 112
  - ❍ 80-118, CONT SPRAY TEST TO TORUS FCV
  - ❍ 80-114, CONT SPRAY TO RAD WASTE IV 11
  - ❍ 80-115, CONT SPRAY TO RAD WASTE IV 12
- ❍ Place CONT SPRAY RAW WTR 121 INTERTIE control switch to CNT SPR 111 position
  - ❍ Confirm open 93-73, CNT SPR 121
  - ❍ Confirm closed 93-26, DIS VLV 111
- ❍ Verify open 80-40, CONT SPRAY BYPASS BV 111
- ❍ Start makeup to Torus as follows:
  - ❍ Start CONTAINMENT SPRAY RAW WATER PUMP 121
  - ❍ Immediately open 80-118 AND monitor torus waterlevel rise
  - ❍ WHEN desired level is reached, stop CONTAINMENT SPRAY RAW WATER PUMP 121
  - ❍ Close 80-118 CONT SPRAY TEST TO TORUS FCV
  - ❍ Place CONT SPRAY RAW WATER 121 INTERTIE control switch to DIS VLV 121 position
    - ❍ Confirm closed 93-73, CNT SPR 121
    - ❍ Confirm open 93-26, DIS VLV 111
  - ❍ Open 80-45, CONT SPRAY BYPASS BV 122
  - ❍ Open 80-16, CONT SPRAY DISCH IV 111

## EVENT 08 & 09: Leak In Drywell, FWP11 Trip, HPCI Mode Failure to Initiate 12

***Instructor Activities:***

- INITIATION POINT:
-

**When the reactor is scrammed – Insert F7**

PC04, Torus leak (35% ramp 1 minute, relative to F6, TUA is 6 min 30 sec after the reactor is scrammed) **(F7)**
RR29, Recirculation Loop Rupture (15%, 10 minute ramp, TUA 1 min)**(F7)**
FW03A, FW Pump Trip 11 (TRUE)**(F7)**

**When the operator starts Containment Spray Pump 111 - Insert (F8)**

CT01A, Containment Spray Pump Trip 111 (TRUE) **(F8)**

***Symptons/Cues Visible To The Crew:***

- K2-4-3, DRYWELL PRESSURE HIGH-LOW alarm clears and then alarms
- L1-4-4, HI DRYWELL TEMP, alarm.
- Rising drywell pressure on panel indicators and process computer indication.
- Rising drywell humidity on panel indicator.
- Lowering reactor water level on panel indicators.

***Critical Task(s) and Justification:***

01 ***Maintain RPV water level above TAF using high and low pressure systems.***
BASIS: With an RPV leak, failure of HPCI to initiate results in a loss of high pressure injection. If manual action is not taken to adjust FCV#12, reactor water level will lower below TAF requiring a RPV blow down. Crew must control RPV level manually to maintain adequate core cooling to prevent fuel damage.

02 ***Depressurize the reactor when it is determined torus water level cannot be maintained above 8 feet.***
BASIS: With the loss of Primary Containment approaching, ERVs must be opened before reaching torus water level of 8 feet. At 8 feet the ERV diacharged become uncovered and the ERVs can no longer be used. Opening an ERV below 8 feet will result in a direct discharge to the torus air space and a loss of the pressure suppression function.

| Time | **SRO:** Applicant Actions Or Behavior |
|---|---|

- ❑ Acknowledge report of torus water level continuing to lower.
- ❑ Direct a reactor scram and concurrent entry into SOP-1, Reactor Scram.
- ❑ Acknowledge report of rising Primary Containment pressure.
- ❑ Acknowledge report of Annunciator K2-4-3, DRYWELL PRESSURE HIGH-LOW
- ❑ Enter and execute EOP-2, RPV Control (see below).
- ❑ Re-Enter and execute EOP-4, Primary Containment Control (see below).
- ❑ As torus level lowers will enter and execute EOP-8, RPV Blowdown
- ❑ Direct Spraying the Containment per EOP 1 Attachment 17.
- ❑ Evaluate EAL matrix for reportability (ALERT per 3.1.1 Drywell pressure cannot be maintained less than 3.5 psig)

## EOP-2, RPV CONTROL

- ❍ **LEVEL**
  - ❍ Direct RPV level maintained +53" to +95" using Condensate/FW & CRD and direct bypass of Core Spray IV Interlocks (EOP-1 Attachment 4).
  - ❍ Evaluate level instrument restrictions (Detail A).
  - ❍ When RPV level cannot be maintained >+53", direct level be maintained above -84" (TAF) and direct use of alternate injection systems (Detail E)
  - ❍ **IF RPV level cannot be maintained >-84" (TAF):**

**This should only be a challenge if the operators did not take actions for HPCI Failure**

- ❍ Direct ADS bypass.
- ❍ Verify EC initiation.
- ❍ Determine Core Spray Subsystems available.
- ❍ Determine Core Spray ready for injection.
- ❍ Enter EOP-8, RPV BLOWDOWN **(see below)**

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| Time | **SRO:** Applicant Actions Or Behavior |
|---|---|

**- continued from previous page -**

- Direct manual opening Core Spray injection valves 40-10,40-09.
- Ensure Core Spray is injecting and evaluate NPSH (FIG N1).
- Direct RPV level restored and maintained +53" to +95".

- **PRESSURE**
  - Direct pressure band below 1080 psig using BPVs.
  - When Blowdown is anticipated direct rapid depressurization using ECs and main turbine bypass valves

## EOP-4, PRIMARY CONTAINMENT CONTROL

- Direct lockout of all containment spray pumps.
- **TORUS TEMP -**
  - Not Challenged until Blowdown occurs.
- **DRYWELL TEMP**
  - When drywell temp reaches 150°F, proceed to subsequent steps.
  - Evaluate Containment Spray Initiation Limit (FIG K). Determination OK to SPRAY as temp exceeds 150° F.
  - NOTE: See PRIMARY CONTAINMENT PRESSURE (below) for containment spray actions
- **PRIMARY CONTAINMENT PRESSURE**
  - May consider EOP-1 Attachment 10 to maintain pressure below 3.5 psig Determines cannot be used with drywell pressure >3.5 psig
  - May direct EOP-1 Attachment 17 to spray containment

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| Time | SRO: Applicant Actions Or Behavior |
|---|---|

- continued from previous page -

- **TORUS WATER LEVEL**
  - Attempt to Maintain torus water level 10.5 to11.25 feet .
    - Determine level cannot be maintained above 10.5 feet
    - Maintain Torus Level above 8 feet (ERV discharges)
    - IF you cannot maintain level above 8 feet THEN:
      - Verify Reactor Scram
      - ENTER RPV CONTROL (EOP-2) and continue
      - BLOW DOWN (EOP-8)
- **HYDROGEN**
  - Monitor drywell H2 and O2 concentrations (NOT CHALLENGED).

## EOP-8, RPV BLOWDOWN

- Determine all rods inserted to at least position 04
- If Drywell pressure is at or above 3.5 psig
  - Prevent Core Spray injection not needed for core cooling (EOP 4 att. 4)
- Direct Initiation of ECs
- If torus water level is above 8 feet – open 3 ERVs
  - DO NOT use Hi/Lo – Lo/Lo Rosemounts following a RPV Blowdown below 500 psig.
- If torus water level is below 8 feet:
  - If less than 3 ERVs open and RPV pressure is more than 72 psig above torus pressure use other Blowdown System in Detail 'O'
- Wait for Shutdown Cooling pressure interlocks to clear (120 psig)

| Time | **SRO:** Applicant Actions Or Behavior |
|---|---|
| | EMERGENCY EVENT CLASSIFICATION |
| | ❍ Evaluate EAL matrix for reportability (3.1.1 Drywell pressure cannot be maintained less than 3.5 psig) |

❑ Brief crew on event.

| Time | **RO/BOP:** Applicant Actions Or Behavior |
|---|---|

- ❑ Report Torus Level still lowering
- ❑ Acknowledge direction/Manually initiate a reactor scram
  - ❑ Place REACTOR Mode Switch in SHUTDOWN
  - ❑ Reduce RECIRC MASTER flow to 25 – 43 x $10^6$ lb/hr.
  - ❑ Confirm Reactor SCRAM.
  - ❑ RESET HPCI if initiation signal is present and FWP 11 or 12 tripped.
- ❑ Recognize/ report reactor coolant leak.
- ❑ Report Primary Containment pressure CANNOT be maintained below 3.5 psig.

***RPV CONTROL ACTIONS:***

- ❑ Acknowledge RPV level be maintained +53" to +95".
- ❑ Recognize FWP 11 Trip
- ❑ Recognize HPCI Failure to Initiate
- ❑ Acknowledge install jumpers to bypass Core Spray IV interlocks (**see EOP 1 Attachment 4 below**).

SOP-1, Reactor Scram

- ❍ Place reactor mode switch to SHUTDOWN.
- ❍ **SCRAM VERIFICATION:**
- ❍ Confirm all rods in using Full Core display green backgrounds or numeric position indications.
- ❍ Observe reactor power lowering.
- ❍ Place all IRMs on Range 8
- ❍ Insert IRM and SRM detectors.
- ❍ Down range IRMs as needed to monitor power decrease.
- ❍ Maintain RPV pressure below 1080 psig.

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| Time | RO/BOP: Applicant Actions Or Behavior |
|---|---|

- continued from previous page-

- ❍ **RPV LEVEL CONTROL:**
- ❍ Confirm FW LVL SP SETDN INIT light is ON.
- ❍ Restore RPV level +53" to +95".
- ❍ Verify #11 or #12 FW Pump running.
- ❍ **RECOGNIZE REPORT:**
  - ❍ **11 FWP TRIP**
  - ❍ **12 FWP not in HPCI,**
  - ❍ **Manually operate the 12 FCV to inject to vessel**
- ❍ Terminate #13 FW Pump Injection (see below)
- ❍ Control #11 or #12 FW Pump Injection (see below)

## Terminate #13 FW Pump Injection

- ❍ Place 13 FWP VALVE CONTROL in MANUAL and close the valve.
- ❍ Verify RPV level is > +53".
- ❍ Place FW PUMP (SHAFT) 13 CLUTCH ENGAGEMENT switch to DISENGAGE and confirm the following:
- ❍ Green friction clutch disengagement light on.
- ❍ 13 FWP Input Shaft RPM meter indicates <1800 decreasing.
- ❍ Red Friction Clutch light off (below FW PUMP (SHAFT) 13 CLUTCH ENGAGEMENT switch).
- ❍ Rotate 29-01, FEEDWATER PUMP 13 BLOCKING VALVE, to close.

| Time | **RO/BOP:** Applicant Actions Or Behavior |
|---|---|

## Control #11 or #12 FW Pump Injection

- ❍ Verify RPV level is > +53".
- ❍ Verify 11/12 FWP CONTROLLERS in MANUAL and set to zero output.
- ❍ Reset HPCI signal as follows:
- ❍ Depress FEEDWATER RETURN TO NORMAL AFTER HPCI CH. 11 and CH. 12 pushbuttons (E panel)
- ❍ Confirm F4-4-1, HPCI MODE AUTO INITIATE is clear.
- ❍ Confirm FW HPCI MODE light(s) are off.
- ❍ Transfer FWP 11 or 12 BYPASS VALVE M/A station from MANUAL to AUTO by matching Black to Red pointer using thumbwheel then place mode switch in AUTO.

***PRIMARY CONTAINMENT CONTROL ACTIONS:***

- ❑ Acknowledge direction to lockout of all containment spray pumps.

## LOCKOUT CONTAINMENT SPRAY PUMPS

- ❍ Place Containment Spray Pumps 111, 112, 121, 122 in PTL.

- ❑ Acknowledge direction to install the Core Spray Jumpers

## EOP-1 Attachment 4, Throttling Core Spray

- ❍ Obtain tools and safety equipment form EOP toolbox at SM desk.
- ❍ Bypass Core Spray IV interlocks by installing **jumpers** at EOP ISOLATION BYPASS JUMPER SUBPANEL (inside Panel N, between 1N1A and 1N1B):

**- continued on next page -**

| Time | **RO/BOP:** Applicant Actions Or Behavior |
|---|---|

**- continued from previous page -**

- ○ Jumper 17: 40-01, INSIDE CS DISCHARGE IV121 BYPASS
- ○ Jumper 18: 40-11, INSIDE CS DISCHARGE IV111 BYPASS
- ○ Jumper 19: 40-06, CORE SPRAY TEST VALVE11 BYPASS
- ○ Jumper 24: 40-09, INSIDE CS DISCHARGE IV122 BYPASS
- ○ Jumper 25: 40-10, INSIDE CS DISCHARGE IV112 BYPASS
- ○ Jumper 26: 40-05, CORE SPRAY TEST VALVE12 BYPASS

- ❑ In anticipation of Blowdown acknowledge direction to rapidly depressurize using ECs and main turbine bypass valve

- ○ Open 39-05 EC Condensate Return Isolation Valve 11
- ○ Open 39-06 EC Condensate Return Isolation Valve 12
- ○ Open BP valves using the By-Pass Opening Jack

## RPV BLOWDOWN and LOW PRESSURE INJECTION

- ○ Place control switches for 3 ERVs to open.
- ○ Report 3 ERVs open.
- ○ Manually open Core Spray injection valves 40-10,40-09.
- ○ Control Core Spray injection and restore RPV level +53" to +95".

## EVENT 10: Loss of Containment Spray Subsystem

***Instructor Activities:***

- **INITIATION POINT:** When directed by the lead evaluator, insert malfunction: CT01A, Containment Spray Pump Trip 111 (TRUE) **(F8)**

***Symptons/Cues Visible To The Crew:***

- Containment Spray Pump Trip.

***Critical Task(s) and Justification:***

**NONE**

## EVENT 10: Loss of Containment Spray Subsystem

| Time | **SRO:** Applicant Actions Or Behavior |
|---|---|

- ❑ Acknowledge report of rising Primary Containment pressure and Temperature.
- ❑ Direct Spraying the Containment per EOP 1 Attachment 17.

### EOP-4, PRIMARY CONTAINMENT CONTROL

- ❍ **PRIMARY CONTAINMENT PRESSURE**
  - ❍ When torus pressure reaches 13 psig, 0R:
  - ❍ Before Drywell temperature reaches 300°F proceed to subsequent steps
  - ❍ Evaluate Containment Spray Initiation Limit (FIG K) and determine OK TO SPRAY.
  - ❍ Direct verify all RRPs tripped.
  - ❍ Direct verify all DW Cooling fans tripped.
  - ❍ Direct containment spray per EOP-1 Attachment 17.
  - ❍ Determine drywell temperature remains below 300°F and blowdown is not required based on DW temperature.
  - ❍ When notified that Containment Spray Pump 111 tripped, directs starting Containment Spray pump 121

- ❑ Brief crew on event.

## EVENT 10: Loss of Containment Spray Subsystem

| Time | **RO/BOP:** Applicant Actions Or Behavior |
|---|---|

- ❑ Report containment parameters as desired by SRO. Report when torus:
  - ❑ temperature reaches 150°F.
  - ❑ pressure reaches 13 psig.
- ❑ Acknowledge direction to initiate containment spray.

### CONTAINMENT SPRAY (EOP-1 Attachment 17 )

- ❍ Check RRP 11, 12, 13, 14, are OFF.
- ❍ Check DW Cooling fans are OFF.
- ❍ Start Containment Spray pumps 111 and 122.
- ❍ If 80-118 is open for Torus Cooling then:
  - ❍ Open the Containment Spray Discharge Valve for the Containment Spray Loop(s) in the Torus Cooling mode.
  - ❍ Close 80-118
  - ❍ Verify open 80-40 and 80-45
  - ❍ Start RAW Water pumps associated with the running Containment Spray pumps.
- ❍ Recognizes/Diagnoses TRIP of Containment Spray pump 111.
- ❍ Notifies SRO of tripped Containment Spray pump 111.
- ❍ Attempts to start Containment Spray pump 121. Recognizes Containment Spray pump 121 does NOT start.
- ❍ Notifies SRO of tripped Containment Spray pump 121.
- ❍ Monitors drywell and torus pressure.

- ❍ Monitors drywell pressure and secures containment sprays (place running pumps in PTL) if drywell pressure lowers below 3.5 psig.
- ❍ Lines up low pressure feedwater and ECCS injections systems as needed to maintain RPV water level between 53 and 95 inches.

V. POST SCENARIO CRITIQUE (Not required for Annual Operating Exam or NRC Initial Exam)

A. After the second caucus, convene the crew in the classroom for a facilitative critique:
   1. What the crew saw and how they responded to each event?
   2. Why the crew responded the way they did or their goal?
   3. What went well during the scenario (STRENGTHS)?
   4. What the crew could have done better (AREAS FOR IMPROVEMENT)?

B. Ensure the expectations in each performance objective are discussed.

C. PERFORMANCE EXPECTATIONS (Attachment 7), that were not met, should be addressed.

D. Review the Critical Tasks if applicable.

E. At the conclusion, review the strengths and areas for improvement for improvement. Review video tape if appropriate.

F. Significant comments from the post scenario discussion should be recorded to allow later retrieval and follow-up.

VI. REFERENCE EVENTS AND COMMITMENTS

A. Reference Events

None

B. Commitments

None

VII. LESSONS LEARNED

None

EVALUATED SCENARIO CHECKLIST

1. Additional Information about these checks:

For continuing training, can be found in NUREG 1021, ES 604 and Appendix D.

For initial training, can be found in NUREG 1021, ES 301 and Appendix D.

2. Qualitative Attributes

| | |
|---|---|
| ✓ | Realism/Credibility |
| ✓ | Event Sequencing |
| ✓ | Simulator Modeling |
| ✓ | Evaluating Crew Competencies |

3. Quantitative Attributes

| | |
|---|---|
| 5 | Total Malfunctions |
| 2 | Malfunctions after EOP Entry |
| 2 | Abnormal Events |
| 1 | Major Transients |
| 3 | EOPs Used |
| 2 | EOP Contingency Procedures Used |
| 100 | Simulator Run Time |
| 30 | EOP Run Time |
| 2 | Crew Critical Tasks (if applicable per Attachment 6.) |

4. Developmental Checks:

Does every event have either a Critical Task(s) or Performance Objective?

Is Criteria given for sequencing to subsequent events?

Is termination criteria clear and unambiguous?

Does termination criteria allow verification that all CT, PO standards are met?

Facility: **Nine Mile Point 1** Scenario No.: **NRC-02** Op-Test No.: **NRC-01**

Examiners: _____ Operators: _____

Initial Conditions: ***100% power.***

Turnover: ***Perform N1-ST-Q4, Reactor Coolant System Isolation Valves Operability Test, Quarterly surveillance on the EC Loop 11 IVs per Section 8.1.***

***#112 Containment Spray Pump OOS for repair. TS 3.3.7.b (day 1 of 15 day LCO).***

| Event No. | Malf. No. | Event Type* | Event Description |
|---|---|---|---|
| 1 | - | N<br>BOP<br>SRO | The crew will perform N1-ST-Q4, Reactor Coolant System Isolation Valves Operability Test, quarterly surveillance on the EC Loop 11 IVs per Section 8.1. After several valves are tested one valve will fail to indicate full open (dual indication).<br><br>***ST-Q4, Tech Specs***<br>***DER-NM-2004-2578, Valve Failed To Indicate Open When Stroke Timed*** |
| | | | |
| 2 | EC06A, Emergency Condenser Tube Leak 111<br><br>(100%; ramp 5 minutes) | C<br>BOP | The crew will respond to EC11 vent radiation monitor alarms and diagnose that a tube leak exists. The crew will isolate EC11 to stop the release.<br><br>***ARP K1-1-2, EAL MATRIX, Tech Specs, OP-13 H.10.0*** |
| | | | |
| 3 | MS08, Second Stage Reheaters 112 Steam Supply Closes (TRUE) | C<br>BOP<br>SRO | The crew will respond to a failure of the steam supply to the second stage reheater. The unbalanced condition requires isolating second stage reheaters.<br><br>***ARP A2-3-5, SOP-1.1, OP-41 H.1.0*** |
| | | | |
| 4 | TU02, Main Turbine Hi Vibration Bearing #5 and #6 (53%; no ramp) | R<br>RO<br>SRO | The unbalanced condition on the main turbine results in turbine vibration. If power is not lowered in response to the turbine vibration, it will be lowered to 80% to allow isolation of the second stage reheaters.<br><br>***SOP-31.1*** |
| | | | |

**NRC EXAM**

| | | | |
|---|---|---|---|
| 5 | TU02, Main Turbine Hi Vibration Bearing #5 and #6 (90%; no ramp)<br>MC01, Main Condenser Air In-Leakage (100%; ramp 2 minutes) | C<br>ALL | The main turbine vibration degrades and a vacuum leak develops from the vibration. Because of the lowering main condenser vacuum and the rising turbine vibration, the crew will insert a manual reactor scram and trip the main turbine.<br>***SOP-1, SOP-31.3*** |
| | | | |
| 6 | RP05A,B<br>RPS A/B failure to scram<br>RP09<br>ARI/ATWS air header exhaust port blocked<br>RD33A-E<br>Control Rod Bank Block 1, 2, 3, 4, 5 Position 48, 24, 48, 24, 48 | M<br>ALL<br>C | ATWS. When the crew scrams the reactor control rods fail to insert requiring actions for an ATWS with power about 25%. Crew will be able to manually insert control rods using RMCS. Manual scrams will be successful in inserting control rods but repetitive scrams will be required.<br>***N1-SOP-1, N1-EOP-2, N1-EOP-3, N1-EOP-4, N1-EOP-1***<br>***PRA: Execute EOP-3.1.*** |
| | | | ***NOTE: Deleted ERV111 blown fuse and ERV fail to open, which was not related to the events in the scenario.*** |
| 7 | See event 5<br>MC01, Main Condenser Air In-Leakage (100%; ramp 2 minutes) | C<br>ALL | Loss of main condenser vacuum. Loss of main condenser as a heat sink. Challenge HCTL.<br>***N1-EOP-3*** |
| | | | |
| 8 | **LP01A/B**<br>LP11/12 pump trip | C<br>BOP | The crew will be required to respond to a failure of the liquid poison pump to continue to run once started. Shortly after one LP pump is started (1-2 seconds) it will trip requiring the crew to start the other pump.<br>***N1-OP-12; H.1.0***<br>***PRA: Inject poison solution into the reactor vessel.*** |
| | | | |

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

| **TARGET QUANTITATIVE ATTRIBUTES (PER SCENARIO; SEE SECTION D.5.d)** | ACTUAL ATTRIBUTES |
|---|---|
| 1. Total malfunctions (5-8) | ~~6~~ |
| 2. Malfunctions after EOP entry (1-2) | 2 |
| 3. Abnormal events (2-4) | 3 |
| 4. Major transients (1-2) | 1 |
| 5. EOPs entered/requiring substantive actions (1-2) | 2 |
| 6. EOP contingencies requiring substantive actions (0-2) | 1 |
| 7. Critical tasks (2-3) | 3 |

#3

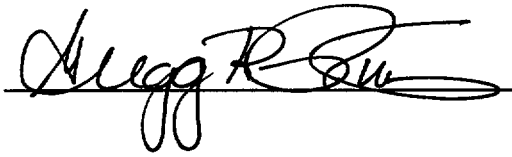
LIST Abnorms

List Real

NMP SIMULATOR SCENARIO

**2004 NRC SCENARIO #2, REV. 0**

N1-ST-Q4 OPERABILITY TEST ON EMERGENCY CONDENSER (EC) LOOP 11 ISOLATION VALVES, EMERGENCY CONDENSER (EC)11 TUBE LEAK, LOSS OF 2nd STAGE REHEAT WITH TURBINE VIBRATION, INCREASED VIBRATION WITH LOSS OF MAIN CONDENSER VACUUM, ATWS, LIQUID POISON FAILURE FOR FIRST SYSTEM INITIATED

| | | |
|---|---|---|
| PREPARER | P. Ballard/D.Wandschneider | DATE 08/01/2004 |
| VALIDATED | Meier, Rabalais, Walker, | DATE 08/04/2004 |
| GEN SUPERVISOR OPS TRAINING |  | DATE 9/8/04 |
| OPERATIONS MANAGER | NA – EXAMINATION SECURITY | DATE |
| CONFIGURATION CONTROL | NA – EXAMINATION SECURITY | DATE |

SCENARIO SUMMARY

Length: 60 minutes

The crew assumes the shift with the plant operating at rated conditions and Containment Spray Pump 112 removed from service for maintenance. The crew will perform N1-ST-Q4, Reactor Coolant System Isolation Valves Operability Test, on the Emergency Condenser (EC) Loop 11 Isolation Valves (IVs) per Section 8.1. This test consists of stoke time tests and when the third valve is tested (05-11, EMERG COND VENT ISOLATION VALVE 112) its open to close stroke test is acceptable but its close to open stroke test will fail to indicate full open (dual indication) because of a defective limit switch. In addition to the TS LCO for performing the surveillance, the SRO must assess the TS for a failed EC vent to the torus.

When the surveillance on the EC Loop 11 IVs is addressed, the crew will respond to EC11 vent radiation monitor alarms and determine based on confirmed alarms and rising shell water level that a tube leak exists. The crew will isolate EC11 to stop the release. The SRO reviews Tech Specs and determines with EC11 inoperable Tech Spec 3.1.3.b applies. EC11 must be restored to operable within 7 days and the makeup level control valve and motor operated isolation valves for EC12 are tested immediately and daily thereafter. However, with a confirmed EC Tube Leak a plant shutdown is required. SRO should also assess EPIP-EPP-01, Attachment 1, EAL Matrix and determine the effluent monitoring threshold has not been reached by referencing Category 5.1.1, 5.1.2 and Table 3. The SRO should assess EOP entry conditions for EOP-5, Secondary Containment Control and EOP-6, Radioactivty Release Control and determine entry is not required.

conditions for EOP-5, Secondary Containment Control and EOP-6, Radioactivty Release Control and determine entry is not required.

When EC Loop 11 is isolated and related actions are complete, the crew will respond to a failure of the steam supply to the second stage reheater which results in an unbalanced condition on the main turbine and a turbine high vibration condition. This will require lowering power to 80% and isolating second stage reheaters. When the second stage reheaters are isolated the main turbine vibration condition degrades concurrent with a lowering main condenser vacuum. Because of the lowering main condenser vacuum and the rising main turbine vibration, the crew will insert a manual reactor scram and trip the main turbine. MT

When the crew inserts a reactor scram, many control rods fail to insert. Because of the degradation of the main condenser vacuum, the main condenser will only be available as a heat sink for a short period of time after the scram before the MSIVs close. The crew will terminate and prevent injection to lower reactor water level and suppress reactor power. When the main condenser is lost as a heat sink, the crew will maintain reactor pressure using the ERVs and the available emergency condenser and will place torus cooling in service. Because of the rising torus water temperature the crew will inject Liquid Poison (LP). When the first Liquid Poison Pump is started, it will trip approximately two (2) seconds later requiring recognition of its failure and starting the other LP Pump. The SRO will direct the actions of EOP-3 and EOP-4 including alternate control rod insertion per EOP-3.1. The crew will be able to insert control rods using the Reactor Manual Control System (RMCS) and manual reactor scrams will be successful in inserting some rods. When reactor water level injection has been terminated and prevented, LP injected, torus cooling placed in service, and control rods are being inserted using RMCS, all contributing to remaining within the HCTL, the scenario will be terminated. If actions are not timely the SRO may be required to reduce the pressure control band to remain within the heat capacity temperature limit.

Major Procedures:

EAL Classification: EAL 2.2.2: **SITE AREA EMERGENCY**

Termination Criteria: All control rods inserted, EOP-3 exited, EOP-2 entered and crew directed to restore reactor water level restored to 53-95.

I. SIMULATOR SET UP

A. IC Number: IC 25

B. Presets/Function Key Assignments

1. Malfunctions:

a. EC06A, Emergency Condenser Tube Leak 111 **(100%; ramp 5 minutes)** **(F3)**

b. MS08, Second Stage Reheaters 112 Steam Supply Valve Closes **(TRUE)** **(F5)**

c. TU02, Main Turbine High Vibration Bearing #5 and #6 **(53%; no ramp)** **(F5)**

d. TU02, Main Turbine High Vibration Bearing #5 and #6 **(90%; no ramp)** **(F6)**

**NOTE: TU02 (F6) is a relative of TU02 (F5)**

e. MC01, Main Condenser Air In-Leakage **(100%; ramp 4 minutes)** **(F6)**

f. LP01A, Liquid Poison Pump Trip 11 **(TRUE)** **(F7)**

g. LP01B, Liquid Poison Pump Trip 12 **(TRUE)** **(F8)**

h. RD33A, Control Rod Bank Blocked Bank 1 **(36.000)** **(QUEUED)**

i. RD33B, Control Rod Bank Blocked Bank 2 **(18.000)** **(QUEUED)**

j. RD33C, Control Rod Bank Blocked Bank 3 **(40.000)** **(QUEUED)**

k. RD33D, Control Rod Bank Blocked Bank 4 **(20.000)** **(QUEUED)**

l. RD33E, Control Rod Bank Blocked Bank 5 **(38.000)** **(QUEUED)**

2. Remotes:

a. FW24, Removal of HPCI Fuses F08/F09 **(PULL)** **(F9)**

3. Overrides:

a. 09DS300-L0-G-025-15 (K-9 panel pg 18 of 19) EC Vent Isolation Vlv 112 green (on) (F4)

Training Composite (as required)

4. Annunciators:

Training Annunciator Composite (as required)

C. Equipment Out of Service

**Containment Spray 112 – Red Clearance**

D. Support Documentation

None

E. Miscellaneous

None

II. **SHIFT TURNOVER INFORMATION**

OFF GOING SHIFT: □ N □ D DATE: _____

**PART I: To be performed by the oncoming Operator before assuming the shift.**

- Control Panel Walkdown (all panels) (SSS, ASSS, STA, CSO, CRE)

**PART II: To be reviewed by the oncoming Operator before assuming the shift.**

- Shift Supervisor Log (SSS, ASSS, STA)
- CSO Log (CSO)
- Lit Control Room Annunciators (SSS, ASSS, STA, CSO, CRE)
- Shift Turnover Checklist (ALL)
- LCO Status (SSS, ASSS, STA)
- Computer Alarm Summary (CSO)

Evolutions/General Information/Equipment Status:

- Reactor Power = 100%
- Loadline = 103%
- #112 Containment Spray Pump OOS for repair. TS 3.3.7.b (day 1 of 15 day LCO).
- Perform N1-ST-Q4, Reactor Coolant System Isolation Valves Operability Test, for EC Loop 11 IVs per Section 8.1. Control Room E available to monitor panels during performance of the test if desired.

**PART III: Remarks/Planned Evolutions:**

Maintenance continues to work on Containment Spray Pump #112.

**PART IV: To be reviewed/accomplished shortly after assuming the shift:**

- Review new Clearances (SSS)
- Shift Crew Composition (SSS/ASSS)
- Test Control Annunciators (CRE)

| TITLE | NAME | TITLE | NAME |
|---|---|---|---|
| SSS | | CRE/OATC | |
| ASSS | | E | |
| STA | | E | |
| CSO | | Other | |

| Scenario ID# | 2004 NRC SCENARIO #2 |
|---|---|

INSTRUCTOR COMMENTS (Strengths, Areas for Improvement, Open Items etc.)

| | | | |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| What Happened? | What we did? | Why? (Goals) | Other Options? |
| | | | |

III. PERFORMANCE OBJECTIVES

A. Critical Tasks:

01 ***Given a failure of the reactor to scram with power generation and Torus water temperature approaching 110°F, the crew will utilize Boron injection, Torus cooling, control rod insertion and RPV pressure control to preclude violation of the HCTL in accordance with EOP-3.***
BASIS: Improper performance or omission of these actions contributes to violation of the HCTL.

02 ***Given a failure of the reactor to scram with power above 6% or unknown and RPV water level above -41 inches, terminate and prevent all injection except Boron and CRD in accordance with EOP-1, Att. 24.***
BASIS: Improper performance or omission of these actions adds unnecessary heat to the torus, which contributes to violation of the HCTL.

03 ***Given reactor water level intentionally lowered per EOP-3, the crew will utilize preferred injection sources to maintain RPV water level above -109 inches when either reactor power is <6% or all ERVs will remain closed with Drywell pressure <3.5 psig or vessel level is at the top of active fuel (-84").***
BASIS: Improper performance or omission of these actions contributes to degradation to a barrier to fission product release by challenging the fuel cladding integrity.

Mark Steps in Script Bold that are part of CTS

B. Performance Objectives:

| EVENT | PERFORMANCE OBJECTIVE |
|---|---|
| 01 | Given a quarterly surveillance for Reactor Coolant Isolation Valves, the crew will recognize the failure of a valve to operate correctly IAW N1-ST-Q4. |
| 02 | Given a valid EC vent radiation monitor alarm, the crew will respond IAW the ARPs, N1-OP-13.<br><br>Given the plant in a condition requiring emergency classifications, the crew shall classify the events properly, complete initial notification forms and discuss the bases for the classification in accordance with the emergency plan procedure. |
| 03 | Given a failure of the steam supply to the second stage reheater, the crew will respond to the unbalanced condition IAW N1-OP-41. |
| 04 & 05 | Given a high main turbine bearing vibration, the crew will take actions necessary to protect the turbine IAW with N1-OP-31, N1-SOP-31.1 and N1-SOP-1. |
| 06 & 07 | Given a failure of the reactor to scram with power generation the crew insert control rods using the RMCS and repetitive scrams IAW N1-EOP-3 and N1-EOP-3.1<br><br>Given an ATWS condition accompanied by a loss of the Main Condenser, the crew recognize the Challenge to HCTL and Inject liquid poison IAW N1-OP-12 |
| 08 | Given a Trip of a liquid poison pump, the crew will recognize the trip and start the second pump IAW N1-OP-12 |
| Generic | Given the plant in a condition requiring emergency classifications, the crew shall classify the events properly, complete initial notification forms and discuss the bases for the classification in accordance with the emergency plan procedure.<br><br>Given the plant or plant system in a condition requiring Technical Specification action, identify the deviation and any required actions/notifications. |

**EVENT 01: N1-ST-Q4, Reactor Coolant System Isolation Valves Operability Test, for EC Loop 11 IVs per Section 8.1.**

***Instructor Activities:***

- Take the simulator out of freeze before the crew enters for the pre-shift walk down and briefing. Allow up to 5 minutes to walk down panels and perform annunciator checks.

- Ensure the following is activated:

- When 05-11 is closed, override open indication EC VENT ISOL VLV 112 green (F4)

- **INITIATION POINT:** The initiation point for this event is when the EC VENT ISOL VLV 112 is stroked shut and receives its closed indication.
- If asked as the FIN team or as Maintenance to investigate, wait three (3) minute then report it appears that the limit switch is damaged.

***Symptons/Cues Visible To The Crew:***

- NOT APPLICABLE

***Critical Task(s) and Justification:***

- NONE

**EVENT 01: N1-ST-Q4, Reactor Coolant System Isolation Valves Operability Test, for EC Loop 11 IVs per Section 8.1.**

| Time | **SRO:** Applicant Actions Or Behavior |
|---|---|

❑ Walk down panels prior to assuming shift.

❑ Conduct shift turnover brief.

❑ Assume the shift.

## N1-ST-Q4

❑ Authorize performance of N1-ST-Q4, Section 8.1; initial and date step 7.10.

❑ Directs Control Room E to monitor panels while RO and BOP perform test.

❑ Direct BOP to perform N1-ST-Q4, Section 8.1.

❑ Acknowledge report TS 3.1.3.b actions are to be entered.

❑ Acknowledge 05-11 has dual indication when performing close to open stroke test and contact FIN Team or maintenance.

❑ Determine TS 3.1.3.b actions no longer apply but TS 3.1.3.d.1 applies for the inoperable EC vent to torus valve.

❑ Determine TS 3.1.3.b actions no longer apply since the other valves covered by this test including those not tested yet are operable.

## TECH SPEC DETERMINATION BEFORE TEST

○ Reference TS 3.1.3.b entry before performing the surveillance.

○ EC11 must be restored to operable within 7 days and the makeup level control valve and motor operated isolation valves for EC12 are tested immediately and daily thereafter.

## TECH SPEC DETERMINATION WHEN 05-11 FAILS

○ Determine TS 3.1.3.d.1 applies.

○ With one high point vent path to the torus inoperable, restore the vent path to an operable condition within 30 days.

○ Consults NIP-DES-04, Attachment 6, determines 05-11 not a coolant IV

**EVENT 01: N1-ST-Q4, Reactor Coolant System Isolation Valves Operability Test, for EC Loop 11 IVs per Section 8.1.**

| Time | **SRO:** Applicant Actions Or Behavior |
|---|---|

- ❑ Brief crew on impact.

**EVENT 01: N1-ST-Q4, Reactor Coolant System Isolation Valves Operability Test, for EC Loop 11 IVs per Section 8.1.**

| Time | **RO/BOP:** Applicant Actions Or Behavior |
|---|---|

❑ Walk down panels prior to assuming shift.

❑ Participate in and ensure understanding of shift turnover brief.

## N1-ST-Q4: Getting Started

❑ Obtain SRO permission to perform N1-ST-Q4, Section 8.1.

❑ Notify CSO of the start of the test, and log, then initial and date step 7.11.

❑ Record test start time and date, then initial and date step7.12.

❑ Notify SRO to enter TS 3.1.3b.

NOTE: Per Test Methods 4.1.5; **Stroke times are measured to at least a tenth of a second for stroke times of 10 seconds or less. Full stroke times of longer than 10 seconds are measured to at least the nearest second. Full stroke time is that interval from the initiation of the actuating signal to the end of the actuating cycle indication.**

NOTE: Per Test Methods 4.1.8; **Valve position indication is demonstrated in the open to close direction by observing a red light only, THEN a red and green light lit, THEN only a green light lit. Satisfactory valve position indication is demonstrated in the close to open direction, by observing a green light only, THEN a green and red light lit, THEN only a red light lit.**

NOTE: Per Test Methods 4.1.11; **Independent verification may be performed after the completion of Section 8.1**, except those marked by an asterisk (*). Those marked by an asterisk must be performed in the order they appear in the test.

**(See next page for valve test steps)**

**EVENT 01: N1-ST-Q4, Reactor Coolant System Isolation Valves Operability Test, for EC Loop 11 IVs per Section 8.1.**

| Time | **RO/BOP:** Applicant Actions Or Behavior |
|---|---|

### 39-12R

- ❍ **Cycle 39-12R**, EMERG CNDSR STM SUPPLY DRAIN IV 112, AND:
  - ❍ **Record open to close stroke time for 39-12R**. (≥2.0 and ≤6.2 sec). (See note for test method 4.1.5).
  - ❍ Ensure satisfactory operation of **VPI lights for open to close <u>and</u> close to open.** (See note for test method 4.1.8).
  - ❍ **Independently verify open 39-12R**. (See note for test method 4.1.11)

### 39-11R

- ❍ **Cycle 39-11R**, EMERG CNDSR STM SUPPLY DRAIN IV 111, AND:
  - ❍ **Record open to close stroke time for 39-11R**. (≥1.5 and ≤4.7 sec). (See note for test method 4.1.5).
  - ❍ Ensure satisfactory operation of **VPI lights for open to close <u>and</u> close to open.** (See note for test method 4.1.8).
  - ❍ **Independently verify open 39-11R**. (See note for test method 4.1.11)

### 05-11 (full open indication failure)

- ❍ **Cycle 05-11**, EMERG COND VENT ISOLATION VALVE 112, AND:
  - ❍ **Record open to close stroke time for 05-11**. (≥0.7 and ≤2.3 sec). (See note for test method 4.1.5).
  - ❍ **Record close to open stroke time for 05-11**. (≤2.0 sec). (See note for test method 4.1.5).
  - ❍ Ensure satisfactory operation of **VPI lights for open to close <u>and</u> close to open.** (See note for test method 4.1.8).
  - ❍ ***Recognize and report dual indication for 05-11. VPI failed; stroke time unknown.*** Acknowledge suspension of test by SRO.

## EVENT 02: Emergency Condenser 11 Tube Leak

***Instructor Activities:***

- **INITIATION POINT:** When directed by the lead evaluator, insert malfunction: EC06A, Emergency Condenser Tube Leak 111 **(100%; ramp 5 minutes)** **(F3)**

- If asked as Chemistry to perform sampling and/or EC Effluent Dose Assessment, acknowledge the request.

- If informed of the EC tube leak, acknowledge the report.

- IF asked as RP to evaluate dose rates on 340' el RB, acknowledge the report.

***Symptons/Cues Visible To The Crew:***

- K1-1-2, EMER COND VENT 11 RAD MONITOR, alarms.
- EMERG COND RMON 111 and EMERG COND RMON 112 on J panel in alarm and radiation levels rising.

- NOTE: If EC11 is not isolated based on confirmed radiation levels and rising shell water level, then EMER COND 111-112 LEVEL HIGH-LOW, will alarm on high level in approximately five (5) minutes.

***Critical Task(s) and Justification:***

- None.

## EVENT 02: Emergency Condenser 11 Tube Leak

| Time | **SRO:** Applicant Actions Or Behavior |
|---|---|

- ❑ Acknowledge report K1-1-2, EMER COND VENT 11 RAD MONITOR, in alarm.
- ❑ Direct actions of K1-1-2, EMER COND VENT 11 RAD MONITOR.
- ❑ Diagnose EC11 tube leak (rising EC vent radiation levels and rising EC water level).
- ❑ Direct EC 11 be isolated.

### ASSESS EFFLUENT DOSE

- ❍ Assess EPIP-EPP-01, Attachment 1, EAL Matrix and determine the effluent monitoring threshold has NOT been reached by referencing Category 5.1.1, 5.1.2, and Table 3.
- ❍ Determine EOP-5, Secondary Containment Control, entry is NOT required.
- ❍ Determine EOP-6, Radioactivty Release Control, entry is NOT required.

### TECH SPEC DETERMINATION

- ❍ Determine that with EC11 isolated (inoperable) Tech Spec 3.1.3.b applies.
- ❍ EC11 must be restored to operable within 7 days and the makeup level control valve and motor operated isolation valves for EC12 are tested immediately and daily thereafter.

### SHUTDOWN DETERMINATION

- ❍ Request Chemistry to perform sampling AND EC Effluent Dose Assessment
- ❍ IF an EC tube leak is confirmed perform shutdown actions in accordance N1-OP-13 H.10.0

❑ Brief crew on event impact.

## EVENT 02: Emergency Condenser 11 Tube Leak

| Time | **RO/BOP:** Applicant Actions Or Behavior |
|---|---|

- ❑ Recognize/report K1-1-2, EMER COND VENT 11 RAD MONITOR, in alarm.
- ❑ Recognize/report rising water level in EC11.
- ❑ Diagnose EC11 tube leak (rising EC vent radiation levels and rising EC water level).
- ❑ Acknowledge direction to perform actions of K1-1-2.

### K1-1-2 ACTIONS

- ❍ Confirm computer points E478 and E 480 in alarm
- ❍ Recognize/report EMERG COND RMON 111 and EMERG COND RMON 112 on J panel in alarm and radiation levels rising.
- ❍ Inform SRO to assess effluent dose.
- ❍ With SRO concurrence, isolate EC11.

### ISOLATE EC 11

- ❍ Close **39-07R**, EC STM ISOLATION VALVE 112
- ❍ Close **39-09R**, EC STM ISOLATION VALVE 111
- ❍ Close **39-05**, EMERG CNDSR COND RET ISOLATION VALVE 11
- ❍ Close **39-11R**, EMERG CNDSR STM SUPPLY DRAIN IV 111
- ❍ Close **39-12R**, EMERG CNDSR STM SUPPLY DRAIN IV 112
- ❍ Close **05-01R**, EMERG COND VENT ISOLATION VALVE 111
- ❍ Close **05-11**, EMERG COND VENT ISOLATION VALVE 112

❑ Reference N1-OP-13, H.10.0

### N1-OP-13, H.10.0 ACTIONS

- ❍ IF an EC Tube Leak is confirmed, THEN initiate normal shutdown in accordance with N1-OP-43C.

## EVENT 03 & 4: Second Stage Reheat Loss / Main Turbine Vibration

***Instructor Activities:***

- **INITIATION POINT:** When directed by the lead evaluator, insert malfunction:
  MS08, Second Stage Reheaters 112 Steam Supply Valve Closes **(TRUE)** **(F4)**
  TU02, Main Turbine High Vibration Bearing #5 and #6 **(53%; no ramp)** **(F5)**

- If asked as maintenance or WEC to investigate, acknowledge the request.

- If reports to management personnel are received, acknowledge the reports.

***Symptons/Cues Visible To The Crew:***

- A2-3-5, TURBINE SUPERVISORY SYSTEM, in alarm.
- Computer points B444 (BRG #5) and B445 (BRG #6) in alarm
- ARP A2-3-5 directs investigation of the reheater system alignment and to equalize heating to both sides of the LP turbine if unbalanced.

***Critical Task(s) and Justification:***

- NONE

## EVENT 03 & 4: Second Stage Reheat Loss / Main Turbine Vibration

| Time | **SRO:** Applicant Actions Or Behavior |
|---|---|

- ❑ Acknowledge report A2-3-5, TURBINE SUPERVISORY SYSTEM, in alarm.
- ❑ Acknowledge report that process computer alarms and vibration recorder show vibration indicated on bearing #5 and #6.
- ❑ Direct actions of A2-3-5, TURBINE SUPERVISORY SYSTEM.
- ❑ Diagnose cause is closure of Second Stage Reheaters 112 Steam Supply Valve.
- ❑ Direct a power reduction per SOP-1.1, Emergency Power Reduction.

### SOP-1.1, Emergency Power Reduction

- ❍ Direct a power reduction to at least 80% or lower using recirc flow.

- ❑ Brief crew on event impact.

| Time | **RO/BOP:** Applicant Actions Or Behavior |
|---|---|

- ❑ Recognize/report A2-3-5, TURBINE SUPERVISORY SYSTEM, in alarm.
- ❑ Recognize/report process computer alarms and vibration recorder shows vibration for bearing #5 and #6 at approximately 8.5 mils.
- ❑ Acknowledge direction to perform action of A2-3-5.
- ❑ Diagnose cause is closure of Second Stage Reheaters 112 Steam Supply Valve.

## A2-3-5 ACTIONS

- ❍ Confirm alarm on computer (B444 and B445 in alarm).
- ❍ Evaluate vibration readings against operating table and determine limits are:
  - ❍ 10 mils for 15 minutes.
  - ❍ 12 mils require immediate trip.
  - ❍ Acceptable limit is 5 mils requiring action to attempt to lower vibration.
- ❍ Inform SRO to notify ISI and Tech Support.
- ❍ Investigate reheater alignment. Report closure of Second Stage Reheaters 112 Steam Supply Valve (MOV-25, 08-30).
- ❍ Equalize heating to both sides of LP turbine per OP-41 (**see below**).

## OP-41 H.1.0 (Removing 2nd Stage Reheat From Service)

- ❍ Inform SRO reactor power limit is 80% to perform this procedure.
- ❍ Direct AO to perform following at Panel Loader M/A Station at East Wall of South Reheater Room Turbine Bldg EL 300:
  - ❍ Panel Loaders of PCV 08-36, SOUTH REHT OUTPUT AND PCV 08-31, NORTH REHT OUTPUT in MANUAL with pressure at least 20 psig.
- ❍ Simultaneously place North and South 2ND STAGE REHEATER STOP CHECK VALVE (08-30 and 08-35) switches to CLOSE (Back Panel N).
- ❍ Direct AO to perform following at Panel Loader M/A Station at East Wall of South Reheater Room Turbine Bldg EL 300:
  - ❍ Simultaneously lower loader manual air pressure and WHEN loader manual air pressure is ≤ 3 psig, verify closed Pressure Control Valves.

| Time | **RO/BOP:** Applicant Actions Or Behavior |
|---|---|

- ❑ Report 2nd stage reheaters removed from service.
- ❑ Monitor turbine vibration for degrading or improving conditions.

**SOP-1.1, EMERGENCY POWER REDUCTION**

- ❍ Reduce Power to obtain desired reactor power:
- ❍ Do NOT enter the RESTRICTED ZONE on the Power to Flow Map.
- ❍ Reduce recirc flow as directed.

## EVENT 05: Lowering Main Condenser Vacuum / Turbine Vibration Degrades

***Instructor Activities:***

- **INITIATION POINT:** When directed by the lead evaluator, insert malfunction:
  TU02, Main Turbine High Vibration Bearing #5 and #6 **(90%; no ramp)** **(F6)**
  MC01, Main Condenser Air In-Leakage **(100%; ramp 4 minutes)** **(F6)**

- If asked as maintenance or WEC to investigate, acknowledge the request.

  If reports to management personnel are received, acknowledge the reports.

- After Scram is reset the first time DELETE malfunctions RD 33A & RD 33D.

- After Scram is reset the second time DELETE malfunctions RD 33B, RD 33C, RD 33E allowing the remainder of the rods to insert.

***Symptons/Cues Visible To The Crew:***

- Computer points B444 (BRG #5) and B445 (BRG #6) vibration degrading.
- Turbine vibration recorder BRG #5 and BRG #6 vibration degrading.
- Per ARP A2-3-5: 12 mils require immediate trip.
- Lowering main condenser vacuum indicator on the process computer.

***Critical Task(s) and Justification:***

- NONE

## EVENT 05: Lowering Main Condenser Vacuum / Turbine Vibration Degrades

| Time | **SRO:** Applicant Actions Or Behavior |
|---|---|

- ❑ Acknowledge report vibration is rising and vacuum is lowering; 12 mils require immediate removal of the turbine from service.
- ❑ Direct a reactor scram and entry into SOP-1, Reactor Scram.
- ❑ Direct a turbine trip and entry into SOP-31.1, Turbine Trip.

## EVENT 05: Lowering Main Condenser Vacuum / Turbine Vibration Degrades

| Time | **RO/BOP:** Applicant Actions Or Behavior |
|---|---|

- ❑ Recognize/report vibration is rising and vacuum is lowering; 12 mils require immediate removal of the turbine from service.
- ❑ Acknowledge direction to scram the reactor (SOP-1, Reactor Scram: see below)

### SOP-1, Reactor Scram

- ❍ Place reactor mode switch to SHUTDOWN.
- ❍ **SCRAM VERIFICATION:**
  - ❍ Determine and report ATWS.
  - ❍ Report reactor power value.
  - ❍ Maintain RPV pressure below 1080 psig.
- ❍ **RPV LEVEL CONTROL:**
  - ❍ Confirm FW LVL SP SETDN INIT light is ON.
  - ❍ Restore RPV level +53" to +95".
  - ❍ Verify #11 or #12 FW Pump running.
  - ❍ Terminate #13 FW Pump Injection (see below)
  - ❍ Control #11 or #12 FW Pump Injection (see below)

## EVENT 05: Lowering Main Condenser Vacuum / Turbine Vibration Degrades

| Time | **RO/BOP:** Applicant Actions Or Behavior |
|---|---|

### Terminate #13 FW Pump Injection

- ❍ Place 13 FWP VALVE CONTROL in MANUAL and close the valve.
- ❍ Verify RPV level is > +53".
- ❍ Place FW PUMP (SHAFT) 13 CLUTCH ENGAGEMENT switch to DISENGAGE and confirm the following:
- ❍ Green friction clutch disengagement light on.
- ❍ 13 FWP Input Shaft RPM meter indicates <1800 decreasing.
- ❍ Red Friction Clutch light off (below FW PUMP (SHAFT) 13 CLUTCH ENGAGEMENT switch).
- ❍ Rotate 29-01, FEEDWATER PUMP 13 BLOCKING VALVE, to close.

### Control #11 or #12 FW Pump Injection

- ❍ Verify RPV level is > +53".
- ❍ Verify 11/12 FWP CONTROLLERS in MANUAL and set to zero output.
- ❍ Reset HPCI signal as follows:
- ❍ Depress FEEDWATER RETURN TO NORMAL AFTER HPCI CH. 11 and CH. 12 pushbuttons (E panel)
- ❍ Confirm F4-4-1, HPCI MODE AUTO INITIATE is clear.
- ❍ Confirm FW HPCI MODE light(s) are off.
- ❍ Transfer FWP 11 or 12 BYPASS VALVE M/A station from MANUAL to AUTO by matching Black to Red pointer using thumbwheel then place mode switch in AUTO.

## EVENT 06 & 07 : ATWS and Loss of Main Condenser Vacuum

***Instructor Activities:***

- Ensure following are QUEUED

  RD33A, Control Rod Bank Blocked Bank 1 **(48.000)** **(QUEUED)**
  RD33B, Control Rod Bank Blocked Bank 2 **(24.000)** **(QUEUED)**
  RD33C, Control Rod Bank Blocked Bank 3 **(48.000)** **(QUEUED)**
  RD33D, Control Rod Bank Blocked Bank 4 **(24.000)** **(QUEUED)**
  RD33E, Control Rod Bank Blocked Bank 5 **(48.000)** **(QUEUED)**

- **INITIATION POINT:** There is no initiation point for the ATWS (preset conditions).

- **OVERRIDE POINT:** if requested to remove HPCI fuses, wait one (1) minute then insert the following override, and then report HPCI fuses removed:
  FW24, Removal of HPCI Fuses F08/F09 **(PULL)** **(F9)**

- **OVERRIDE POINT:** if requested to remove RPS fuses, wait four (4) minutes then insert the following remotes, and then report RPS fuses removed:
  RP05-RP14 **(NO TRIGGER)**

- **OVERRIDE POINT:** if requested to vent the scram air header, wait fifteen (15) minutes and then insert the following malfunction, and then report scram air header is venting.
  RD34 **(100%, ramp is 15 minutes)** **(NO TRIGGER)**

- If reports to management personnel are received, acknowledge the reports.

***Symptons/Cues Visible To The Crew:***

- Full core display numeric positions indicate 24 or 48 for most control rods.
- Indicated reactor power is approximately 30%.
- Lowering main condenser vacuum indicator on the process computer.

***Critical Task(s) and Justification:***

01 ***Given a failure of the reactor to scram with power generation and Torus water temperature approaching 110°F, the crew will utilize Boron injection, Torus cooling, control rod insertion and RPV pressure control to preclude violation of the HCTL in accordance with EOP-3.***
BASIS: Improper performance or omission of these actions contributes to violation of the HCTL.

02 ***Given a failure of the reactor to scram with power above 6% or unknown and RPV water level above -41 inches, terminate and prevent all injection except Boron and CRD in accordance with EOP-1, Att. 24.***
BASIS: Improper performance or omission of these actions adds unnecessary heat to the torus, which contributes to violation of the HCTL.

03 ***Given reactor water level intentionally lowered per EOP-3, the crew will utilize preferred injection sources to maintain RPV water level above -109 inches when either reactor power is <6% or all ERVs will remain closed with Drywell pressure <3.5 psig or vessel level is at the top of active fuel (-84").***
BASIS: Improper performance or omission of these actions contributes to degradation of a fission product barrier by challenging the fuel cladding integrity.

| Time | **SRO:** Applicant Actions Or Behavior |
|---|---|

- ❑ Acknowledge report control rods failed to insert (ATWS).
- ❑ Enter EOP-2, RPV Control (**see below**) then exit and go to EOP-3, Failure to Scram (**see below**).
- ❑ Enter and execute EOP-4, Primary Containment Control when torus temp reaches 85°F (**see below**).

## EOP-2, RPV CONTROL

- ❍ Answer "all rods in to at least 04" NO.
- ❍ Answer "will the reactor stay shutdown without boron" NO.
- ❍ Exit EOP-2 and Enter EOP-3 (**see below**)

## EOP-3, FAILURE TO SCRAM

- ❍ Direct Bypass ADS.
- ❍ Direct prevent Core Spray injection per EOP-1, Attachment 4.
- ❍ Evaluate EAL matrix for reportability (ALERT per 2.2.1).

### *EOP-3 LEVEL CONTROL ACTIONS*

- ❍ Direct verify containment isolations per SOP-40.2 when RPV level reaches low-low level (+5") or main condenser vacuum reaches 7 in hg.
- ❍ Direct MSIV jumpers installed per EOP-1, Attachment 2.

  Evaluate the state of the lowering condenser vacuum. May determine not to install the jumpers or install them to keep the MSIVs open as long as possible before closing on low vacuum.
- ❍ With reactor power >6% and RPV level above –41" (using FZLI correction table FIG X), go to ⑧.
- ❍ Directs terminate and prevent injection using EOP-1, Attachment 24.
- ❍ Lower level at least to -41" (corrected).

| Time | **SRO:** Applicant Actions Or Behavior |
|---|---|

- When reactor power <6% **OR** RPV level reaches –84 inches **OR** all ERVs remain closed:
  - Direct level band between –109" and the corrected level it was lowered to using Cond/FW and CRD.
  - Evaluate level instrument restrictions in Detail A. Determine acceptable to use FZLI.
- Determine WAIT UNTIL 600 gallons boron injected (860 gallons in LP tank) OR all rods inserted to 04 OR reactor will stay shutdown without boron.
- If 600 gallons boron injected (860 gallons in LP tank) then direct level restored to +53" to +95".

## EOP-3 POWER CONTROL ACTIONS

- Directs Reactor Mode Switch in SHUTDOWN.
- Directs initiation of ARI.
- Directs verify trip of RRPs.
- Directs execution of EOP-3.1.
- Before torus temperature reaches 110°F, direct LP injection.
  - Record LP tank level: approximately1460Gallons.
  - Direct verification RWCU isolates.
- May answer "is main condenser available" YES but MSIVs are either still open and soon to close on low vacuum or are already closed and cannot be reopened.

## EOP-3 PRESSURE CONTROL ACTIONS

- Direct pressure band below 1080 psig using ECs and/or ERVs.

| Time | **SRO:** Applicant Actions Or Behavior |
|---|---|

## EXIT FROM EOP-3

- If all rods in then:
  - Direct stopping LP injection.
  - Exit EOP-3 and Enter EOP-2 (see below).

## EOP-2, RPV CONTROL

- Direct restoring level to +53" to +95" using Cond/FW and CRD.

## EOP-4, PRIMARY CONTAINMENT CONTROL

- Direct lockout of all containment spray pumps.
- **TORUS TEMP**
  - Direct torus cooling per EOP-1, Attachment 16, to maintain torus temp below 85°F.
  - Monitor HCTL (FIG M) and reduce reactor pressure band as necessary to stay in GOOD region.
- **DRYWELL TEMP**
  - Maintain drywell temp below 150°F (NOT CHALLENGED).
- **PRIMARY CONTAINMENT PRESSURE**
  - Maintain drywell pressure below 3.5 psig (NOT CHALLENGED).
- **TORUS WATER LEVEL**
  - Maintain torus water level 10.5 to11.25 feet (NOT CHALLENGED).
- **HYDROGEN**
  - Monitor drywell H2 and O2 concentrations (NOT CHALLENGED).

| Time | **SRO:** Applicant Actions Or Behavior |
|---|---|

## EMERGENCY EVENT CLASSIFICATION

- ❍ Evaluate EAL matrix for reportability (initially ALERT per 2.2.1 and based on inability to insert control rods with manual reactor scrams then SITE AREA EMERGENCY per 2.2.2.)

- ❑ Brief crew on event.

| Time | **RO/BOP:** Applicant Actions Or Behavior |
|---|---|

- ❑ Recognize/ report all control rods not inserted: ATWS.
- ❑ When directed bypass ADS and report ADS bypassed.

**ADS INHIBIT**

- ○ Place ADS CH 11 keylock to BYPASS.
- ○ Place ADS CH 121 keylock to BYPASS.

## EOP-3 LEVEL CONTROL ACTIONS

- ❑ When directed prevent Core Spray injection per EOP-1, Attachment 4.

**EOP-1 Attachment 4, Prevent Core Spray Injection**

- ○ Obtain tools and safety equipment form EOP toolbox at SM desk.
- ○ Bypass Core Spray IV interlocks by installing **jumpers** at EOP ISOLATION BYPASS JUMPER SUBPANEL (inside Panel N, between 1N1A and 1N1B):
  - ○ Jumper 17: 40-01, INSIDE CS DISCHARGE IV121 BYPASS
  - ○ Jumper 18: 40-11, INSIDE CS DISCHARGE IV111 BYPASS
  - ○ Jumper 19: 40-06, CORE SPRAY TEST VALVE11 BYPASS
  - ○ Jumper 24: 40-09, INSIDE CS DISCHARGE IV122 BYPASS
  - ○ Jumper 25: 40-10, INSIDE CS DISCHARGE IV112 BYPASS
  - ○ Jumper 26: 40-05, CORE SPRAY TEST VALVE12 BYPASS

- ❑ Verify containment isolations per SOP-40.2 when RPV level reaches low-low level (+5") or main condenser vacuum reaches 7 in hg.
- ❑ If directed install MSIV jumpers per EOP-1, Attachment 2.

| Time | **RO/BOP:** Applicant Actions Or Behavior |
|---|---|

### EOP-1 Attachment 2, MSIV Lo-Lo Isolation Bypass

- ❍ Obtain tools and safety equipment form EOP toolbox at SM desk.
- ❍ Bypass Core Spray IV interlocks by installing **jumpers** at EOP ISOLATION BYPASS JUMPER SUBPANEL (inside Panel N, between 1N1A and 1N1B):
  - ❍ Jumper 1: MSIV LO/LO ISOL. BYPASS RELAY 11K19A
  - ❍ Jumper 2: MSIV LO/LO ISOL. BYPASS RELAY 11K20A
  - ❍ Jumper 8: MSIV LO/LO ISOL. BYPASS RELAY 12K19A
  - ❍ Jumper 9: MSIV LO/LO ISOL. BYPASS RELAY 12K20A

❑ When directed terminate and prevent injection using EOP-1, Attachment 24.

### EOP-1 Attachment 24, TERMINATE AND PREVENT

- ❍ Perform one of the following:
  - ❍ Place FEEDWATER ISOLATION VALVE 11 and FEEDWATER ISOLATION VALVE 12 to CLOSE.

    **OR**

  - ❍ Place FEEDWATER PUMP 11 and FEEDWATER PUMP 12 control switches in PTL.
- ❍ Select MAN on FW 11 VALVE CONTROL and rotate knurled knob full CCW.
- ❍ Select MAN on FW 12 VALVE CONTROL and rotate knurled knob full CCW.
- ❍ Select MAN on FW 13 VALVE CONTROL and rotate knurled knob full CCW.
- ❍ Direct AO to pull FU-8 and FU-9 (HPCI fuses) in Panel IS34.
- ❍ Verify closed FEEDWATER PUMP 13 BLOCKING VALVE.
- ❍ Verify FEEDWATER 11 BYPASS VALVE in MAN and at zero.
- ❍ Verify FEEDWATER 12 BYPASS VALVE in MAN and at zero.

| Time | **RO/BOP:** Applicant Actions Or Behavior |
|---|---|

- ❑ Inform SRO when level reaches target level (-41" corrected) as directed by SRO.
- ❑ Inform SRO when power <6% **or** RPV level reaches TAF (–84 inches corected).
- ❑ When directed establish injection and maintain level between –109" (corrected) and corrected level it was lowered to using Cond/FW.

EOP-1 Attachment 24, THROTTLE INJECTION

- ❍ Perform one of the following:
  - ❍ REOPEN FEEDWATER ISOLATION VALVE 11 and FEEDWATER ISOLATION VALVE 12 if closed to terminate injection.

    **OR**
  - ❍ RESTART FEEDWATER PUMP 11 and/or FEEDWATER PUMP 12 by placing its control switch in START if placed in PTL to terminate injection.
- ❍ Adjust FW 11 VALVE CONTROL and/or FW 12 VALVE CONTROL by rotating knurled to establish injection and maintain desired level band.

- ❑ Monitor and report if 600 gallons boron injected (800 gallons in LP tank).
- ❑ Monitor and report if all rods inserted to 04.

- ❑ When directed to restore level to +53" to +95" using Cond/FW see actions above.

| Time | **RO/BOP:** Applicant Actions Or Behavior |
|---|---|

# EOP-3 POWER CONTROL ACTIONS

❑ When directed initiate ARI.

- ❍ Depress MANUAL ARI pushbutton

❑ When directed trip RRP 11, 12, 13, 14, and 15.

- ❍ Place REACTOR RP MOTOR 11 (12) (13) (14) (15) MG SET control switches to STOP.

❑ When directed perform EOP-3.1, Section 3 (driving rods) and 4 (manual scrams).

| DRIVE RODS USING RMCS | REPEATED MANUAL SCRAMS |
|---|---|
| ❍ Verify a CRD Pump running. | |
| ❍ Reactor Mode Switch to REFUEL. | |

*Both SECTION 3 and SECTION 4 require the following actions*

## DEFEAT ARI

- ❍ Place ARI OVERRIDE switch in OVERRIDE.

## INSERT RPS SCRAM LOGIC RELAY BYPASS JUMPERS

- ❍ Obtain tools and safety equipment form EOP toolbox at SM desk.
- ❍ Defeat RPS logic relays by installing **jumpers** at EOP ISOLATION BYPASS JUMPER SUBPANEL (inside Panel N, between 1N1A and 1N1B):
  - ❍ Jumper 5: BYPASS RELAY 11K7 TO RELAY 11K51B
  - ❍ Jumper 6: BYPASS RELAY 11K8 TO RELAY 11K52B
  - ❍ Jumper 12: BYPASS RELAY 12K7 TO RELAY 11K51B
  - ❍ Jumper 13: BYPASS RELAY 12K8 TO RELAY 12K52B

## RESET SCRAM

- ❍ Depress Ch 11 and Ch 12 RESET buttons.

| Time | **RO/BOP:** Applicant Actions Or Behavior |
|---|---|

| DRIVE RODS (cont.) | MANUAL SCRAMS (cont.) |
|---|---|
| ❍ Bypass the RWM.<br><br>❍ Insert rods to 00 using EMER ROD IN starting with high power regions of core (use LPRM indications). | ❍ Direct AO to verify open 44-167 (CRD-12), Charging Water Header Blocking valve(RB El 237 west hall).<br><br>❍ WHEN…SDV drained (following clear):<br>- *F1-1-8, RPS CH 11 SCRAM DUMP VOL WTR LVL HIGH*<br>- *F3-1-4, CONT ROD DRIVE SCRAM DUMP VOLUME WTR LVL HIGH*<br>- *F4-1-1, RPS CH 12 SCRAM DUMP VOL WTR LVL HIGH*<br>AND…Either Reactor Pressure or CRD Charging Water Pressure >450 psig.<br><br>THEN…manual scram by depressing the Ch 11 and Ch 12 scram buttons.<br><br>IF…control rods move inward, THEN…reset scram and repeat steps. |

- ❑ Monitor and report when torus temperature reaches 85°F.
- ❑ When directed to inject liquid poison (**Go to event 06, LP Pump Trip**).
- ❑ Monitor and report when all rods inserted to 04.
- ❑ When directed to stop liquid poison injection.

| STOP LIQUID POISON INJECTION (OP-12 G.0) |
|---|
| ❍ Place keylock switch to OFF.<br>❍ Confirm GREEN LIGHT ON and RED LIGHT OFF for pump started. |

| Time | **RO/BOP:** Applicant Actions Or Behavior |
|---|---|

# EOP-4, PRIMARY CONTAINMENT CONTROL

❑ When directed place containment spray pumps 111, 112, 121, 122 in PTL.

## LOCKOUT CONTAINMENT SPRAY PUMPS

❍ Place Containment Spray Pumps 111, 121, 121, 122 in PTL.

❑ When directed to prevent Core Spray injection:

## EOP-1 Attachment 4, Prevent Core Spray Injection

❍ Obtain tools and safety equipment form EOP toolbox at SM desk.

❍ Prevent Core Spray injection by installing **jumpers** at EOP ISOLATION BYPASS JUMPER SUBPANEL (inside Panel N, between 1N1A and 1N1B):

- ❍ Jumper **17**: 40-01, INSIDE CS DISCHARGE IV121 BYPASS
- ❍ Jumper **18**: 40-11, INSIDE CS DISCHARGE IV111 BYPASS
- ❍ Jumper **19**: 40-06, CORE SPRAY TEST VALVE11 BYPASS
- ❍ Jumper **24**: 40-09, INSIDE CS DISCHARGE IV122 BYPASS
- ❍ Jumper **25**: 40-10, INSIDE CS DISCHARGE IV112 BYPASS
- ❍ Jumper **26**: 40-05, CORE SPRAY TEST VALVE12 BYPASS

❑ Report containment parameters as desired by SRO: drywell and torus pressures and temperatures. Report when torus temperature reaches 85°F.

❑ When directed to initiate torus cooling.

## TORUS COOLING (EOP-1 Attachment 16)

- ❍ CLOSE the CONT SPRAY BYPASS BV(s) for selected loop:
  - ❍ **Loop 111**: 80-45 CONT SPRAY BYPASS BV 122.
  - ❍ **Loop 112**: 80-40 CONT SPRAY BYPASS BV 111.
    80-45 CONT SPRAY BYPASS BV 122.
  - ❍ **Loop 121**: 80-40 CONT SPRAY BYPASS BV 111.
    80-45 CONT SPRAY BYPASS BV 122.
  - ❍ **Loop 122**: 80-40 CONT SPRAY BYPASS BV 111.

---

- ❍ Verify closed 80-115, CONT SPRAY TO RAD WASTE IV 12.
- ❍ Verify closed 80-114, CONT SPRAY TO RAD WASTE IV 11.

---

- ❍ CLOSE Cont Spray Discharge IV Keylock Switch for selected loop:
  - ❍ **Loop 111**: 80-16, CONT SPRAY DISCHARGE IV 111.
  - ❍ **Loop 112**: 80-36, CONT SPRAY DISCHARGE IV 112.
  - ❍ **Loop 121**: 80-15, CONT SPRAY DISCHARGE IV 121.
  - ❍ **Loop 122**: 80-35, CONT SPRAY DISCHARGE IV 122.

---

- ❍ OPEN CONT SPRAY BYPASS BV for selected loop:
  - ❍ **Loop 111**: 80-40, CONT SPRAY BYPASS BV 111.
  - ❍ **Loop 112**: 80-44, CONT SPRAY BYPASS BV 112.
  - ❍ **Loop 121**: 80-41, CONT SPRAY BYPASS BV 121.
  - ❍ **Loop 122**: 80-45, CONT SPRAY BYPASS BV 122.

---

- ❍ Place 80-118, CONT SPRAY TEST TO TORUS FCV to OPEN and HOLD until open (throttle valve).
- ❍ Start CONTAINMENT SPRAY RAW WATER PUMP in selected loop (111 or 112 or 121 or 122).
- ❍ Start CONTAINMENT SPRAY PUMP in selected loop (111 or 112 or 121 or 122).

---

## EVENT 08: LP Pump Trip

***Instructor Activities:***

- **INITIATION POINT:** When Liquid Poison is started, two to three (2-3) seconds later insert the applicable malfunction to trip the running pump:

  IF **SYS 11** started, then **(F7)**: LP01A, LP Pump Trip 11 (TRUE)

  IF **SYS 12** started, then **(F8)**: LP01B, LP Pump Trip 12 (TRUE)

***Symptons/Cues Visible To The Crew:***

- RED LIGHT goes out and GREEN LIGHT turns ON.
- Pump discharge pressure lowers to zero.
- Pump amps for pump started lowers to zero.

***Critical Task(s) and Justification:***

01 ***Given a failure of the reactor to scram with power generation and Torus water temperature approaching 110°F, the crew will utilize Boron injection, Torus cooling, control rod insertion and RPV pressure control to preclude violation of the HCTL in accordance with EOP-3.***
BASIS: Improper performance or omission of these actions contributes to violation of the HCTL.

## EVENT 08: LP Pump Trip

| Time | **SRO:** Applicant Actions Or Behavior |
|---|---|

- ❑ BEFORE Torus water temperature reaches 110°F, direct inject liquid poison.
- ❑ When informed of LP Pump failure, ensure opposite system started and injection is successful.

**EVENT 08: LP Pump Trip**

| Time | **RO/BOP:** Applicant Actions Or Behavior |
|---|---|

❑ When directed inject liquid poison.

## LIQUID POISON INJECTION (OP-12 H.1.0)

- ❍ Place keylock switch to either SYS 11 **or** SYS 12.
- ❍ Confirm RED LIGHT ON and GREEN LIGHT OFF for pump started.
- ❍ LIQUID POISON EXPL VALVE 11 CONTINUITY light OFF.
- ❍ LIQUID POISON EXPL VALVE 12 CONTINUITY light OFF.
- ❍ Verify LIQUID POISON HDR PR value is greater than reactor pressure.
- ❍ **RECOGNIZE AND REPORT the LP Pump that was started tripped. Place keylock switch to opposite system** (go to SYS 11 if SYS 12 started or go to SYS 12 if SYS 11 started).
- ❍ Report LP tank level: ~1460 Gallons.
- ❍ Verify CU RETURN ISOLATION VALVE 1 (INSIDE) 33-01 closed.
- ❍ Verify CU SUPPLY ISOLATION VALVE 11 (INSIDE) 33-02 closed.
- ❍ Verify CU SUPPLY ISOLATION VALVE 12 (OUTSIDE) 33-04 closed.

V. POST SCENARIO CRITIQUE (Not required for Annual Operating Exam or NRC Initial Exam)

A. After the second caucus, convene the crew in the classroom for a facilitative critique:
   1. What the crew saw and how they responded to each event?
   2. Why the crew responded the way they did or their goal?
   3. What went well during the scenario (STRENGTHS)?
   4. What the crew could have done better (AREAS FOR IMPROVEMENT)?

B. Ensure the expectations in each performance objective are discussed.

C. PERFORMANCE EXPECTATIONS (Attachment 7), that were not met, should be addressed.

D. Review the Critical Tasks if applicable.

E. At the conclusion, review the strengths and areas for improvement for improvement. Review video tape if appropriate.

F. Significant comments from the post scenario discussion should be recorded to allow later retrieval and follow-up.

VI. REFERENCE EVENTS AND COMMITMENTS

A. Reference Events

DER-NM-2004-2578, Valve Failed To Indicate Full Open During Stroke Time Test.

B. Commitments

None

VII. LESSONS LEARNED

None

EVALUATED SCENARIO CHECKLIST

1. Additional Information about these checks:

   For continuing training, can be found in NUREG 1021, ES 604 and Appendix D.

   For initial training, can be found in NUREG 1021, ES 301 and Appendix D.

2. Qualitative Attributes

| | |
|---|---|
| ✓ | Realism/Credibility |
| ✓ | Event Sequencing |
| ✓ | Simulator Modeling |
| ✓ | Evaluating Crew Competencies |

3. Quantitative Attributes

| | |
|---|---|
| 5 | Total Malfunctions |
| 2 | Malfunctions after EOP Entry |
| 2 | Abnormal Events |
| 1 | Major Transients |
| 3 | EOPs Used |
| 2 | EOP Contingency Procedures Used |
| 60 | Simulator Run Time |
| 30 | EOP Run Time |
| 3 | Crew Critical Tasks (if applicable per Attachment 6.) |

4. Developmental Checks:

   Does every event have either a Critical Task(s) or Performance Objective?

   Is Criteria given for sequencing to subsequent events?

   Is termination criteria clear and unambiguous?

   Does termination criteria allow verification that all CT, PO standards are met?

Facility: **Nine Mile Point 1** Scenario No.: **NRC-03** Op-Test No.: **NRC-01**

Examiners: _____ Operators: _____

Initial Conditions: ***100% power.***

Turnover: ***N1-ST-M4B, Emergency Diesel Generator 103 AND PB 103 Operability Test, completed satisfactory last shift. Substitute Reactor Building Ventilation Supply and Exhaust Fans from system 12 to system 11.***

| Event No. | Malf. No. | Event Type* | Event Description |
|---|---|---|---|
| 1 | - | N<br>BOP | Substitute Reactor Building Ventilation Supply and Exhaust Fans from system 12 to system 11.<br>***OP-10 F.3.2, F.1.0, and F.2.0.*** |
| 2 | HV01A, RB Exhaust Fan Trip 11 (TRUE)<br>R.B. Exhaust Fan 12 & Outlet Damper (POS_1) | C<br>BOP | Reactor Building Exhaust Fan 11 trips and exhaust fan 12 will not start. Start RBEVS in response to a degraded Reactor Building negative pressure (0 psig).<br>***ARP L1-3-4, L1-1-5, EOP-5, OP-10 H.1.0, Tech Specs*** |
| 3 | FW37, 13 FCV Oscillation (50%; ramp = 1 minute) | C<br>ALL | The crew will respond to FCV 13 oscillations. Later in the scenario the crew will be required to manually adjust 13 FCV to maintain RPV level below the high level trip when reactor power is lowered.<br>***SOP-16.1, OP-16; F.6.0*** |
| 4 | EG 11, 345KV Power Grid Transient (FINAL VALUE: 338; no ramp) | C<br>BOP | The crew will respond to a power grid transient with 115KV voltage and frequency degraded. This includes EDG103 and dead bus transfer to energize PB103.<br>***ARP A6-2-6, A6-3-3, SOP-33.A.3, Multiple Tech Specs, OP-45; E.3.0*** |
| 5 | EG16, Generator Cooling Fan Leads Trip (Final value: 50, 1 minute) | R<br>RO<br>SRO | The crew will be required to lower power to maintain isophase bus duct temperatures within limits. When reactor power is lowered the temperatures stabilize then lower.<br>***ARP A7-3-5, SOP-1.3, OP-32; H.4.0*** |

| | | | |
|---|---|---|---|
| 6 | EG 11, 345KV Power Grid Transient (FINAL VALUE: 328; 1 minute ramp) | C<br>ALL | When the power reduction has been made, the grid conditions degrade requiring removal of the main generator from service because of the low frequency.<br>***SOP-33.A.3 (continued),SOP-33.1, SOP-1*** |
| | | | |
| 7 | **ED01B**<br>**Loss of Offsite 115KV Power South Oswego – Line 1**<br>**ED01A**<br>**Loss of Offsite 115KV Power JAF-Line 4**<br>DG01A, Diesel Generator 102 Failure to Start (TRUE) | C<br>ALL | Loss of offsite power with EDG102 fail to start and cannot be started. EDG102 and PB102 loss impact SOP-5 execution and RPV level and containment control actions.<br>***SOER 99-1; Loss of Grid***<br>***SOER 03-1; Emergency Power Reliability***<br>***NMP LER: Loss of grid (Summer 2003)***<br>***N1-SOP-5, EOP-2, EAL Matrix,*** |
| | | | |
| 8 | RR29, Recirculation Loop Rupture (12%; ramp time = 10 minutes) | M<br>ALL | Reactor coolant leak.<br>***EOP-2, EOP-4, EAL Matrix, EOP-1, EOP-8*** |
| | | | |
| 9 | CS03D, Core Spray Inboard Injection Vlv Fail To Open 40-10 (TRUE)<br>CS03D, Core Spray Inboard Injection Vlv Fail To Open 40-09 (TRUE) | C<br>BOP<br>SRO | Core Spray injection valves fail to automatically open and must be manually opened to restore and maintain RPV level above TAF following the RPV blowdown.<br>***EOP-1*** |
| | | | |

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

| **TARGET QUANTITATIVE ATTRIBUTES (PER SCENARIO; SEE SECTION D.5.d)** | ACTUAL ATTRIBUTES |
|---|---|
| 1. Total malfunctions (5-8) | 7 |
| 2. Malfunctions after EOP entry (1-2) | 3 |
| 3. Abnormal events (2-4) | 3 |
| 4. Major transients (1-2) | 1 2 |
| 5. EOPs entered/requiring substantive actions (1-2) | 2 |
| 6. EOP contingencies requiring substantive actions (0-2) | 1 |
| 7. Critical tasks (2-3) | 2 |

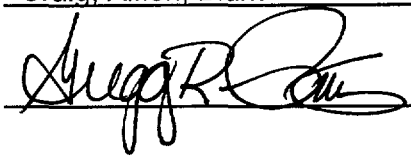
LIST abnormals

LIST EOP Contingencies absent

NMP SIMULATOR SCENARIO

**2004 NRC SCENARIO #3, REV. 0**

SWAP REACTOR BUILDING VENTILATION FANS, LOSS OF REACTOR BUILDING VENTILATION, #13 FEEDWATER FCV OSCILLATIONS, MAJOR GRID DISTURBANCE, LOSS OF OFFSITE POWER AND EDG102, REACTOR COOLANT LEAK, CORE SPRAY INJECTION VALVES FAIL TO AUTO OPEN

| | | |
|---|---|---|
| PREPARER | P. Ballard/D.Wandschneider | DATE 08/23/2004 |
| VALIDATED | Craig, Alfieri, Blum | DATE 08/25/2004 |
| GEN SUPERVISOR OPS TRAINING |  | DATE 9/8/04 |
| OPERATIONS MANAGER | NA – EXAMINATION SECURITY | DATE |
| CONFIGURATION CONTROL | NA – EXAMINATION SECURITY | DATE |

SCENARIO SUMMARY

Length: 60 minutes

The crew assumes the shift with the plant operating at rated conditions. N1-ST-M4B, EDG 103 and PB 103 Operability Test, were completed two (2) hours ago by the last shift.

The crew will change the Reactor Building (RB) ventilation lineup from #12 exhaust and supply fans running to #11 supply and exhaust fans running. SRO determines Technical Specifications (TS) for RB isolation valves is met.

When the RB ventilation lineup has been changed, #11 RB exhaust fan trips. The crew will diagnose the fan trip and a positive RB pressure. When the crew attempts to restart #12 RB exhaust fan, it fails to start. The crew will start the Reactor Building Emergency Ventilation System (RBEVS) to restore a negative RB pressure. Entry into N1-EOP-5, Secondary Containment Control is required. SRO determines the secondary containment TS is still satisfied.

When RBEVS is started and RB ventilation is isolated, the crew will respond to #13 Feedwater Flow Control Valve oscillations. The resultant oscillations require entry into SOP-16.1, Feedwater Failures. The crew will transfer #13 Feedwater FCV to manual to terminate the oscillation. With #13 Feedwater FCV in manual, the crew will place #11 Feedwater FCV into automatic. This requires taking manual control of the master feedwater level controller while the FCV alignment is made and then returning the master feedwater level controller to automatic control.

When the down power is required later in the scenario, the crew will be required to adjust #13 FCV in manual to maintain reactor water level to avoid a reactor scram.
When feedwater level control is corrected, a grid disturbance occurs requiring the crew enter N1-SOP-33.A.3 and perform the actions for voltage <114Kv. The crew is expected to reduce reactor power, but may maintain reactor power at the current power level because of the event (chance of making grid less stable) and dispatch personnel to investigate. This includes starting EDG103 for degraded 115Kv. This is a dead bus transfer with numerous TS LCO entries that apply until the power transfer is complete. The SRO will determine both offsite circuits are inoperable and enter the actions of TS 3.6.3.e(2), which requires EDG103 be started and one line be available within 24 hours to meet the TS action.

When EDG103 is powering PB103, an isophase bus duct high temperature alarm will be received if the crew has not already lowered reactor power in response to the grid disturbance. The crew will be required to lower reactor power to maintain isophase bus duct temperature below 125°C. When reactor power has been lowered to 90% or lower, the alarm will clear and field reports will confirm lowering temperatures.

When the actions for the grid disturbance have been taken or the crew has lowered reactor power in response to the high isophase bus duct temperatures, main turbine vibration will increase and frequency will approach 58 hz requiring removal of the main generator from service. Approximately one (1) minute after the reactor is scrammed, offsite power will be lost and EDG102 fails to start and cannot be started. The crew will enter SOP-5 and perform the actions for a loss of 115KV power.

The transient also causes a reactor coolant leak to develop in the drywell. The crew will enter the EOPs to control containment parameters and reactor water level. Because of the loss of high-pressure injection the crew will be required to blowdown and use low-pressure systems (Core Spray) to restore and maintain reactor water level above TAF. The crew must manually open Core Spray System 12 injection valves to establish low-pressure injection. Core Spray System 11 is not available because of the EDG102 failure and PB102 loss. When the crew has restored and maintained reactor water level above TAF and containment spray has been initiated, the scenario may be terminated.

Major Procedures: OP-10, EOP-5, SOP-16.1, SOP-33.A.3, OP-45, SOP-1.3, OP-32, SOP-33.1, SOP-1, SOP-5, EOP-2, EOP-4, EOP-1, EOP-8, EAL Matrix.

EAL Classification: EAL 2.1.2, Site Area Emergency, RPV level cannot be maintained >-84 inches (TAF).

Termination Criteria: Reactor water level restored and maintained above TAF and containment spray has been initiated.

I. SIMULATOR SET UP

A. IC Number: IC 25

***ENSURE CRD Pump 11 in service and 12 CRD Pump is off.***
***Ensure RPS UPS 162 trouble alarm (A3-1-2) reset.***
***Place 11 RBCLC Pump in service and 12 RBCLC is off.***
***Ensure RB Vent Supply and Exhaust Fans system 12 are running in FAST speed.***

B. Presets/Function Key Assignments

1. Malfunctions:

   a. HV01A, Reactor Building Exhaust Fan Trip 11 **(TRUE)** **(F3)**

   b. FW37, 13 FCV Oscillations **(50%; ramp time = 1 minute)** **(F4)**

   c. EG11, 345KV Power Grid Transient **(FINAL VALUE: 338; no ramp time)** **(F5)**

   d. EG16, Generator Cooling Fan Leads Trip **(FINAL VALUE: TRUE)** **(F6)**

   e. EG11, 345KV Power Grid Transient **(FINAL VALUE: 328; 1 minute)** **(F7)**
   ***NOTE: Make this relative to EG11 (F5)***

   f. TU02, Main Turbine High Vibration **(FINAL VALUE: 65%; 2 minute ramp)** **(F7)**

   g. ED01A, Loss of Offsite 115KV Power, JAF-Line 4 **(TRUE)** **(F8)**

   h. ED01B, Loss of Offsite 115KV Power, South Oswego – Line 1 **(TRUE)** **(F8)**

   i. RR29, Recirculation Loop Rupture **(20%; ramp time = 10 minutes)** **(F9)**

   j. DG01A, Diesel Generator 102 Failure to Start (TRUE) **(QUEUED)**

2. Remotes:

   a. None

3. Overrides:

   a. R.B. Exhaust Fan 12 & Outlet Damper **(POS_1)** **(F3)**
   ***(SWITCH) 11S054-DI-046-12 Locate on L-11 page 8 of 10.***

   ***NOTE: jumper overrides located on N-12***

   b. 12BNJ116 – EOP JUMPER FOR CS VALVE **(IN)** **(QUEUED)**
   c. 12BNJ117 – EOP JUMPER FOR CS VALVE **(IN)** **(QUEUED)**
   d. 12BNJ118 – EOP JUMPER FOR CS VALVE **(IN)** **(QUEUED)**
   e. 12BNJ123 – EOP JUMPER FOR CS VALVE **(IN)** **(QUEUED)**
   f. 12BNJ124 – EOP JUMPER FOR CS VALVE **(IN)** **(QUEUED)**
   g. 12BNJ125 – EOP JUMPER FOR CS VALVE **(IN)** **(QUEUED)**

4. Annunciators:

   Training Annunciator Composite (as required)

C. Equipment Out of Service None

D. Support Documentation None

E. Miscellaneous None

F. Surrogate SRO Briefing

When required to start RBEVS for loss of reactor building ventilation, direct start of 11 RBEVS.

When FCV#13 oscillation occurs, ensure direct placing 11 FWP FCV in AUTO with 13 FWP FCV in MANUAL per N1-OP-16, F.6.0.

For initial grid voltage/frequency degradation, when conditions are stable and monitoring per N1-SOP-33.A.3, if candidates have not performed ARP A6-3-3, then direct performance.

For the reacitivity change, when isophase bus duct cooling high temperature is received, direct an emergency power reduction to 90%. This will terminate the temperature increase and isophase temperatures will start to lower.

When conditions are stable following the loss of offsite power, ensure entry into N1-SOP-5 is directed.

Ensure candidates make the determination that the Core Spray IVs fail to open before providing direction to open the valves manually.

II. **SHIFT TURNOVER INFORMATION**

OFF GOING SHIFT: □ N □ D DATE: _____

**PART I: To be performed by the oncoming Operator before assuming the shift.**

- Control Panel Walkdown (all panels) (SSS, ASSS, STA, CSO, CRE)

**PART II: To be reviewed by the oncoming Operator before assuming the shift.**

- Shift Supervisor Log (SSS, ASSS, STA)
- CSO Log (CSO)
- Lit Control Room Annunciators (SSS, ASSS, STA, CSO, CRE)
- Shift Turnover Checklist (ALL)
- LCO Status (SSS, ASSS, STA)
- Computer Alarm Summary (CSO)

Evolutions/General Information/Equipment Status:

- Reactor Power = 100%
- Loadline = 103%

N1-ST-M4B, EMERGENCY DIESEL GENERATOR 103 AND PB 103 OPERABILITY TEST, completed by the last shift.

**PART III: Remarks/Planned Evolutions:**

Swap Reactor Building Ventilation Supply and Exhaust Fans per N1-OP-10.

**PART IV: To be reviewed/accomplished shortly after assuming the shift:**

- Review new Clearances (SSS)
- Shift Crew Composition (SSS/ASSS)
- Test Control Annunciators (CRE)

| TITLE | NAME | TITLE | NAME |
|---|---|---|---|
| SSS | | CRE/OATC | |
| ASSS | | E | |
| STA | | E | |
| CSO | | Other | |

| Scenario ID# | 2004 NRC SCENARIO #3 |
|---|---|

INSTRUCTOR COMMENTS (Strengths, Areas for Improvement, Open Items etc.)

| |
|---|
| |
| |
| |
| |
| |
| |

| What Happened? | What we did? | Why? (Goals) | Other Options? |
|---|---|---|---|
| | | | |

III. PERFORMANCE OBJECTIVES

A. Critical Tasks:

01 ***Depressurize the reactor and use low pressure systems to restore and maintain reactor water level above TAF.***
BASIS: With the loss of high pressure injection systems concurrent with the reactor coolant leak, a blowdown is required to reduce reactor pressure to below the shutoff head for the available Core Spray Pumps. This pressure reduction permits Core Spray System injection and restoration and maintenance of reactor water level above TAF.

02 ***Open Core Spray injection valves upon failure of the valves to automatically open when reactor pressure reaches 365 psig.***
BASIS FOR CT-2.0: Failure to manually open Core Spray injection valves which fail to automatically open will result in extended time below TAF until alternate injection systems can be aligned locally and made available for injection jeopardizing fuel cladding integrity.

B. Performance Objectives:

| EVENT | PERFORMANCE OBJECTIVE |
|---|---|
| 01 | Given a condition requiring substitution of the running Reactor Building Ventilation Supply and Exhaust Fans, the crew will shift fans IAW N1-OP-10. |
| 02 | Given a degradation of the Reactor Building Ventilation Supply and Exhaust Fans, the crew will recognize the condition, enter EOP - 5 and start running Reactor Building Emergency Ventilation System IAW N1-OP-10. |
| 03 | Given problems with the #13 Feedwater FCV, the crew will recognize the condition and take actions IAW N1-OP-16 and SOP 16.1. |
| 04 | Given instability problems with the Grid, the crew will recognize the degraded conditions of voltage and frequency and respond IAW the ARPs and N1-SOP-33.<br><br>Given instability problems with the Grid, the crew will respond with a dead bus transfer of PB103 to Emergency Diesel Generator 103 IAW N1-OP-45. |
| 05 | Given rising Isophase bus duct temperatures, the crew will respond by lowering power in order to lower and stabilize temperatures IAW N1-SOP-1.3, N1-OP-32. |
| 06 | As a result of continued Grid degradation, the crew will be required to remove the main generator from service IAW N1-SOP-33, N1-SOP-1. |
| 07 | Given a loss of 115KV with a failure of 102 Emergency Diesel Generator to start, the crew will respond IAW N1-SOP-5 and N1-EOP-2. |
| 08 | Given a Reactor Coolant Leak, the crew will take actions IAW NI-EOP-1, 2, 4, 8 |
| 09 | Given a failure of the Core Spray injection valves to automatically open, the crew will recognize the failure and manually open the valves IAW with N1-EOP-1. |
| Generic | Given the plant in a condition requiring emergency classifications, the crew shall classify the events properly, complete initial notification forms and discuss the bases for the classification in accordance with the emergency plan procedure.<br><br>Given the plant or plant system in a condition requiring Technical Specification action, identify the deviation and any required actions/notifications. |

**EVENT 01: Substitution of Reactor Building Ventilation Supply and Exhaust Fans per N1-OP-10.**

***Instructor Activities:***

- Take the simulator out of freeze before the crew enters for the pre-shift walk down and briefing. Allow up to 5 minutes to walk down panels and perform annunciator checks.

- **INITIATION POINT:** The initiation point for this event is when the SRO directs the normal evolution to be performed. There are NO instructor activities related to this normal evolution.

- If contacted as the AO to set TC-202-13 to minimum setting (RB SUPPLY VENT HEATERS CONTROL SWITCH), report duct heaters are not in service. TC-202-13 is at the minimum setting.

***Symptons/Cues Visible To The Crew:***

- NOT APPLICABLE

***Critical Task(s) and Justification:***

- NONE

**EVENT 01: Substitution of Reactor Building Ventilation Supply and Exhaust Fans per N1-OP-10.**

| Time | **SRO:** Applicant Actions Or Behavior |
|---|---|

❑ Walk down panels prior to assuming shift.

❑ Conduct shift turnover brief.

❑ Assume the shift

N1-OP-10

❑ Authorize performance of N1-OP-10, Substitution of Exhaust and Supply Fans, per sections F.3.2, F.1.0, and F.2.0.

❑ Acknowledge report to inform Chemistry when changing ventilation lineups.

❑ Inform Chemistry of change in ventilation lineup.

❑ Brief crew on impact.

**EVENT 01: Substitution of Reactor Building Ventilation Supply and Exhaust Fans per N1-OP-10.**

| Time | **RO/BOP:** Applicant Actions Or Behavior |
|---|---|

❑ Walk down panels prior to assuming shift.

❑ *Participate in and ensure understanding of shift turnover brief.*

## N1-OP-10: Getting Started

❑ Obtain SRO permission to perform N1-OP-10, Substitution of Exhaust and Supply Fans, per sections F.3.2, F.1.0, and F.2.0.

❑ Notify SRO to inform Chemistry of ventilation lineup changes being made.

## N1-OP-10: F.3.2, Shifting Fans to Slow Speed

❍ Direct AO to ensure RB SUPPLY VENT HEATERS CONTROL SWITCH at minimum setting.

NOTE: L1-3-4, REACT BLDG/ATM DIFF PRESS, may be received.

❍ Place #12 Supply Fan control switch in SLOW.

❍ Place #12 Exhaust Fan control switch in SLOW.

❍ Observe Rx Bldg D/P indicator between -0.25 and -0.4 inches of water.

## N1-OP-10: F.1.1, Substituting Exhaust Fans

NOTE: L1-3-4, REACT BLDG/ATM DIFF PRESS, may be received.

❍ Start REACTOR BLDG EXHAUST FAN 11 on SLOW speed.

❍ Confirm open 202-08, REACTOR BLDG EXHAUST FAN 11 OUTLET DAMPER.

❍ Stop REACTOR BLDG EXHAUST FAN 12.

❍ Confirm closed 202-07, REACTOR BLDG EXHAUST FAN 12 OUTLET DAMPER.

**EVENT 01: Substitution of Reactor Building Ventilation Supply and Exhaust Fans per N1-OP-10.**

| Time | **RO/BOP:** Applicant Actions Or Behavior |
|---|---|

## N1-OP-10: F.2.1, Substituting Supply Fans

NOTE: L1-3-4, REACT BLDG/ATM DIFF PRESS, may be received.

- ❍ Start REACTOR BLDG SUPPLY FAN 11 on SLOW speed.
- ❍ Confirm throttled open FCV 202-03, REACTOR BLDG SUPPLY FAN 11 INLET DAMPER.
- ❍ Stop REACTOR BLDG SUPPLY FAN 12.
- ❍ Confirm closed FCV 202-04, REACTOR BLDG SUPPLY FAN 12 INLET DAMPER.

## N1-OP-10: F.3.2, Shifting Fans to Fast Speed

NOTE: L1-3-4, REACT BLDG/ATM DIFF PRESS, may be received.

- ❍ Place #11 Exhaust Fan control switch in FAST.
- ❍ Place #11 Supply Fan control switch in FAST.
- ❍ Observe Rx Bldg D/P indicator between -0.25 and -0.4 inches of water.

❑ Reports supply and exhaust fans substituted per N1-OP-10.

**EVENT 02: Reactor Building Ventilation Exhaust Fan#11 trip and Exhaust Fan #12 cannot be started.**

***Instructor Activities:***

- Ensure OVERRIDE R.B. Exhaust Fan 12 & Outlet Damper **(POS_1) (F1)** assigned to same **Trigger (F3)** as malfunction HV01A, Reactor Building Exhaust Fan Trip 11.

- **INITIATION POINT:** When directed by the lead examiner, insert the following malfunction: HV01A, Reactor Building Exhaust Fan Trip 11 **(TRUE) (F3)**

***Symptons/Cues Visible To The Crew:***

- L1-3-4, REACT BLDG/ATM DIFF PRESS
- L1-1-5, RB VENT EXH FAN 11- 12 TRIP - VIB
- Observe RB Exhaust Fan 11 is tripped.

***Critical Task(s) and Justification:***

- None

**EVENT 02: Reactor Building Ventilation Exhaust Fan#11 trip and Exhaust Fan #12 cannot be started.**

| Time | **SRO:** Applicant Actions Or Behavior |
|---|---|

- ❑ Acknowledge report L1-3-4, REACT BLDG/ATM DIFF PRESS, in alarm.
- ❑ Acknowledge report L1-1-5, RB VENT EXH FAN 11- 12 TRIP - VIB, in alarm.
- ❑ Acknowledge report exhaust fan 11 tripped.
- ❑ Direct start of Exhaust Fan 12.
- ❑ Direct actions of L1-3-4 and L1-1-5 to be performed.
- ❑ Diagnose reactor building negative pressure is degraded low.
- ❑ Recognize entry condition for EOP-5, Secondary Containment Control.

EOP-5

- ❍ Determine no emergency exists (activation of emergency plan not required).
- ❍ Per SC-3, ensure RBEVS started and RB ventilation isolated.

TECH SPEC DETERMINATION

- ❍ Determine that with the reactor building isolated and RBEVS running and maintaining reactor building negative pressure within the limit, entry into Tech Spec actions for Secondary Containment IS NOT REQUIRED.
  - ❍ TS 3.4.2 and TS 3.4.4 requirements are met.

❑ Brief crew on event impact.

**EVENT 02: Reactor Building Ventilation Exhaust Fan#11 trip and Exhaust Fan #12 cannot be started.**

| Time | **RO/BOP:** Applicant Actions Or Behavior |
|---|---|

- ❑ Recognize/report L1-3-4, REACT BLDG/ATM DIFF PRESS, in alarm.
- ❑ Recognize/report L1-1-5, RB VENT EXH FAN 11- 12 TRIP - VIB, in alarm.
- ❑ Recognize/report exhaust fan 11 tripped.
- ❑ Acknowledge direction to perform actions of L1-3-4, L1-1-5.

## L1-1-5 ACTIONS

- ❍ Confirm computer point E125 in alarm
- ❍ Verify exhaust fan 11 outlet damper closed.
- ❍ Attempt to start exhaust fan 12 and report that it will not start.
- ❍ Start RBEVS (see below).
- ❍ Isolate reactor building ventilation (see below).

## L1-3-4 ACTIONS

- ❍ Confirm computer point D313 in alarm.
- ❍ Monitor D/P for entry into EOP-5.
- ❍ Inform SRO D/P is zero.

**EVENT 02: Reactor Building Ventilation Exhaust Fan#11 trip and Exhaust Fan #12 cannot be started.**

| Time | **RO/BOP:** Applicant Actions Or Behavior |
|---|---|

❑ Reference N1-OP-10, H.1.0.

BEFORE starting 11 or 12 RBEVS 11

- ❍ Verify open 202-36, EM VENTILATION FROM REACTOR BLDG BV.
- ❍ Verify closed 202-47, EM VENTILATION TIE BV
- ❍ Verify closed 202-74, EM VENTILATION LOOP 11 COOLING BV
- ❍ Verify closed 202-75, EM VENTILATION LOOP 12 COOLING BV
- ❍ Notify Rad Protection RBEVS will be placed in service

To start 11 RBEVS

- ❍ Place 202-37, EM VENTILATION LOOP 11 INLET BV control switch to OPEN.
- ❍ Verify open 202-37, EM VENTILATION LOOP 11 INLET BV.
- ❍ Start 202-53, EVS FAN 11.
- ❍ Verify open 202-34, EM VENT EXHAUST FAN 11 OUTLET BV.
- ❍ Confirm proper operation of 202-50, EM VENT EXHAUST FAN 11 INLET FCV, by observing flow indication and Rx Bldg DP.

To start 12 RBEVS

- ❍ Place 202-38, EM VENTILATION LOOP 12 INLET BV control switch to OPEN.
- ❍ Verify open 202-38, EM VENTILATION LOOP 12 INLET BV.
- ❍ Start 202-33, EVS FAN 12.
- ❍ Verify open 202-35, EM VENT EXHAUST FAN 12 OUTLET BV.
- ❍ Confirm proper operation of 202-51, EM VENT EXHAUST FAN 12 INLET FCV, by observing flow indication and Rx Building DP.

**EVENT 02: Reactor Building Ventilation Exhaust Fan#11 trip and Exhaust Fan #12 cannot be started.**

| Time | **RO/BOP:** Applicant Actions Or Behavior |
|---|---|

## To Isolate Reactor Building Ventilation

- ❍ Place REACTOR BLDG SUPPLY FAN 11 in OFF.
- ❍ Place control switch for 202-31, REACTOR BLDG EXHAUST ISOLATION VALVE 12 and 202-32, REACTOR BLDG EXHAUST ISOLATION VALVE 11 in CLOSE.
- ❍ Place control switch for 202-15, REACTOR BLDG SUPPLY ISOLATION VALVE 11 and 202-16, REACTOR BLDG SUPPLY ISOLATION VALVE 12 in CLOSE.

❑ Report RBEVS in service and reactor building ventilation isolated.

## EVENT 03: Feedwater FCV 13 Oscillation

***Instructor Activities:***

- **INITIATION POINT:** When directed by the lead evaluator, insert malfunction: FW37, 13 FCV Oscillations **(50%; ramp time = 1 minute) (F4)**
- If asked as maintenance to investigate, acknowledge the request.
- If reports to management personnel are received, acknowledge the reports.

***Symptons/Cues Visible To The Crew:***

- Feed Pump 13 indications oscillating.
- Feed Pump 13 flow controller oscillating.
- Master Feedwater Controller is oscillating.

***Critical Task(s) and Justification:***

- NONE

## EVENT 03: Feedwater FCV 13 Oscillation

| Time | **SRO:** Applicant Actions Or Behavior |
|---|---|

- ❑ Acknowledge report 13 FWP indications and FCV controller oscillating.
- ❑ Diagnose 13 FWP FCV controller failed in automatic.
- ❑ Direct placing operating FWP FCV in AUTO with 13 FWP FCV in MANUAL per OP-16.

### SOP-16.1, FW System Failures

- ❍ Determine problem with FWLC.
- ❍ Direct placing 13 FCV in manual.

- ❑ Brief crew on event impact.

## EVENT 03: Feedwater FCV 13 Oscillation

| Time | **RO/BOP:** Applicant Actions Or Behavior |
|---|---|

- ❑ Recognize/report report reactor power is oscillating.
- ❑ Recognize/report 13 FWP indications and FCV controller oscillating.
- ❑ Acknowledge entry into SOP-16.1

### SOP-16.1, FW Failures

- ❍ Determine 13 FWP FCV failed in automatic.
- ❍ Place 13 FWP FCV in MANUAL.

- ❑ Acknowledge direction to place operating FWP FCV in AUTO with 13 FWP FCV in MANUAL.

### Placing 11(12) FWP FCV in AUTO with 13 FWP FCV in MANUAL (N1-OP-16, F.5.0 [#11] or F.6.0 [#12])

#### First place 13 FCV to MANUAL

- ❍ Verify FWP 13 VALVE CONTROL M/A station in BAL.
- ❍ Null FWP 13 VALVE CONTROL by adjusting manual knob on FWP 13 VALVE CONTROL M/A station until deviation meter reads 50% (red dot).
- ❍ Place FWP 13 VALVE CONTROL M/A station mode switch in MAN.
- ❍ Adjust output of 11 (12) FWP VALVE CONTROL or FWP 13 VALVE CONTROL with manual control knob as needed to control reactor water level.

#### Then place operating FCV in AUTO (see next page)

**EVENT 03: Feedwater FCV 13 Oscillation**

| Time | **RO/BOP:** Applicant Actions Or Behavior |
|---|---|

Then place 11 (12) FCV in AUTO (from previous page)

- ❍ Place FEEDWATER MASTER CONTROL M/A station in MAN.
- ❍ Null FWP 11(12) VALVE CONTROL by adjusting manual knob on FEEDWATER MASTER CONTROL until deviation meter reads 50% (red dot) on FWP 11(12) VALVE CONTROL GEMAC.
- ❍ Place FWP 11(12) VALVE CONTROL M/A station mode switch in BAL.
- ❍ Control vessel level with manual knob on FEEDWATER MASTER CONTROL.
- ❍ Null FEEDWATER MASTER CONTROL setpoint error by adjusting thumbwheel/setpoint tape to align manual setpoint (orange arrow) directly under automatic setpoint (green-band).
- ❍ Place FEEDWATER MASTER CONTROL M/A station mode switch to AUTO.
- ❍ Verify system response by adjusting thumbwheel on FEEDWATER MASTER CONTROL to maintain reactor vessel level.

## EVENT 04: Major Grid Disturbance

***Instructor Activities:***

- **INITIATION POINT:** When directed by the lead evaluator, insert malfunction:
  EG 11, 345KV Power Grid Transient **(FINAL VALUE: 338; no ramp) (F5)**
  NOTE: Set to 338 = 58.8 hz and 113.6 volts

- If asked as power control, inform Unit 1 there is a system-wide disturbance and it is being investigated. Peaking units are being started and you expect to recover from the problem within one (1) hour. Maintain power at the current power level and avoid power changes. The load flow computer is not available.

- If reports to management personnel are received, acknowledge the reports.

- If report to Fitzpatrick, acknowledge the report. Report Fitzpatrick is experiencing the grid disturbance: frequency at 58.8, voltage at 113.6 volts.

***Symptons/Cues Visible To The Crew:***

- A6-3-3, 345 KV SYS FREQUENCY HIGH-LOW
- A6-2-6, 345 KV BUS VOLTAGE HIGH-LOW
- A8-1-3, 115 KV BUS LOW VOLTAGE
- FREQUENCY at 58.8 hz
- VOLTAGE at 113.6 v
- Computer points F432, F433, F434 indicate 113.6 volts

***Critical Task(s) and Justification:***

- NONE

| Time | **SRO:** Applicant Actions Or Behavior |
|---|---|

- ❑ Acknowledge report of following alarms and indications:

  A6-3-3, 345 KV SYS FREQUENCY HIGH-LOW
  A6-2-6, 345 KV BUS VOLTAGE HIGH-LOW
  A8-1-3, 115 KV BUS LOW VOLTAGE
  FREQUENCY at 58.8 hz, VOLTAGE at 113.6 v
  Computer points F432, F433, F434 indicate 113.6 volts

- ❑ Direct entry into SOP-33.A.3, Major Grid Disturbances.

## SOP-33A.3

- ❍ Direct computer points F432, F433, and F434 placed on special log.
- ❍ Determine no transmission line outages.
- ❍ Determine no surveillance testing in progress or planned.
- ❍ Call power control to determine if low voltage post contingency alarm.
- ❍ Determine 115 kv bus phase voltage <114 kv on all three phases.
- ❍ Evaluate Tech Specs (see below).
- ❍ Direct EDG103 start and load per OP-45, section E.3.0.
- ❍ Determine 115 kv bus phase voltage >109.3 kv.
- ❍ Determine ACTUAL VOLTAGE ≥ CONTINGENCY VOLTAGE OF 109.9 KV path is to be answered "Load Flow Computer Not Available."

## TECH SPEC DETERMINATION (loss of both offsite circuits)

- ❍ Evaluate TS 3.6.3.e(2)
- ❍ Determine with no 115 kv line available (<114 kv) both EDG102 and EDG103 must be operable and one EDG running. One 115 kv line must be available within 24 hours. If 24 hours expires, then shutdown initiated within one hour and reactor to be in cold shutdown within ten hours.

**EVENT 04: Major Grid Disturbance**

| Time | **SRO:** Applicant Actions Or Behavior |
|---|---|

TECH SPEC DETERMINATION (EDG103 dead bus transfer)

- ❍ Determine numerous momentary TS LCOs are not met while the dead-bus transfer occurs. Most limiting is TS 3.1.5 (ADS) requiring cold shutdown in 10 hours.
- ❍ Evaluate TS 3.0.1 entry because of loss of normal power. Determine no system powered from opposite division is inop; TS 3.0.1 does not apply.

❑ Brief crew on event impact.

**EVENT 04: Major Grid Disturbance**

| Time | **RO/BOP:** Applicant Actions Or Behavior |
|---|---|

- ❑ Acknowledge report of following alarms and indications:

  A6-3-3, 345 KV SYS FREQUENCY HIGH-LOW
  A6-2-6, 345 KV BUS VOLTAGE HIGH-LOW
  A8-1-3, 115 KV BUS LOW VOLTAGE
  FREQUENCY at 58.8 hz, VOLTAGE at 113.6 v
  Computer points F432, F433, F434 indicate 113.6 volts

- ❑ Acknowledge entry into SOP-33.A.3, Major Grid Disturbances (see below).

- ❑ Perform A6-3-3, A6-2-6 actions. Reference A8-1-3.

## A6-2-6 ACTIONS

- ❑ Monitor BUCK/BOOST meter and 345 kv recorder.
- ❑ Determine condition is normal; isolation of amplidyne under load conditions is not required.

## A6-3-3 ACTIONS

- ❑ Determine "± 0.6 to 1.4 hz" variation from 60 hz = 90 minutes operation time
- ❑ Notify power control of 90 minutes operation time.
- ❑ Perform OP-32 (H.7.0) for 345 KV System Frequency High/Low (no additional actions beyond those identified in ARP and SOP).

## SOP-33A.3

- ❍ Place computer points F432, F433, and F434 placed on special log.
  - ❍ Depress LOG SRVS function key (twice).
  - ❍ Enter log number 24, then TAB and enter 4, then TAB and enter P.
  - ❍ Enter Computer Point ID F423, F433, F434.
  - ❍ Depress LOG SRVS function key.
- ❍ Determine 115 kv bus phase voltage <114 kv on all three phases.
- ❍ Start and load EDG103 per OP-45, section E.3.0 (see below).
- ❍ Determine 115 kv bus phase voltage >109.3 kv.

| Time | **RO/BOP:** Applicant Actions Or Behavior |
|---|---|

## EDG103 START (OP-45, E.3.0)

- ❑ Verify relays reset by taking DIESEL GEN 103 control switch to EM STOP.
- ❑ Determine Pre-Start Checks not required because run within past 24 hours..
- ❑ Place DIESEL GEN 103 control switch to START.
- ❑ Adjust speed to 60 Hz using DIESEL GOV control switch.
- ❑ Inform SRO deenergizing PB 103 requires entry into Tech Spec 3.1.5.
- ❑ Shift required loads on PB 17B to alternate power source (none required).
- ❑ Place R1013, PB 103 Normal Power Supply Breaker in PULL-TO-LOCK.
- ❑ Place Sync Key in R1032 SYN and place to ON.
- ❑ Close R1032, Diesel Generator 103 Output Breaker.
- ❑ Confirm Annunciator A5-2-3, DSL GEN 103 START, alarming.
- ❑ Confirm computer point W037, DSL GEN 103 STARTED, YES.
- ❑ Confirm normal voltage on PB 103 and PB 17B.
- ❑ Reset LOCKOUT 86-17 device.
- ❑ Remove Sync Key from R1032 SYN.

## EVENT 05: Isophase Bus Duct Cooling High Temperature

- **INITIATION POINT:** After the crew has responded to the grid disturbance and EDG103 is started and loaded, and as directed by the lead evaluator, insert malfunction: EG16, Generator Cooling Fan Leads Trip **(FINAL VALUE: TRUE) (F6)**

- If asked to report isophase bus duct temperatures, wait one (1) minute and then report temperatures are 116°C and rising.

- If asked to check isophase fan in service and TBCLC aligned to isophase cooler, report system is operating normally.

- After reactor power has been lowered and if lowered to at least 90%, and asked to report isophase bus duct temperatures, wait one (1) minute and then report temperatures are 115°C and lowering slowly.

***Symptons/Cues Visible To The Crew:***

- A7-3-5, GEN LEADS HIGH TEMP.
- Computer point D177, AIR TEMP PHASE 1&3 HIGH.
- Field reports of elevated temperatures approaching 125°C.

***Critical Task(s) and Justification:***

- NONE

## EVENT 05: Isophase Bus Duct Cooling High Temperature

| Time | **SRO:** Applicant Actions Or Behavior |
|---|---|

- ❑ Acknowledge report of alarm A7-3-5, GEN LEADS HIGH TEMP.
- ❑ Direct a power reduction to maintain isophase bus duct temperature below 125°C.

### SOP-1.3, Emergency Power Reduction

- ❍ Direct a reduction in recirc flow to a new target reactor power level. This determination is based on the reports from the field.

- ❑ Brief crew on impact of event.

## EVENT 05: Isophase Bus Duct Cooling High Temperature

| Time | **RO/BOP:** Applicant Actions Or Behavior |
|---|---|

- ❑ Recognize/report alarm A7-3-5, GEN LEADS HIGH TEMP.
- ❑ Acknowledge report to reduce reactor power that determined by the SRO.
- ❑ Acknowledge direction to perform actions of A7-3-5, GEN LEADS HIGH TEMP.

### A7-3-5, GEN LEADS HIGH TEMP

- ❍ Confirm D177, AIR TEMP PHASE 1&3 on process computer.
- ❍ Dispatch operators to verify Generator Bus Cooling Fan in operation with control switch in MANUAL at PB 131 and to verify TBCLC aligned to Generator Bus Cooling Fan Cooler.
- ❍ Refer to OP-32, Section H.4.0, Loss of Generator Bus Cooling Fan (see below).

### OP-32, Section H.4.0, Loss of Generator Bus Cooling Fan

- ❍ Dispatch operators to maintain local surveillance of bus temperatures.
- ❍ Inform SRO itmay be necessary to lower generator load to maintain bus temperature less than 125°C.
- ❍ Check generator operating within the limits of OP-32, Attachment 5, Estimated Capability Curve. Determine within limits.

### SOP-1.3, Emergency Power Reduction

- ❍ Direct a reduction in recirc flow to a new target reactor power level. This determination is based on the reports from the field.

❑ Brief crew on impact of event.

## EVENT 06: Grid Frequency Degrades

- **Ensure this malfunction (EG11) is relative to the previous EG11 malfunction entered.**

- **INITIATION POINT:** After the crew has responded to the grid disturbance with EDG103 started and loaded and LOCKOUT 86-17 reset, and the isophase bus duct high temperature alarm has been initiated to provide a power reduction for the evaluators to observe, and as directed by the lead evaluator, insert malfunction:
  EG 11, 345KV Power Grid Transient **(FINAL VALUE: 328; 1 minute ramp) (F7)**
  TU02, Main Turbine High Vibration **(FINAL VALUE: 65%; 2 minute ramp) (F7)**

- Call as power control and ask what NMP1 is doing. Have degrading grid conditions.

***Symptons/Cues Visible To The Crew:***

- FREQUENCY slowly lowers to 58.1 Hz and continues to lower below 58 Hz.
- A2-3-5, TURBINE SUPERVISORY SYSTEM

***Critical Task(s) and Justification:***

- NONE

**EVENT 06: Grid Frequency Degrades**

| Time | **SRO:** Applicant Actions Or Behavior |
|---|---|

- ❑ Acknowledge report FREQUENCY is lowering; 58 hz requires removal of the main generator from service.
- ❑ Direct a turbine trip per SOP-31.1, Turbine Trip.

SOP-33A.3 (Frequency variation is ≥1.9 Hz)

- ❍ Direct a turbine trip per SOP-31.1.

- ❑ Direct a reactor scram and concurrent entry into SOP-1, Reactor Scram.

- ❑ Acknowledge report of loss of offsite power and only EDG103 started and loaded.
- ❑ Direct entry into SOP-5, Loss of 115KV (see event 07: loss of offsite power)

## EVENT 06: Grid Frequency Degrades

| Time | **RO/BOP:** Applicant Actions Or Behavior |
|---|---|

- ❑ Recognize/report FREQUENCY is lowering; 58.1 hz requires removal of the main generator from service.
- ❑ Acknowledge direction to scram the reactor (SOP-1, Reactor Scram: see below)

### SOP-1, Reactor Scram

- ❍ Place reactor mode switch to SHUTDOWN.
- ❍ **SCRAM VERIFICATION:**
  - ❍ Confirm all rods in using Full Core display green backgrounds or numeric position indications.
  - ❍ Observe reactor power lowering.
  - ❍ Place all IRMs on Range 8
  - ❍ Insert IRM and SRM detectors.
  - ❍ Down range IRMs as needed to monitor power decrease.
  - ❍ Maintain RPV pressure below 1080 psig.
- ❍ **RPV LEVEL CONTROL:**
  - ❍ Confirm FW LVL SP SETDN INIT light is ON.
  - ❍ Restore RPV level +53" to +95".
  - ❍ Verify #11 or #12 FW Pump running.
  - ❍ Terminate #13 FW Pump Injection (see below)
  - ❍ Control #11 or #12 FW Pump Injection (see below)

**EVENT 06: Grid Frequency Degrades**

| Time | **RO/BOP:** Applicant Actions Or Behavior |
|---|---|

## Terminate #13 FW Pump Injection

- ❍ Place 13 FWP VALVE CONTROL in MANUAL and close the valve.
- ❍ Verify RPV level is > +53".
- ❍ Place FW PUMP (SHAFT) 13 CLUTCH ENGAGEMENT switch to DISENGAGE and confirm the following:
  - ❍ Green friction clutch disengagement light on.
  - ❍ 13 FWP Input Shaft RPM meter indicates <1800 decreasing.
  - ❍ Red Friction Clutch light off (below FW PUMP (SHAFT) 13 CLUTCH ENGAGEMENT switch).
- ❍ Rotate 29-01, FEEDWATER PUMP 13 BLOCKING VALVE, to close.

## Control #11 or #12 FW Pump Injection

- ❍ Verify RPV level is > +53".
- ❍ Verify 11/12 FWP CONTROLLERS in MANUAL and set to zero output.
- ❍ Reset HPCI signal as follows:
  - ❍ Depress FEEDWATER RETURN TO NORMAL AFTER HPCI CH. 11 and CH. 12 pushbuttons (E panel)
  - ❍ Confirm F4-4-1, HPCI MODE AUTO INITIATE is clear.
  - ❍ Confirm FW HPCI MODE light(s) are off.
- ❍ Transfer FWP 11 or 12 BYPASS VALVE M/A station from MANUAL to AUTO by matching Black to Red pointer using thumbwheel then place mode switch in AUTO.

❑ Recognize/report loss of offsite power and only EDG103 started and loaded.

## EVENT 07: Loss of Off Site Power

- Ensure malfunction DG01A, Diesel Generator 102 Failure to Start **(TRUE)** **(QUEUED)**

- **INITIATION POINT:** When the reactor mode switch is placed to shutdown or a reactor scram occurs, ***WAIT ONE (1) MINUTE*** and then insert malfunctions: :
  ED01A, Loss of Offsite 115KV Power, JAF-Line 4 **(TRUE)** **(F8)**
  ED01B, Loss of Offsite 115KV Power, South Oswego – Line 1 **(TRUE)** **(F8)**

- If directed as AO to restore I&C Bus 130, wait Two (2) minutes, perform Remote Functions as follows: ED12, I&C Bus 130 Normal Power Breaker, to open, wait 5 seconds and then ED 13, I&C Bus 130 Alternate Power Breaker to close. Then call and report I&C Bus 130 is restored.

***Symptons/Cues Visible To The Crew:***

- Loss of Line #1.
- Loss of Line #4.
- Supply Breakers 1012 and 1013 tripped.
- EDG103 started and loaded. PB103 powered by EDG103.
- EDG102 not started. PB102 not powered.

***Critical Task(s) and Justification:***

- None.

**EVENT 07: Loss of Off Site Power**

| Time | **SRO:** Applicant Actions Or Behavior |
|---|---|

- ❑ Acknowledge report of loss of offsite power and only EDG103 started and loaded.
- ❑ Direct entry into SOP-5, Loss of 115KV.
- ❑ Enter and execute EOP-2, RPV Control (see Event 08, Reactor Coolant Leak)

## SOP-5, Loss of 115 KV

- ❍ Evaluate EAL matrix for reportability (ALERT per 6.1.3 after 15 minutes)
- ❍ Direct manual start and load of EDG102.
- ❍ Direct performance of SOP-5 Path C on page 8.
- ❍ Direct monitoring of EDG103 loading (<2300 KW).
- ❍ Dispatch AOs to perform in plant load reductions (Table1).

## EMERGENCY EVENT CLASSIFICATION

- ❍ Evaluate EAL matrix for reportability (ALERT per 6.1.3 after 15 minutes)

- ❑ Brief crew on event.

## EVENT 07: Loss of Off Site Power

| Time | **RO/BOP:** Applicant Actions Or Behavior |
|---|---|

- ❑ Recognize/report of loss of offsite power and only EDG103 started and loaded.
- ❑ Acknowledge entry into SOP-5, Loss of 115KV.

### SOP-5, Loss of 115 KV

- ❍ Attempt manual start and load of EDG102; report manual start unsuccessful.
- ❍ Verify PB16A-B TIE BKR R-1042 tripped.
- ❍ Verify PB17A-B TIE BKR R-1052 tripped.
- ❍ Place DW COOLING FANS 11-16 in PTL.
- ❍ Place IAC 11 and IAC 12 in PTL.
- ❍ **PATH C:**
  - ❍ Monitor and maintain EDG103 loading <2300 KW.
  - ❍ Dispatch AOs to perform in plant load reductions (Table1).
  - ❍ Place FEEDWATER PUMP 12 in PTL.
  - ❍ Place COND XFER PUMP 12 in PTL.
  - ❍ **Restore PB17 loads as follows:**
    - ❍ Reset LOCKOUT 86-17.
    - ❍ Start RBCLC PUMP 12, and ESW PUMP 12, and CRD PUMP 12.
    - ❍ Start RBEVS 12 if required (see Event 02 for RBEVS 12 start).
    - ❍ Call and direct AO to restore I&C Bus 130.
  - ❍ **Restore PB17A as follows:**
    - ❍ Open PB17A SUPPLY BKR R-1051.
    - ❍ Close PB17A-B TIE BKR R-1052.
    - ❍ Start IAC 12

## EVENT 08 & 09: Reactor Coolant Leak / Core Spray Injection Valves Fail to Open

- Ensure following malfunctions **(QUEUED):**

| | |
|---|---|
| 12BNJ116 – EOP JUMPER FOR CS VALVE **(IN)** | **(QUEUED)** |
| 12BNJ117 – EOP JUMPER FOR CS VALVE **(IN)** | **(QUEUED)** |
| 12BNJ118 – EOP JUMPER FOR CS VALVE **(IN)** | **(QUEUED)** |
| 12BNJ123 – EOP JUMPER FOR CS VALVE **(IN)** | **(QUEUED)** |
| 12BNJ124 – EOP JUMPER FOR CS VALVE **(IN)** | **(QUEUED)** |
| 12BNJ125 – EOP JUMPER FOR CS VALVE **(IN)** | **(QUEUED)** |

- **INITIATION POINT:** When SOP-5 is entered and (PATH C) determined to be taken or when directed by the lead evaluator, insert the following malfunction:
  RR29, Recirculation Loop Rupture **(12%; ramp time = 10 minutes)** **(F9)**

***Symptons/Cues Visible To The Crew:***

- K2-4-3, DRYWELL PRESSURE HIGH-LOW alarm.
- L1-4-4, HI DRYWELL TEMP, alarm.
- Rising drywell pressure on panel indicators and process computer indication.
- Rising drywell humidity on panel indicator.
- Lowering reactor water level on panel indicators.

- For Core Spray Injection Valves 49-09 and 49-10 failure to open: Valves are observed to remain in the closed position when reactor pressure lowers to 365 psig.

***Critical Task(s) and Justification:***

When RPV level cannot be maintained > 284" (TAF)

01 ***Depressurize the reactor and use low pressure systems to restore and maintain reactor water level above TAF.***
BASIS: With the loss of high pressure injection systems concurrent with the reactor coolant leak, a blowdown is required to reduce reactor pressure to below the shutoff head for the available Core Spray Pumps. This pressure reduction permits Core Spray System injection and restoration and maintenance of reactor water level above TAF.

02 ***Open Core Spray injection valves upon failure of the valves to automatically open when reactor pressure reaches 365 psig.***
BASIS FOR CT-2.0: Failure to manually open Core Spray injection valves which fail to automatically open will result in extended time below TAF until alternate injection systems can be aligned locally and made available for injection jeopardizing fuel cladding integrity.

| Time | **SRO:** Applicant Actions Or Behavior |
|---|---|

- ❑ Acknowledge report of reactor coolant leak.
- ❑ Enter and execute EOP-2, RPV Control (see below).
- ❑ Enter and execute EOP-4, Primary Containment Control (see below).
- ❑ Evaluate EAL matrix for reportability (SITE AREA EMERGENCY per 2.1.2).

## EOP-2, RPV CONTROL

- ❍ **LEVEL**
  - ❍ Direct RPV level maintained +53" to +95" using CRD and direct bypass of Core Spray IV Interlocks (EOP-1 Attachment 4).
  - ❍ Evaluate level instrument restrictions (Detail A). Direct use of FZLI.
  - ❍ When RPV level cannot be maintained >+53", direct level be maintained above -84" (TAF) and direct use of alternate injection systems (Detail E)
  - ❍ When RPV level cannot be maintained >-84" (TAF):
    - ❍ Direct ADS bypass.
    - ❍ Verify EC initiation.
    - ❍ Determine two (2) Core Spray Subsystems available (112 and 122).
    - ❍ Determine Core Spray ready for injection.
    - ❍ * Enter EOP-8, RPV BLOWDOWN **(see below)**
    - ❍ Direct manual opening Core Spray injection valves 40-10,40-09.
    - ❍ Ensure Core Spray is injecting and evaluate NPSH (FIG N1).
    - ❍ Direct RPV level restored and maintained +53" to +95".
- ❍ **PRESSURE**
  - ❍ Direct pressure band below 1080 psig using BPVs.

| Time | **SRO:** Applicant Actions Or Behavior |
|---|---|

## EOP-8, RPV BLOWDOWN

- **TAKES ALL CONTROL RODS INSERTED (YES) PATH**
  - Determine drywell pressure 3.5 psig and Core Spray injection is needed for core cooling.
  - Confirm ECs are already initiated.
  - Determines torus water level above 8.0'.
  - Directs opening of three (3) ERVs.
  - Directs use of FZLI; reminds crew not to use Rosemounts below 500psig.
  - Determine Core Spray Injection valves failed to open.
  - Direct manual opening of Core Spray Injection Valves 40-09, 40-10.

## EOP-4, PRIMARY CONTAINMENT CONTROL

- Direct lockout of all containment spray pumps.
- **TORUS TEMP**
  - Maintain torus temperature below 85°F (NOT CHALLENGED).
- **DRYWELL TEMP**
  - When drywell temp reaches 150°F, proceed to subsequent steps.
  - Evaluate Containment Spray Initiation Limit (FIG K). Early in the event this determination will be NO SPRAY until the coolant leak degrades.
  - NOTE: See PRIMARY CONTAINMENT PRESSURE (below) for containment spray actions

**(continued on next page)**

| Time | **SRO:** Applicant Actions Or Behavior |
|---|---|

**(continued from previous page)**

- **PRIMARY CONTAINMENT PRESSURE**
  - Consider EOP-1 Attachment 10 to maintain pressure below 3.5 psig. Determines cannot be used with drywell pressure >3.5 psig.
  - When torus pressure reaches 13 psig and proceed to subsequent steps.
  - Evaluate Containment Spray Initiation Limit (FIG K) and determine OK TO SPRAY.
  - Direct verify all RRPs tripped.
  - Direct verify all DW Cooling fans tripped.
  - Direct containment spray per EOP-1 Attachment 17.
  - Determine drywell temperature remains below 300°F and blowdown is not required based on DW temperature.
- **TORUS WATER LEVEL**
  - Maintain torus water level 10.5 to11.25 feet (NOT CHALLENGED).
- **HYDROGEN**
  - Monitor drywell H2 and O2 concentrations (NOT CHALLENGED).

## EMERGENCY EVENT CLASSIFICATION

- Evaluate EAL matrix for reportability (SITE AREA EMERGENCY per 2.1.2.)

- ☐ Brief crew on event.

| Time | **RO/BOP:** Applicant Actions Or Behavior |
|---|---|

- ❑ Recognize/ report reactor coolant leak.

***RPV CONTROL ACTIONS:***

- ❑ Acknowledge RPV level be maintained +53" to +95".
- ❑ Acknowledge install jumpers to bypass Core Spray IV interlocks (**see EOP Attachment 4 below**).

EOP-1 Attachment 4, Throttling Core Spray

- ❍ Obtain tools and safety equipment form EOP toolbox at SM desk.
- ❍ Bypass Core Spray IV interlocks by installing **jumpers** at EOP ISOLATION BYPASS JUMPER SUBPANEL (inside Panel N, between 1N1A and 1N1B):
  - ❍ Jumper 17: 40-01, INSIDE CS DISCHARGE IV121 BYPASS
  - ❍ Jumper 18: 40-11, INSIDE CS DISCHARGE IV111 BYPASS
  - ❍ Jumper 19: 40-06, CORE SPRAY TEST VALVE11 BYPASS
  - ❍ Jumper 24: 40-09, INSIDE CS DISCHARGE IV122 BYPASS
  - ❍ Jumper 25: 40-10, INSIDE CS DISCHARGE IV112 BYPASS
  - ❍ Jumper 26: 40-05, CORE SPRAY TEST VALVE12 BYPASS
- ❍ When 365 psig is reached, throttle Core Spray Inboard IVs 40-09 and 40-10 as necessary to maintain RPV level between +53" and +95".

- ❑ Report RPV level CANNOT be maintained above +53" (see scram actions for level control actions).
- ❑ Acknowledge level be maintained above -84" (TAF) and approval to use alternate injection systems. Direct AO to perform EOP 1 Attachment 12 or 13 and 19 (**see below**).

| Time | **RO/BOP:** Applicant Actions Or Behavior |
|---|---|

## EOP-1, ALTERNATE INJECTION SYSTEMS

- ❍ Direct AO to align LP Test Tank Injection to RPV per EOP-1, Attachment 12.
- ❍ When aligned then place LP Keylock switch to SYS 11 or SYS 12.

OR

- ❍ Establish RPV injection using LP Tank per EOP-1, Attachment 13.
- ❍ Place LP Keylock switch to SYS 11 or SYS 12.

AND

- ❍ Direct AO to align RPV injection using Fire Water System per EOP-1, Attachment 19.
- ❍ When aligned and reactor pressure within fire water system capability, and if needed for RPV injection then direct AO to open 29-07, Drywell Flooding Valve and 100-33, Fire Sys to FW Disch Hdr Valve, to inject to the RPV.

❑ Acknowledge RPV level cannot be maintained >-84" (TAF) and RPV Blowdown required (**see below**).

## RPV level cannot be maintained >-84" (TAF)

- ❍ Report Core Spray Pumps 112 and 122 running.
- ❍ Report Core Spray Topping Pumps 112 and 122 running.
- ❍ Place ADS Channel 11 keylock in BYPASS.
- ❍ Place ADS Channel 12 keylock in BYPASS.
- ❍ Confirm EC 11 and EC 12 in service.

| Time | **RO/BOP:** Applicant Actions Or Behavior |
|---|---|

## RPV BLOWDOWN and LOW PRESSURE INJECTION

- ❍ Place control switches for 3 ERVs to open.
- ❍ Report 3 ERVs open.
- ❍ Manually open Core Spray injection valves 40-10,40-09. ✓
- ❍ Control Core Spray injection and restore RPV level +53" to +95".

***PRIMARY CONTAINMENT CONTROL ACTIONS:***

- ❑ Acknowledge direction to lockout of all containment spray pumps.

## LOCKOUT CONTAINMENT SPRAY PUMPS

- ❍ Place Containment Spray Pumps 111, 121, 121, 122 in PTL.

- ❑ Report containment parameters as desired by SRO: drywell and torus pressures and temperatures. Report when torus pressure reaches 13 psig.
- ❑ Acknowledge direction to initiate containment spray.

## CONTAINMENT SPRAY (EOP-1 Attachment 17 )

- ❍ Check RRP 11, 12, 13, 14, 15 are OFF.
- ❍ Check DW Cooling fans 11, 12, 13, 14, 15, 16 are OFF.
- ❍ Start Containment Spray pumps powered from EDG103 (121 and 122).
- ❍ Monitor drywell pressure and secure containment sprays (place running pumps in PTL) if drywell pressure lowers below 3.5 psig.

V. POST SCENARIO CRITIQUE (Not required for Annual Operating Exam or NRC Initial Exam)

A. After the second caucus, convene the crew in the classroom for a facilitative critique:
   1. What the crew saw and how they responded to each event?
   2. Why the crew responded the way they did or their goal?
   3. What went well during the scenario (STRENGTHS)?
   4. What the crew could have done better (AREAS FOR IMPROVEMENT)?

B. Ensure the expectations in each performance objective are discussed.

C. PERFORMANCE EXPECTATIONS (Attachment 7), that were not met, should be addressed.

D. Review the Critical Tasks if applicable.

E. At the conclusion, review the strengths and areas for improvement for improvement. Review video tape if appropriate.

F. Significant comments from the post scenario discussion should be recorded to allow later retrieval and follow-up.

VI. REFERENCE EVENTS AND COMMITMENTS

A. Reference Events

SOER 99-1, Loss of Grid

SOER 03-1, Emergency Power Reliability

B. Commitments

None

VII. LESSONS LEARNED

None

EVALUATED SCENARIO CHECKLIST

1. Additional Information about these checks:

   For continuing training, can be found in NUREG 1021, ES 604 and Appendix D.

   For initial training, can be found in NUREG 1021, ES 301 and Appendix D.

2. Qualitative Attributes

| | |
|---|---|
| ✓ | Realism/Credibility |
| ✓ | Event Sequencing |
| ✓ | Simulator Modeling |
| ✓ | Evaluating Crew Competencies |

3. Quantitative Attributes

| | |
|---|---|
| 7 | Total Malfunctions |
| 3 | Malfunctions after EOP Entry |
| 3 | Abnormal Events |
| 1 | Major Transients |
| 2 | EOPs Used |
| 1 | EOP Contingency Procedures Used |
| 60 | Simulator Run Time |
| 30 | EOP Run Time |
| 2 | Crew Critical Tasks (if applicable per Attachment 6.) |

4. Developmental Checks:

   Does every event have either a Critical Task(s) or Performance Objective?

   Is Criteria given for sequencing to subsequent events?

   Is termination criteria clear and unambiguous?

   Does termination criteria allow verification that all CT, PO standards are met?

Facility: **Nine Mile Point 1** Scenario No.: **NRC-04 (ALT)** Op-Test No.: **NRC-01**

Examiners: _____ Operators: _____

Initial Conditions: ***100% power.***

Turnover: ***Need to perform Monthly performance of N1-ST-M8, RBEVS Operability Test.***

***122 Containment Spray Pump removed from service. EPR in control.***

| Event No. | Malf. No. | Event Type* | Event Description |
|---|---|---|---|
| 1 | 11M40, 11 RBEVS Train flow meter downscale 11-M040-AO-053, Set at 0.0. | N<br>BOP<br>SRO | N1-ST-M8, RBEVS Operability Test is scheduled for its monthly performance. During the test, when the RBEVS fan is started, the fan flow indicator will fail downscale and the train must be declared inoperable. The SRO must make a T.S. determination.<br>***N1-ST-M8, Tech Specs*** |
| 2 | RP01B, Reactor Trip Bus MG Set Trips (141) **(TRUE)**<br>RD06, Rod 22-19 Failure – Scrammed (10 Sec. TD) **(TRUE)**<br>**Overrride for control rod 22-19 position 02.** | C<br>RO<br>BOP<br>SRO | Loss of Reactor Trip Bus 141 and a coincident single control rod scram. When control rod 22-19 scrams its CRD Mechanism becomes stuck at position 02. The crew will enter N1-OP-48 and restore power to the bus, then the scram may be reset. The crew must lower power, asses recovering the control rod and the SRO must make a T.S. determination.<br>***N1-OP-05, N1-OP-16, N1-OP-48 , Tech Specs*** |
| 3 | RX01, Fuel Cladding Failure - 10% Ramp - 5 minutes, TUA – 1 Min. | R<br>RO<br>SRO | A small fuel leak will develop from the abnormal rod pattern. Rising reactor coolant activity levels will require entry into the Emergency Plan and Emergency Power Reduction.<br>***EAL Matrix, EPIP-EPP-18, N1-SOP-1.1, N1-SOP-25.2*** |

| | | | |
|---|---|---|---|
| 4 | ED04, AC Power Board Electrical Fault (PB11), clears in 3 secs | C<br>RO<br>BOP<br>SRO | During the emergency power reduction the crew will transfer normal house service to the reserve transformers. When the transfer is made both PB 11 supply breakers will trip. The crew can recover PB 11. The trip of PB 11 will cause a trip of RRPs 11 and 12, this will result in entry into the restricted area of the Power to Flow map and the reactor should be manually scrammed.<br><br>***N1-SOP-30.1, N1-OP-30, N1-SOP-1.3, Tech Specs, N1-SOP-1,2*** |
| | | | |
| 5 | EC06A, Emergency Condenser Tube Leak 111<br><br>EC08A, EC STM IV 111 Fail to Close = 80%<br><br>EC08B, EC STM IV 112 Fail to Close = 80% | BOP<br>SRO<br>MT<br>ALL | When the reactor is scrammed (If the crew does NOT scram the reactor this malfunction will require a reactor scram) a piping rupture will occur in EC Loop 11. The steam isolation valves fail to fully close.<br><br>***N1-SOP-1.1, N1-SOP-1,*** declares Site Area |
| | | | |
| 6 | RD33E, Control Rod Bank 5, Insert Fail position (48)<br><br>ED26, Failure of PB 11 to Auto Transfer **(TRUE)** | RO<br>SRO | A bank of control rods will fail to fully insert requiring the crew to perform actions to manually insert control rods. (if PB11 was not transferred previously it will fail to automatically transfer and must be manually transferred.)<br><br>***N1-EOP-2, N1-EOP-3, N1-EOP-4; Att. 2 and 4, N1-OP-12, H.1.0 and G.0*** |
| | | | |
| 7 | RX01, Fuel Cladding Failure - 100% Ramp - 15 minutes | ~~MT~~<br>ALL | Rising reactor coolant activity and radiation levels will require a blowdown. When EOP-8 is entered the crew must enter the path for all control rods not inserted. This will require the crew to terminate and prevent injection prior to emergency depressurization.<br><br>***N1-EOP-8, EAL Matrix*** |
| | | | |

Result of Major Transient

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

| **TARGET QUANTITATIVE ATTRIBUTES (PER SCENARIO; SEE SECTION D.5.d)** | ACTUAL ATTRIBUTES |
|---|---|
| 1. Total malfunctions (5-8) | 8 |
| 2. Malfunctions after EOP entry (1-2) | 1 |
| 3. Abnormal events (2-4) | 4 |
| 4. Major transients (1-2) | 1 |
| 5. EOPs entered/requiring substantive actions (1-2) | 2 |
| 6. EOP contingencies requiring substantive actions (0-2) | 1 |
| 7. Critical tasks (2-3) | 3 |

NMP SIMULATOR SCENARIO

**2004 NRC SCENARIO, ALTERNATE, REV. 0**

PERFORM N1-ST-M8, REACTOR BUILDING EMERGENCY VENTILATION, SYSTEM OPERABILITY TEST, LOSS OF BUS 141, INADVERTENT SINGLE ROD SCRAM, FUEL FAILURE, EMERGENCY CONDENSER PIPING RUPTURE, FAILURE OF PB 11 TO AUTO TRANSFER

| | | |
|---|---|---|
| PREPARER | P. Ballard/D.Wandschneider | DATE 08/24/2004 |
| VALIDATED | Mancuso, Swayze, Tracz | DATE 08/28/2004 |
| GEN SUPERVISOR OPS TRAINING |  | DATE 9/8/04 |
| OPERATIONS MANAGER | NA – EXAMINATION SECURITY | DATE |
| CONFIGURATION CONTROL | NA – EXAMINATION SECURITY | DATE |

SCENARIO SUMMARY

Length: 60 minutes

The crew assumes the shift with the plant operating at rated conditions. N1-ST-M8, Reactor Building Emergency Ventilation System (RBEVS) Operability Test is scheduled for its monthly performance. During the test, when the RBEVS fan is started, the fan flow indicator will fail downscale and the train must be declared inoperable. The SRO must make a Technical Specifications (T.S.) determination.

After the T. S. determination is made the crew must respond to a loss of Reactor Trip Bus 141 and a coincident single control rod scram. When control rod 22-19 scrams its CRD Mechanism becomes stuck with the control rod at position 02. This requires declaring the control rod inoperable. A local operator may be dispatched to restore alternate power to the bus, then the scram may be reset. The crew must lower power, asses recovering the control rod and the SRO must make a T.S. determination.

A small fuel leak will develop from the abnormal rod pattern. Rising reactor coolant activity levels will require entry into the Emergency Plan and entry into EPIP-EPP-18, Activation and Direction of the Emergency Plans and N1-SOP-1.1, Emergency Power Reduction.

Per N1-SOP-1.1 the crew will transfer normal house service to the reserve transformers. When the transfer is made both PB 11 supply breakers will trip. The crew will enter N1-SOP-30.1 and recover PB 11. The trip of PB 11 will cause a trip of Reactor Recirculation Pumps (RRPs) 11

and 12, this will result in entry into the restricted area of the Power to Flow map and the reactor should be manually scrammed.

When the reactor is scrammed (If the crew does NOT scram the reactor this malfunction will require a reactor scram) a piping rupture will occur in Emergency Condenser (EC) Loop 11. The steam isolation valves will only close to an intermediate position. With the primary system discharging into the reactor building and the failure of the isolation valves the crew must insert a manual scram.

Following the scram a bank of control rods will fail to fully insert requiring the crew to enter EOP-3, Failure to Scram. With a bank of control rods stuck out of the core the SRO must direct boron injection. Additionally, if PB11 was not transferred previously, PB 11 will fail to automatically transfer when the turbine trips and must be manually transferred.

Rising reactor coolant activity and radiation levels and the un-isolated leak will require a blowdown per EOP-8, RPV Blowdown. When EOP-8 is entered the crew must enter the path for all control rods not inserted to at least position 04. This will require the crew to terminate and prevent injection prior to emergency depressurization.

When the crew has depressurized the reactor thereby stopping the release, and have recovered RPV parameters and all control rods inserted, the scenario may be terminated.

Major Procedures: N1-ST-M8, N1-SOP-40.1, N1-OP-5, N1-OP-48, N1-OP-16, N1-SOP-1.1 EAL Matrix, EPIP-EPP-18, N1-OP-30, SOP-1, SOP-5, EOP-6, EOP-2, EOP-3, EOP-1, EOP-8.

EAL Classification: General Emergency per 3.4.2

Termination Criteria: Release terminated by depressurizing the RPV, all control rods inserted, EOP-3 exited, EOP-2 entered and crew directed to restore reactor water level restored to 53-95.

I. SIMULATOR SET UP

A. IC Number: IC 25

B. Presets/Function Key Assignments

1. Malfunctions:

a. RP01B, Reactor Trip Bus MG Set Trips (141) **(TRUE)** **(F3)**

b. RD06, Rod 22-19 Failure – Scrammed (10 Sec. TD) **(TRUE)** **(F3)**

c. RD34 2219 pos 06 Single Rod Insert Fail Position TUA – 10 sec **(F3)**

d. RX01, Fuel Cladding Failure - 10% Ramp - 5 minutes, TUA – 1 Min. **(F3)**

e. RX01 (relative), Fuel Cladding Failure - 20% Ramp - 5 minutes **(F9)**

f. RX01, Fuel Cladding Failure - 100% Ramp - 15 minutes **(F4)**

g. EC08A, EC STM IV 111 Fail to Close = 80% **(QUEUED)**

h. EC08B, EC STM IV 112 Fail to Close = 80% **(QUEUED)**

i. ED26, Failure of PB 11 to Auto Transfer **(TRUE)** **(QUEUED)**

j. EC06A, Emergency Condenser Tube Leak 111 – 50% Ramp 1minute **(F5)**

k. RD33E, Control Rod Bank 5, Insert Fail position (48) **(QUEUED)**

l. RP02, Rx Trip Bus 141 Pwr Source **(MAINT)** **(QUEUED)**

m. ED04, AC Power Board Electrical Fault (PB11), clears in 3 secs **(F6)**

2. Remotes:

a. RP02, Rx Trip Bus 141 Pwr Source **(MAINT)** **(F7)**

3. Overrides:

a. 11M40, 11 RBEVS Train flow meter downscale (L Panel Page 7of 8) 11-M040-AO-053, Set at 0.0. **(QUEUED)**

b. 9DS213, Cleanup Pump Aux Suction Valve 1 (G) **(OFF)** **(ACTIVE)**

c. 9DS214, Cleanup Pump Aux Suction Valve 1 (R) **(OFF)** **(ACTIVE)**

4. Annunciators:

Training Annunciator Composite (as required)

C. Equipment Out of Service

NONE.

D. Support Documentation

a. N1-ST-M8, Rx Bldg Emergency Ventilation System Operability Test marked up through step 7.3.

**SETUP CONTINUED ON NEXT PAGE**

**SETUP CONTINUED FROM PREVIOUS PAGE**

E. Miscellaneous

Ensure RB Ventilation Supply and Exhaust Fans 12 operating

Ensure Turbime Building Ventilation Supply and Exhaust Fans 12 operating

II. **SHIFT TURNOVER INFORMATION**

OFF GOING SHIFT: ☐ N ☐ D DATE: _____

**PART I: To be performed by the oncoming Operator before assuming the shift.**

- Control Panel Walkdown (all panels) (SSS, ASSS, STA, CSO, CRE)

**PART II: To be reviewed by the oncoming Operator before assuming the shift.**

- Shift Supervisor Log (SSS, ASSS, STA)
- CSO Log (CSO)
- Lit Control Room Annunciators (SSS, ASSS, STA, CSO, CRE)
- Shift Turnover Checklist (ALL)
- LCO Status (SSS, ASSS, STA)
- Computer Alarm Summary (CSO)

Evolutions/General Information/Equipment Status:

- Reactor Power = 100%
- Loadline = 103%

**PART III: Remarks/Planned Evolutions:**

Monthly performance of N1-ST-M8, Reactor Building Emergency Ventilation System RBEVS Operability Test.

**PART IV: To be reviewed/accomplished shortly after assuming the shift:**

- Review new Clearances (SSS)
- Shift Crew Composition (SSS/ASSS)
- Test Control Annunciators (CRE)

| TITLE | NAME | TITLE | NAME |
|---|---|---|---|
| SSS | | CRE/OATC | |
| ASSS | | E | |
| STA | | E | |
| CSO | | Other | |

| Scenario ID# | 2004 NRC SCENARIO #3 |
|---|---|

INSTRUCTOR COMMENTS (Strengths, Areas for Improvement, Open Items etc.)

| |
|---|
| |
| |
| |
| |
| |
| |

| What Happened? | What we did? | Why? (Goals) | Other Options? |
|---|---|---|---|
| | | | |

III. PERFORMANCE OBJECTIVES

A. Critical Tasks:

NOT CT

01 ***Given an Emergency Condenser (EC) steam line isolation failure with a pathway outside the normal process system flowpaths and coolant activity >300 µCi/gm $I^{131}$ equivalent the crew will declare a General Emergency per section 3.4.2 of EPIP-EPP-01 Emergency Action Level Matrix.***
BASIS: Recognition and declaration of this event are required to initiate protective actions for the general public.

02 ***Given an un-isolatable primary system leak with indications of fuel failure the crew will enter EOP-8 and emergency depressurize the reactor.*** OK
BASIS: Emergency depressurization is required to stop the radioactive discharge from the reactor through the tube leak in the Emergency Condenser. Emergency depressurization is the only method available to remove the driving force (reactor pressure) behind the discharge. define failure Criteria ?

03 ***Given a condition where all control rods are NOT inserted to a least position 04, the crew will terminate and prevent all RPV injection except boron and CRD injection sources.*** OK
BASIS: Improper performance or omission of these actions contributes to degradation to a barrier to fission product release by further challenging the fuel cladding integrity.
define Failure criteria ?

B. Performance Objectives:

| EVENT | PERFORMANCE OBJECTIVE |
|---|---|
| 01 | Given a monthly operability test for Reactor Building Emergency Ventilation System, the crew will recognize an inoperable condition and take action IAW with N1-ST-M8 and Technical Specifications. |
| 02 | Given a loss of Reactor Trip Bus 141, the crew will transfer power to the alternate power source IAW N1-OP-48.<br><br>Given a loss of Reactor Trip Bus 141, the crew will respond to a loss of Feedwater Heating IAW N1-OP-16.<br><br>Given a single rod scram, the crew will respond to a mispositioned rod IAW with N1-OP-5. |
| 03 | Given a small fuel leak, the crew will respond to rising reactor coolant activity levels IAW N1-SOP-1.1, and 25.1 |
| 04 | Given a condition requiring transfer of house service and subsequent supply breaker trip, the crew will take action IAW N1-SOP-30.<br><br>Given a loss of 2 Reactor Recirculation pumps and subsequent entry into the restricted zone, the crew will take actions IAW with N1-SOP-1, 2. |
| 05 | Given an Emergency Condenser tube leak, the crew will take actions to mitigate the release IAW N1-SOP-1, 1.1 |
| 06 | Given a failure of the all the control rods to insert following a scram condition, the crew will enter and execute N1-EOP-3. |
| 07 | Given coolant activity level that require a blowdown with control rods NOT inserted, the crew will terminate and prevent prior to emergency depressurization IAW N1-EOP-8 |

## EVENT 01: Monthly performance of N1-ST-M8, RBEVS Operability Test

***Instructor Activities:***

- Take the simulator out of freeze before the crew enters for the pre-shift walk down and briefing. Allow up to 5 minutes to walk down panels and perform annunciator checks.

- **INITIATION POINT:** The initiation point for this event is when the SRO directs the performance of Monthly performance of N1-ST-M8, RBEVS Operability Test. There are NO instructor activities related to this normal evolution.

- If contacted as the AO report that RBEVS Fan appears to have a higher noise level than it usually has.

- If asked when EVS fan 11 starts, respond 202-76 - 10 kw heater red light is on and green light is off.

- When EVS fan 11 is SD, if asked respond 202-76 - 10 kw heater red light is off and green light is on.

***Symptons/Cues Visible To The Crew:***

- EMER VENT FLOW indicator 202-49B remains downscale after RBEVS Fan is started.

***Critical Task(s) and Justification:***

- NONE

**EVENT 01: Monthly performance of N1-ST-M8, RBEVS Operability Test**

| Time | **SRO:** Applicant Actions Or Behavior |
|---|---|

❑ Walk down panels prior to assuming shift.

❑ Conduct shift turnover brief.

❑ Assume the shift

N1-ST-M8

❑ Authorize performance of Monthly performance of N1-ST-M8, RBEVS Operability Test.

❑ Acknowledge report of EMERG VENT FLOW indicator 202-49B has failed downscale.

❑ Directs suspension of of N1-ST-M8, RBEVS Operability Test.

❑ Directs the operator to N/A steps up to 8.1.14, then back out of procedure by performing steps 8.1.14 through 8.1.19.

TECH SPEC DETERMINATION.

❑ Recognize Tech Spec entry.

❑ Locates Tech Spec 3.4.4.e.

❑ Determines a 7 day LCO exists

❑ Verifies the operability of redundant equipment.

❑ Contacts plant supervision and notifies them of the instrument failure.

❑ Contacts FIN Team or maintenance and requests assistance.

❑ Brief crew on impact.

**EVENT 01: Monthly performance of N1-ST-M8, RBEVS Operability Test**

| Time | **RO/BOP:** Applicant Actions Or Behavior |
|---|---|

❑ Walk down panels prior to assuming shift.

❑ Participate in and ensure understanding of shift turnover brief.

## N1-ST-M8: Getting Started

- ❍ Obtain SRO permission to perform N1-ST-M8, RBEVS Operability Test.
- ❍ Reviews procedure.

## N1-ST-M8: 8.1, Operation of RBEVS Loop 11

- ❍ Verify open 220-36.
- ❍ Verify closed 202-47.
- ❍ Place 202-37, EM Ventilation loop Inlet BV in OPEN.
- ❍ Verifies 202-37, EM Ventilation loop Inlet BV opens.
- ❍ Start 202-53, EVS FAN.
- ❍ Verifies 202-53, EVS FAN starts.
- ❍ Recognize no change in EMERG VENT FLOW indicator 202-49B.
- ❍ Diagnose failure of EMERG VENT FLOW indicator 202-49B.
- ❍ Notifies SRO that EMERG VENT FLOW indicator 202-49B has failed downscale.
- ❍ May place Control Switch in PTL
- ❍ May place off normal tag on panel

**EVENT 01: Monthly performance of N1-ST-M8, RBEVS Operability Test**

| Time | **RO/BOP:** Applicant Actions Or Behavior |
|---|---|

N1-ST-M8: 8.1, Securing RBEVS Loop 11.

- ❍ Stops 202-53, EVS FAN.
- ❍ Verifies 202-53, EVS FAN stops
- ❍ Places 202-37, EM Ventilation loop Inlet BV in CLOSE.
- ❍ Verifies 202-37, EM Ventilation loop Inlet BV closes.
- ❍ Verify open 220-36.
- ❍ Verify closed 202-47.
- ❍ Reports to SRO that EVS FAN 11 is secured.

**EVENT 02: Reactor Trip Bus Motor Generator 141 Trips with single rod scram.**

***Instructor Activities:***

- **INITIATION POINT:** When directed by the lead examiner, insert the following malfunction:
RP01B, Reactor Trip Bus MG Set Trips (141) **(TRUE)** **(F3)**

RD06 Rod 22-19 Failure – Scrammed (10 Sec. TD) **(F3)**

RD34 2219 pos 06 Single Rod Insert Fail Position TUA – 10 sec **(F3)**

**AFTER SCRAM IS RESET REMOVE THE FOLLOWING MALFUNCTIONS**

**RD06 Rod 22-19 Failure – Scrammed THEN**

**RD34 2219 pos 06 Single Rod Insert Fail Position**

- Role Play: when directed to investigate, as NAO, report supply breaker to the Reactor Trip Bus MG Set Motor thermal overload relay 49 has opened. No fault of the Trip bus.

- Role Play: As Reactor Engineer when first notified that control rod 22-19 is at position 06 due to an individual rod scram suggest that reactor power be immediately lowered to 90% with recirculation flow while you run a check of core parameters.

- Role Play: **WHEN ASKED** for a GAP-OPS-05, Attachment 1, REACTIVITY MANEUVER REQUEST FORM, tell the control room you will write it up after you determine the control rod manipulations required.

- Role Play: **IF ASKED** as Reactor Engineer to determine if specification 3.1.1a (Shutdown Margin) is met within six (6) hours state you will start it immediately.

- Role Play: As NAO report that Rx Trip Bus 141 is transferred and ½ scram and FW heaters may be reset.

- Role Play: As electrical maintenance, report ground on PB13B bus bar.

- REMOTE FUNCTIONS:

  RP02, Rx Trip Bus 141 Pwr Source **(MAINT)**. **(F7)**

  This normally would take approximately 20 minutes-will use time compression.

**- continued on next page -**

**EVENT 02: Reactor Trip Bus Motor Generator 141 Trips with single rod scram.**

**- continued from previous page-**

***Symptons/Cues Visible To The Crew:***

- CRD accumulator light for control rod 22-19 energizes.
- CRD scram light for control rod 22-19 energizes.
- Scram Solenoid lights for RTS B de-energize.
- F3-2-5, CRD ACCUMULATOR LEVEL HIGH PRESS LOW
- F4-3-2, RX. TRIP BUS M-G SET 141 TROUBLE
- F3-2-6, CONTROL ROD DRIFT
- F4-3-8, RPS CH 12 MAN REACTOR TRIP
- F4-2-8, RPS CH 12 AUTO REACTOR TRIP

***Critical Task(s) and Justification:***

- None

**EVENT 02: Reactor Trip Bus Motor Generator 141 Trips with single rod scram.**

| Time | **SRO:** Applicant Actions Or Behavior |
|---|---|

- ❑ Acknowledge report of following alarms and indications:
  - CRD accum light for control rod 22-19 energizes.
  - CRD scram light for control rod 22-19 energizes.
  - Scram Solenoid lights for RPS B de-energize.
  - F3-2-5, CRD ACCUMULATOR LEVEL HIGH PRESS LOW
  - F4-3-2, RX. TRIP BUS M-G SET 141 TROUBLE
  - F3-2-6, CONTROL ROD DRIFT
  - F4-3-8, RPS CH 12 MAN REACTOR TRIP
  - F4-2-8, RPS CH 12 AUTO REACTOR TRIP
  - Control Rod 22-19 position indication is at position 02.

- ❑ Dispatch operator/Electrical Maintenance to investigate loss of RX. Trip Bus M-G Set 141.

- ❑ Enter N1-OP-5 Control Rod Drive System, Section H.9, Control Rod(s) Mispositioned or double notched.

**N1-OP-5 Control Rod Drive System**

- ❍ Diagnoses/Determines rod 22-19 has inserted more than 3 notches and crossed rod trips.
- ❍ Notifies Reactor Engineering.
- ❍ Directs a reduction of reactor power to 90% using recirculation flow in accordance with N1-SOP 1.1
- ❍ Requests a Reactivity Maneuver Request Form from Reactor Engineering.

- ❑ Determine I & C Bus 130A is available, then dispatch an operator to perform a dead bus transfer per N1-OP-48.

- ❑ Confirm Unit parameters are normal and direct resetting the scram.

**EVENT 02: Reactor Trip Bus Motor Generator 141 Trips with single rod scram.**

| Time | **SRO:** Applicant Actions Or Behavior |
|---|---|

- ❑ Directs RO to attempt moving control rod 22-19 with the CRD system using the ENERGENCY ROD IN switch per F3-2-6.
- ❑ Directs valving out the accumulator for control rod 22-19 per F3-2-6.

**TECH SPEC DETERMINATION**

- ○ Determines T.S. 3.6.12 is met with RPS PB 141 de-energized.
- ○ Determines control rod 22-19 is inoperable per T.S. 3.1.1a(2) and that it is the only inoperative control rod.
- ○ Directs Reactor Engineer to determine if specification 3.1.1a (Shutdown Margin) is met within the next six (6) hours.
- ○ Until specification 3.1.1a (Shutdown Margin) is determined and a determination that the cause of the failure was not due to a failed control rod drive mechanism collet housing are made, the plant is in a 48 hour LCO.

- ❑ Brief crew on event impact.

**EVENT 02: Reactor Trip Bus Motor Generator 141 Trips with single rod scram.**

| Time | **RO/BOP:** Applicant Actions Or Behavior |
|---|---|

- ❑ Recognize/Report the following alarms and indications:
  - CRD accum light for control rod 22-19 energizes.
  - CRD scram light for control rod 22-19 energizes.
  - Scram Solenoid lights for RPS B de-energize.
  - F3-2-5, CRD ACCUMULATOR LEVEL HIGH PRESS LOW
  - F4-3-2, RX. TRIP BUS M-G SET 141 TROUBLE
  - F3-2-6, CONTROL ROD DRIFT
  - F4-3-8, RPS CH 12 MAN REACTOR TRIP
  - F4-2-8, RPS CH 12 AUTO REACTOR TRIP
  - Control Rod 22-19 position indication is at position 02.

## F3-2-6 ACTIONS

- ❍ Determines only one control rod has drifted and is stuck at position 02.
- ❍ Attempt inserting control rod 22-19 using the ENERGENCY ROD IN switch.
- ❍ Directs AO to valve out the accumulator for control rod 22-19 per N1-OP-5, Section H Hydraulic Control Unit (HCU) Isolation.
- ❍ Initiates OD-7, Option 2 to update control rod scan (pattern).

- ❑ Determines I & C Bus 130A is available
- ❑ Directs an operator to determine the status of M G Set 141.
- ❑ Directs an operator to perform a dead bus transfer per N1-OP-48

## F4-2-8 ACTIONS

- ❍ Determines RPS Channel 11 sensors are normal.
- ❍ When power is restored resets RPS Channel 12 trip.

**EVENT 02: Reactor Trip Bus Motor Generator 141 Trips with single rod scram.**

| Time | **RO/BOP:** Applicant Actions Or Behavior |
|---|---|

❑ Enters N1-OP-16, Section H. Loss of Feedwater Heating from F4-3-2, RX. TRIP BUS M-G SET 141 TROUBLE.

## N1-OP-16 ACTIONS

❍ Asses magnitude and rate of heating loss by observing feedwater temperature using Computer Points A390, A392, A393, A394, A395.

❍ Adjust reactor power as necessary to maintain rate power <1850 MWth **AND** Computer Points A390 and A392 above the minimum FW temp for core thermal power (Attachment 4).

## POWER REDUCTION

❍ Reduce recirc flow using Master Recirc Flow Control.

## EVENT 03: Fuel Failure/Off-Gas Radiation Monitor Annunciator

***Instructor Activities:***

- No activities are required for the fuel failure, that malfunction begins when control rod 22-19 scrammed and is on a ramp.
- RX01, Fuel Cladding Failure - 10% Ramp - 5 minutes, TUA – 1 Min. **(F3)**
- After Emerg Power Reduction, Insert
  - RX01, Fuel Cladding Failure - 20% Ramp - 5 minutes **(F9)**
- If the operators attempt to manually transfer house loads to the reserve transformer insert following fault when breaker R113 is opened. **NOTE this fault will automatically clear in 3 seconds allowing the operator to recover the bus.**
- ED04, AC Power Board Electrical Fault (PB11), clears in 3 secs **(F6)**

- Role Play: If reports to management personnel are received, acknowledge the reports.

- Role Play: When directed as Chemistry to sample off-gas and reactor coolant for gross activity report back in 1 minute that reactor coolant gross activity is 34 µCi/gm $I^{131}$ equivalent and confirmation of fuel leak. If further samples are requested, report every six (6) minutes increasing the number by ~ two (2) each time, i.e. 64 µCi/gm, 128 µCi/gm, etc.

***Symptons/Cues Visible To The Crew:***

Annunciator H1-1-7, OFF GAS HIGH RADIATION
Rising off-gas radiation levels on RAM-RN12A and 12B.

***Critical Task(s) and Justification:***

- NONE

## EVENT 03: Fuel Failure/Off-Gas Radiation Monitor Annunciator

| Time | **SRO:** Applicant Actions Or Behavior |
|---|---|

❑ Acknowledge report of off-gas high radiation annunciator.

❑ Enter N1-SOP-25.2 Fuel Failure/High Activity

### N1-SOP-25.2 ACTIONS

- ❍ Notify Chemistry to sample reactor coolant for gross activity.
- ❍ Direct crew to close Turbine Building Roof Vents, Sidewall Vents and Roll Doors.
- ❍ Classify event as an UNUSUAL EVENT per EPIP-EPP-18 1.1 Coolant Activity.
- ❍ Directs crew to lower reactor power using recirculation flow to the top of the Restricted Zone.

❑ Implements EPIP-EPP-18, Activation and Direction of the Emergency Plans, Attachment 1 SM/ED CHECKLIST.

❑ Brief crew on event impact.

## EVENT 03: Fuel Failure/Off-Gas Radiation Monitor Annunciator

| Time | **RO/BOP:** Applicant Actions Or Behavior |
|---|---|

❑ Recognize/report H1-1-7, OFF GAS HIGH RADIATION, in alarm.

### H1-1-7 and N1-SOP-25.2 ACTIONS

- ❍ Notify Chemistry to sample offgas and reactor coolant for gross activity.
- ❍ Close Turbine Building Roof Vents, Sidewall Vents and Roll Doors.
- ❍ Notify the SRO to classify the event per EPIP-EPP-01.
- ❍ When Chemistry confirms high radiation reduce power to the top of the restricted zone.

❑ When directed, lower reactor power using recirculation flow in accordance with N1-SOP-1.1, Emergency Power Reduction.

### N1-SOP-1.1 ACTIONS

- ❍ Transfers House Service to the Reserve Bus per N1-OP-30, Section G
- ❍ Lower recirculation flow using the RECIRC MASTER Controller to the top of the Restricted Zone (≤ 43 Mlb/hr, ~65% power).

## EVENT 03: Fuel Failure/Off-Gas Radiation Monitor Annunciator

| Time | **RO/BOP:** Applicant Actions Or Behavior |
|---|---|

### N1-OP-30 ACTIONS

- ❍ Confirm Main Generator load is stable. (Requires stopping reactor power reduction.)
- ❍ Inserts Sync. Key in Breaker R112.
- ❍ Confirms voltages matched.
- ❍ Inserts Sync. Key in Breaker R112.
- ❍ Close Breaker R112 and immediately open R113.
- ❍ Observes/Diagnoses tripping of Breakers R112 and R113.
- ❍ Notifies Crew of breakers tripping and the loss of PB11.

## EVENT 04: Loss of PB 11

***Instructor Activities:***

- **INITIATION POINT:** When the operator attempts to manually transfer house loads to the reserve transformer insert following fault when breaker R113 is opened.

  Malfunctions:

  a. ED04, AC Power Board Electrical Fault (PB11), clears in 3 secs **(F6)**

  **OTHER WISE THE MALFUNCTION BELOW WILL OCCUR AUTOMATICALLY:**

  b. ED26, Failure of PB 11 to Auto Transfer **(TRUE)** **(QUEUED)**

- Role Play: If sent to inspect PB 11 or Breakers R112 and R113, report there are NO indications of a fault on the PB or the breakers.

***Symptons/Cues Visible To The Crew:***

- Annunciators: A4-1-1, POWER BOARD 11 R113 TRIP and A4-1-2, POWER BOARD 11 R112 TRIP

***Critical Task(s) and Justification:***

-

**EVENT 04: Loss of PB 11**

| Time | **SRO:** Applicant Actions Or Behavior |
|---|---|

- ❑ Acknowledge report of following alarms and indications:
  - ❑ A4-1-1, POWER BOARD 11 R113 TRIP
  - ❑ A4-1-2, POWER BOARD 11 R112 TRIP
  - ❑ Loss of power to PB 11

- ❑ Direct entry into N1-SOP-30.1, Loss of Power Board 11.
- ❑ Recognize/Diagnose the trip of Reactor Recirc Pumps 11 and 12
- ❑ Enters N1-SOP-1.3 Recirc Pump Trip at Power

**N1-SOP-1.3 ACTIONS**

- ❍ Verify at least 3 Recirc Pumps are running.
- ❍ Determines entry into the restricted area of the Power to Flow map.
- ❍ Determines APRMs are inoperative.
- ❍ Directs closing Recric Pump 11 and 12 Discharge Valves.
- ❍ Directs a reactor scram

**TECH SPEC DETERMINATION**

- ❍ Insufficient time to make a determination at this time

- ❑ Brief crew on event impact.

**EVENT 04: Loss of PB 11**

| Time | **RO/BOP:** Applicant Actions Or Behavior |
|---|---|

- ❑ Recognize/Report the following alarms and indications:
  - ❑ A4-1-1, POWER BOARD 11 R113 TRIP
  - ❑ A4-1-2, POWER BOARD 11 R112 TRIP
  - ❑ Loss of power to PB 11

- ❑ Per direction and ARP-A4 enter N1-SOP-30.1, Loss of Power Board 11.

## N1-SOP-30.1 ACTIONS

Verify the following:

- ❍ At least three Reactor Recirc Pumps running.
- ❍ Service Water Pump 12 running
- ❍ IAC 12 and/or 13 running
- ❍ Turbine Building Cooling Water Pump 12 running
- ❍ RBCLC System running
- ❍ Feedwater Pump 12 running
- ❍ Steam Packing Exhauster 12 running

- ❍ Notify SRO APRMs are inoperative.
- ❍ Close Recirc Pumps 11 and 12 discharge valves.
- ❍ Hold open Recirc Pumps 11 and 12 discharge valves for 2-3 seconds.
- ❍ Restore OG Vacuum Pump

**Continued on the next page**

**EVENT 04: Loss of PB 11**

| Time | **RO/BOP:** Applicant Actions Or Behavior |
|---|---|

**Continued from the previous page**

Re-energize PB 11 by:

- ❍ Inserts Sync Key and rotates clockwise to ON.
- ❍ Closes Breaker R112
- ❍ Confirms normal voltage on PB 11
- ❍ Rotates Sync Key counterclockwise to OFF and removes.

❑ When directed enters N1-SOP-01, Reactor Scram

## N1-SOP-01 ACTIONS

- ❍ Place Mode Switch in Shutdown.
- ❍ Recognize/Diagnose failure of all control rods to insert.
- ❍ Maintain RPV water level 53 to 95 inches
- ❍ Maintain RPV pressure below 1080 psig.
- ❍ Verify Turbine Generator tripped and house buses transferred.
- ❍ Verify at least one Electric Feedwater Pump operating

## EVENT 05: Piping Rupture in EC Loop 11

- **INITIATION POINT:** if desired to provide conditions requiring a reactor scram (if not already done), and as directed by the lead evaluator, insert malfunction:

  EC08A EC STM IV 111 Fail to Close = 80%
  EC08B EC STM IV 112 Fail to Close = 80%
  EC06A, Emergency Condenser Tube Leak 111 **(F5)**
  RD33E, Control Rod Bank 5, Insert Fail position (48) **(QUEUED)**
  RX01, Fuel Cladding Failure - 100% Ramp - 15 minutes **(F4)**

- Role Play: Continue as Chemistry to sample off-gas and reactor coolant for gross activity report every nine (6) minutes increasing the number by ~ two (2) each time, i.e. 64 µCi/gm, 128 µCi/gm, etc.

- Role Play: When requested as RP to check dose rates at the EC piping above elevation 340 respond that you will send a Tech up right away. If called back report that you have not heard back from the Tech and that you will try to contact the Tec.

-

## EVENT 05: Piping Rupture in EC Loop 11

| Time | **SRO:** Applicant Actions Or Behavior |
|---|---|

❑ Acknowledges report of annunciator, K-1-1-4, EC Rad Monitors.

❑ Directs crew to obtain a radiation value from RE-RN04B-4.

❑ Directs the isolation of 12 EC.

### SOP-1.1, Emergency Power Reduction

○ Direct a reduction in recirc flow to a new target reactor power level. This determination is based on the reports from the field.

- Declares a Site Area Emergency (Loss of Primary Containment Integrity, with a leakage path). EAL 3.4.1

Request Shift Chem Tech assess EC effluent dose IAW Tech Specs and ODCM.

❑ Directs a reactor scram

❑ Brief crew on impact of event.

## EVENT 05: Piping Rupture in EC Loop 11

| Time | **RO/BOP:** Applicant Actions Or Behavior |
|---|---|

- ❑ Reports/responds to annunciator K-1-1-4, EC Rad Monitors.
- ❑ Confirms alarm on computer printout.
- ❑ Confirms radiation levels on J Panel.
- ❑ Notifies crew of radiation levels on RE-RN04B-4
- ❑ Places control switch for 39-08R in CLOSE.
- ❑ Diagnoses failure of 39-08R to fully close.
- ❑ Places control switch for 39-10R in CLOSE.
- ❑ Diagnoses failure of 39-10R to fully close
- ❑ Report failure of steam IVs.
- ❑ Notifies RP to check dose rates at the EC piping above elevation 340.
- ❑ When directed enters N1-SOP-01, Reactor Scram

### N1-SOP-01 ACTIONS

- ❍ Place Mode Switch in Shutdown.
- ❍ Recognize/Diagnose failure of all control rods to insert.
- ❍ Maintain RPV water level 53 to 95 inches
- ❍ Maintain RPV pressure below 1080 psig.
- ❍ Verify Turbine Generator tripped and house buses transferred.
- ❍ Verify at least one Electric Feedwater Pump operating

**ATWS – Failure of one bank of rods to insert.**

- **ADJUST POINT:** this malfunction was already cued, no simulator actions are required.

  RD33E, Control Rod Bank 5, Insert Fail position (48) **(QUEUED)**

***Critical Task(s) and Justification:***

02 ***Given an un-isolatable primary system leak with indications of fuel failure the crew will enter EOP-8 and emergency depressurize the reactor.***
BASIS: Emergency depressurization is required to stop the radioactive discharge from the reactor through the tube leak in the Emergency Condenser. Emergency depressurization is the only method available to remove the driving force (reactor pressure) behind the discharge.

**ATWS – Failure of one bank of rods to insert.**

| Time | **SRO:** Applicant Actions Or Behavior |
|---|---|

- ❑ Acknowledge report control rods failed to insert (ATWS).
- ❑ Enter EOP-2, RPV Control (**see below**) then exit and go to EOP-3, Failure to Scram (**see below**).

## EOP-2, RPV CONTROL

- ❍ Answer "all rods in to at least 04" NO.
- ❍ Answer "will the reactor stay shutdown without boron" NO.
- ❍ Exit EOP-2 and Enter EOP-3 (**see below**)

## EOP-3, FAILURE TO SCRAM

- ❍ Direct Bypass ADS.
- ❍ Direct prevent Core Spray injection per EOP-1, Attachment 4.
- ❍ Evaluate EAL matrix for reportability (Currently at a Site Area per 3.4.1).

### EOP-3 LEVEL CONTROL ACTIONS

- ❍ Direct verify containment isolations per SOP-40.2.
- ❍ Direct MSIV jumpers installed per EOP-1, Attachment 2.

  Evaluate the state of the lowering condenser vacuum. May determine not to install the jumpers or install them to keep the MSIVs open as long as possible before closing on low vacuum.

- ❍ With reactor power <6% there is no need to lower RPV water level.

### EOP-3 POWER CONTROL ACTIONS

- ❍ Directs Reactor Mode Switch in SHUTDOWN.
- ❍ Directs initiation of ARI.

Continued on the next page

**ATWS – Failure of one bank of rods to insert.**

| Time | **SRO:** Applicant Actions Or Behavior |
|---|---|

Continued from the previous page

- ○ Directs execution of EOP-3.1.
- ○ Before torus temperature reaches 110°F, direct Liquid Poison (LP) injection.
  - ○ Record LP tank level: 1400 Gallons.
  - ○ Direct verification RWCU isolates.

## EOP-3 PRESSURE CONTROL ACTIONS

- ○ Direct pressure band below 1080 psig using BPVs or alternate pressure control systems.

### EXIT FROM EOP-3

- ○ If all rods in then:
  - ○ Direct stopping LP injection.
  - ○ Exit EOP-3 and Enter EOP-2 (see below).

### EOP-2, RPV CONTROL

- ○ Direct maintaining RPV water level to +53" to +95" using Cond/FW and CRD.

❑ Brief crew on event.

**EVENT 06: ATWS – Failure of one bank of rods to insert.**

| Time | **RO/BOP:** Applicant Actions Or Behavior |
|---|---|

- ❑ Recognize/ report all control rods not inserted: ATWS.
- ❑ When directed bypass ADS and report ADS bypassed.
- ❑ Inform SRO that reactor power <6%.

### ADS INHIBIT

- ○ Place ADS CH 11 keylock to BYPASS.
- ○ Place ADS CH 121 keylock to BYPASS.

## EOP-3 LEVEL CONTROL ACTIONS

- ❑ When directed prevent Core Spray injection per EOP-1, Attachment 4.

### EOP-1 Attachment 4, Prevent Core Spray Injection

- ○ Obtain tools and safety equipment form EOP toolbox at SM desk.
- ○ Bypass Core Spray IV interlocks by installing **jumpers** at EOP ISOLATION BYPASS JUMPER SUBPANEL (inside Panel N, between 1N1A and 1N1B):
  - ○ Jumper 17: 40-01, INSIDE CS DISCHARGE IV121 BYPASS
  - ○ Jumper 18: 40-11, INSIDE CS DISCHARGE IV111 BYPASS
  - ○ Jumper 19: 40-06, CORE SPRAY TEST VALVE11 BYPASS
  - ○ Jumper 24: 40-09, INSIDE CS DISCHARGE IV122 BYPASS
  - ○ Jumper 25: 40-10, INSIDE CS DISCHARGE IV112 BYPASS
  - ○ Jumper 26: 40-05, CORE SPRAY TEST VALVE12 BYPASS

- ❑ Verify containment isolations per SOP-40.2.
- ❑ If directed install MSIV jumpers per EOP-1, Attachment 2.

**EVENT 06: ATWS – Failure of one bank of rods to insert.**

| Time | **RO/BOP:** Applicant Actions Or Behavior |
|---|---|

EOP-1 Attachment 2, MSIV Lo-Lo Isolation Bypass

- ○ Obtain tools and safety equipment form EOP toolbox at SM desk.
- ○ Bypass Core Spray IV interlocks by installing **jumpers** at EOP ISOLATION BYPASS JUMPER SUBPANEL (inside Panel N, between 1N1A and 1N1B):
  - ○ Jumper 1: MSIV LO/LO ISOL. BYPASS RELAY 11K19A
  - ○ Jumper 2: MSIV LO/LO ISOL. BYPASS RELAY 11K20A
  - ○ Jumper 8: MSIV LO/LO ISOL. BYPASS RELAY 12K19A
  - ○ Jumper 9: MSIV LO/LO ISOL. BYPASS RELAY 12K20A

- ❑ Monitor and report if 600 gallons boron injected (800 gallons in LP tank).
- ❑ Monitor and report if all rods inserted to 04.

## EOP-3 POWER CONTROL ACTIONS

- ❑ When directed initiate ARI.

- ○ Depress MANUAL ARI pushbutton

- ❑ When directed perform EOP-3.1, Section 3 (driving rods) and 4 (manual scrams).

| DRIVE RODS USING RMCS | REPEATED MANUAL SCRAMS |
|---|---|
| ○ Verify a CRD Pump running.<br>○ Reactor Mode Switch to REFUEL. | |

*Both SECTION 3 and SECTION 4 require the following actions*

DEFEAT ARI

- ○ Place ARI OVERRIDE switch in OVERRIDE.

| Time | **RO/BOP:** Applicant Actions Or Behavior |
|---|---|

## INSERT RPS SCRAM LOGIC RELAY BYPASS JUMPERS

- ❍ Obtain tools and safety equipment form EOP toolbox at SM desk.
- ❍ Defeat RPS logic relays by installing **jumpers** at EOP ISOLATION BYPASS JUMPER SUBPANEL (inside Panel N, between 1N1A and 1N1B):
  - ❍ Jumper 5: BYPASS RELAY 11K7 TO RELAY 11K51B
  - ❍ Jumper 6: BYPASS RELAY 11K8 TO RELAY 11K52B
  - ❍ Jumper 12: BYPASS RELAY 12K7 TO RELAY 11K51B
  - ❍ Jumper 13: BYPASS RELAY 12K8 TO RELAY 12K52B

## RESET SCRAM

- ❍ Depress Ch 11 and Ch 12 RESET buttons.

| DRIVE RODS (cont.) | MANUAL SCRAMS (cont.) |
|---|---|
| ❍ Bypass the RWM.<br><br>❍ Insert rods to 00 using EMER ROD IN starting with high power regions of core (use LPRM indications). | ❍ Direct AO to verify open 44-167 (CRD-12), Charging Water Header Blocking valve(RB El 237 west hall).<br><br>❍ WHEN...SDV drained (following clear):<br>- *F1-1-8, RPS CH 11 SCRAM DUMP VOL WTR LVL HIGH*<br>- *F3-1-4, CONT ROD DRIVE SCRAM DUMP VOLUME WTR LVL HIGH*<br>- *F4-1-1, RPS CH 12 SCRAM DUMP VOL WTR LVL HIGH*<br><br>AND...Either Reactor Pressure or CRD Charging Water Pressure >450 psig.<br><br>THEN...manual scram by depressing the Ch 11 and Ch 12 scram buttons.<br><br>IF...control rods move inward,<br>THEN...reset scram and repeat steps. |

❑ When directed to inject liquid poison (**Go to event 06, LP Pump Trip**).

## LIQUID POISON INJECTION (OP-12 H.1.0)

**EVENT 06: ATWS – Failure of one bank of rods to insert.**

| Time | **RO/BOP:** Applicant Actions Or Behavior |
|---|---|

- ○ Place keylock switch to either SYS 11 **or** SYS 12.
- ○ Confirm RED LIGHT ON and GREEN LIGHT OFF for pump started.
- ○ LIQUID POISON EXPL VALVE 11 CONTINUITY light OFF.
- ○ LIQUID POISON EXPL VALVE 12 CONTINUITY light OFF.
- ○ Verify LIQUID POISON HDR PR value is greater than reactor pressure.
- ○ Report LP tank level: ~1400 Gallons.
- ○ Verify CU RETURN ISOLATION VALVE 1 (INSIDE) 33-01 closed.
- ○ Verify CU SUPPLY ISOLATION VALVE 11 (INSIDE) 33-02 closed.
- ○ Verify CU SUPPLY ISOLATION VALVE 12 (OUTSIDE) 33-04 closed.

- ❑ Monitor and report when all rods inserted to 04.
- ❑ When directed to stop liquid poison injection.

STOP LIQUID POISON INJECTION (OP-12 G.0)

- ○ Place keylock switch to OFF.
- ○ Confirm GREEN LIGHT ON and RED LIGHT OFF for pump started.

## EVENT 07: Gross Fuel Failure goes to General Emergency

- **INITIATION POINT:** This condition results from the continued degradation of the fuel from the previously inserted malfunction. When Chemistry notifies the Control Room that reactor coolant activity is approaching >300 µCi/gm $I^{131}$ equivalent the SRO must anticipate the offsite release rate reaching the Emergency Plan General Emergency level and in accordance with N1-EOP-6 RPV direct a blowdown.
-

  RX01, Fuel Cladding Failure - 100% Ramp - 15 minutes **(F4)**

- Role Play: Continue as Chemistry to sample off-gas and reactor coolant for gross activity report every nine (6) minutes increasing the number by ~ two (2) each time, i.e. 64 µCi/gm, 128 µCi/gm, etc.
- As Chemistry, call and state that external exposure reate is 750 mrem/Hr.

***Critical Task(s) and Justification:***

01 ***Given an EC steam line isolation failure with a pathway outside the normal process system flowpaths and coolant activity >300 µCi/gm $I^{131}$ equivalent the crew will declare a General Emergency per section 3.4.2 of EPIP-EPP-01 Emergency Action Level Matrix.***
BASIS: Recognition and declaration of this event are required to initiate protective actions for the general public.

03 ***Given a condition where all control rods are NOT inserted to a least position 04, the crew will terminate and prevent all RPV injection except boron and CRD injection sources.***
BASIS: Improper performance or omission of these actions contributes to degradation to a barrier to fission product release by further challenging the fuel cladding integrity.

## EVENT 07: Gross Fuel Failure goes to General Emergency

| Time | **SRO:** Applicant Actions Or Behavior |
|---|---|

- ❑ Evaluate EAL matrix and determine the rising reactor coolant activity with the un-isolated EC leak will require declaring a General Emergency per section 3.4.2 of EPIP-EPP-01 Emergency Action Level Matrix.
- ❑ Per N1-EOP-6 Direct entering N1-EOP-8 and blowing down.

### EOP-8, RPV BLOWDOWN

- ❍ **TAKES "ALL CONTROL RODS ARE NOT INSERTED (NO)" path**
- ❍ **TAKES "REACTOR WILL NOT REMAIN SHUTDOWN WITHOUT BORON (NO/UNKNOWN)" path**
  - ❍ Directs terminating and preventing all RPV injection except boron and CRD..
  - ❍ Verifies EC-11 initiated.
  - ❍ Verifies Torus water level is > 8.0 ft.
  - ❍ Directs opening of three (3) ERVs.

### EMERGENCY EVENT CLASSIFICATION

- ❍ Evaluate EAL matrix for reportability (Based on latest chemistry report) a General Emergency per section 3.4.2.

- ❑ Brief crew on event.

**EVENT 07: Gross Fuel Failure goes to General Emergency**

| Time | **RO/BOP:** Applicant Actions Or Behavior |
|---|---|

- ❑ Recognize/ report reactor coolant leak.

RPV BLOWDOWN and LOW PRESSURE INJECTION

- ○ Confirm EC 11 in service.
- ○ Place control switches for 3 ERVs to open.
- ○ Report 3 ERVs open.
- ○ Manually open Core Spray injection valves 40-10,40-09.
- ○ Control Core Spray injection and restore RPV level +53" to +95".

V. POST SCENARIO CRITIQUE (Not required for Annual Operating Exam or NRC Initial Exam)

A. After the second caucus, convene the crew in the classroom for a facilitative critique:
   1. What the crew saw and how they responded to each event?
   2. Why the crew responded the way they did or their goal?
   3. What went well during the scenario (STRENGTHS)?
   4. What the crew could have done better (AREAS FOR IMPROVEMENT)?

B. Ensure the expectations in each performance objective are discussed.

C. PERFORMANCE EXPECTATIONS (Attachment 7), that were not met, should be addressed.

D. Review the Critical Tasks if applicable.

E. At the conclusion, review the strengths and areas for improvement for improvement. Review video tape if appropriate.

F. Significant comments from the post scenario discussion should be recorded to allow later retrieval and follow-up.

VI. REFERENCE EVENTS AND COMMITMENTS

A. Reference Events

None

B. Commitments

None

VII. LESSONS LEARNED

None

EVALUATED SCENARIO CHECKLIST

1. Additional Information about these checks:

   For continuing training, can be found in NUREG 1021, ES 604 and Appendix D.

   For initial training, can be found in NUREG 1021, ES 301 and Appendix D.

2. Qualitative Attributes

| | |
|---|---|
| ✓ | Realism/Credibility |
| ✓ | Event Sequencing |
| ✓ | Simulator Modeling |
| ✓ | Evaluating Crew Competencies |

3. Quantitative Attributes

| | |
|---|---|
| 5 | Total Malfunctions |
| 2 | Malfunctions after EOP Entry |
| 2 | Abnormal Events |
| 1 | Major Transients |
| 3 | EOPs Used |
| 2 | EOP Contingency Procedures Used |
| 50 | Simulator Run Time |
| 30 | EOP Run Time |
| 3 | Crew Critical Tasks (if applicable per Attachment 6.) |

4. Developmental Checks:

   Does every event have either a Critical Task(s) or Performance Objective?

   Is Criteria given for sequencing to subsequent events?

   Is termination criteria clear and unambiguous?

   Does termination criteria allow verification that all CT, PO standards are met?