| Facility: **Nine Mile Point 2** | Scenario No.: **NRC-01** | Op-Test No.: **NRC-01** |
|---|---|---|

Examiners: _____  Operators: _____

**Initial Conditions:** Simulator IC-20
   1.  96% Power Rod Line >100% (103%)

**Turnover:**
   1.  Raise Suppression Pool water level to 200 feet using CSH Pump per N2-OP-33

| Event No. | Malf. No. | Event Type* | Event Description |
|---|---|---|---|
| 1 | | N (BOP) N (SRO) | Suppression Pool Fill Utilizing CSH Pump. The crew will lineup the High Pressure Core Spray System and add makeup water to the Suppression Pool from the Condensate Storage Tanks per normal operating procedure **N2-OP-33 High Pressure Core Spray H.3.0** |
| 2 | RR08B | I (ATC) I, TS (SRO) | Recirc Flow Unit B Failed Downscale. Results in failure diagnosis, instrument bypass and SRO Tech Spec implementation. **N2-ARP-01** **N2-OP-92** **Tech Spec 3.1.3** |
| 3 | FW03A RR31 RR30 | C (BOP) R (SRO) R (ATC) | Feedwater Pump A spurious trip with Reactor Recirculation FCV B runback failure due to trip of hydraulics (TS 3.4.1). FCV lockup results in failure to automatically reduce power to within single Feedwater pump capacity. Rapid Power Reduction with Cram Rods is required to prevent automatic scram on Low RPV Water Level **N2-SOP-6 Feedwater Failures, SOP-29 Sudden Reduction In Core Flow SOP-101D Rapid Power Reduction** |
| 4 | FW35 | I (ATC) | Steam flow signal to Feedwater Level Control operates erratically resulting in water level transient. Require taking manual contol of Feedwater to stabilize level. **N2-SOP-6 Feedwater Failures** |
| 5 | Override Switch P628-B22C-S4A-A | C (BOP) C,TS (SRO) | ADS/SRV 121 fails opens due to ADS Division I control switch failure. Valve closes when fuses pulled. (TS 3.5.1.E, F, and H / TS 3.0.3) **N2-SOP-34 Stuck Open SRV** |
| 6 | TU02 9% and MC01 15%, Ramp Time 3 minutes | M (ALL) | The main turbine vibration degrades and a small amount of Main Condenser air in-leakage results in a slight drop in vacuum. Because of the rising turbine vibration, the crew will insert a manual reactor scram and trip the main turbine. **N2-ARP-01** **N2-SOP-9** **N2-EOP-RPV** |

| 7 | MC01@ 100% Ramp Time % minutes | M (Major event continued but not counted) | Loss of main condenser vacuum. The degrading vibration causes a main condenser vacuum leak that degrades rapidly once the reactor is scrammed and results in automatic closure of MSIVs. The loss of the main condenser as a heat sink requires manual operation of SRVs for pressure control and contributes to challenging the Heat Capacity Temperature Limit. Rising Suppression Pool temperature requires entry into N2-EOP-PC. **N2-EOP-PC** |
|---|---|---|---|
| 8 | RD17 RP12A RP12B | C (ATC) C (BOP) C (SRO) | Incomplete Scram. When the crew scrams the reactor control rods fail to insert due to hydraulic lock. Reactor power will lower to about 18% to 23% by APRM indication. The crew will be able to manually insert control rods using RMCS. Additional manual scrams will be successful in inserting control rods. **N2-EOP-C5** **N2-EOP-6 Attachment 14** |
| 9 | CU08 | C (BOP) | The crew will be required to respond to a failure of RRCS to initiate and WCS to isolate when SLC is manually initiated. |
| 10 | FW01A FW01B FW01C | C (ALL) | Trip of all Condensate Pumps results in loss of all Feedwater capability after terminate and prevent injection is performed. The crew will be required to perform RPV Blowdown when RPV water level cannot be maintained above MSCWL. The use of Alternate Injection systems such as low pressure ECCS systems is then required to maintain adequate core cooling. **EOP-C2** |
| 11 | | | SRO ADMIN JPM 5-1  SRO classifies the event as Site Area Emergency 2.2.2 |

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

| Facility: **Nine Mile Point 2** | Scenario No.: **NRC-01** | Op-Test No.: **NRC-01** |
|---|---|---|

| TARGET QUANTITATIVE ATTRIBUTES (PER SCENARIO; SEE SECTION D.5.d) | ACTUAL ATTRIBUTES | |
|---|---|---|
| 1.  Total malfunctions (5-8) **Events 2,3,4,5,8,9** | 6 | |
| 2.  Malfunctions after EOP entry (1-2) **Events 9,10** | 2 | |
| 3.  Abnormal events (2-4) **Event 4 SOP-6, Event 5 SOP-34** | 2 | |
| 4.  Major transients (1-2) **Event 6 (and 7 only counted once)** | 1 | |
| 5.  EOPs entered/requiring substantive actions (1-2) **Event 6 and 7 EOP-RPV, EOP-PC** | 2 | |
| 6.  EOP contingencies requiring substantive actions (0-2) **Event 8 EOP-C5, Event 10 EOP-C2** | 2 | |
| 7.  Critical tasks (2-3) | 4 | |
| **CRITICAL TASK DESCRIPTIONS:** **CT-1.0 Close ADS valve prior to SPT reaching 110°F** **CT-2.0 Avoid exceeding HCTL** **CT-3.0 Restore and maintain RPV water level above MSCRWL (-39 inches)** **CT-4.0 Fully insert control rods** | | |

# NMP SIMULATOR SCENARIO

**NRC Scenario 1**      **REV. 0**      **No. of Pages:__48_**

## RECIRC FLOW UNIT FAILURE/FEEDPUMP TRIP WITH PARTIAL RUNBACK/TURBINE HIGH VIBRATION/FAILURE TO SCRAM

PREPARER      _____G. Bobka_____      DATE 2/10/05_____

VALIDATED      _____R. Lange, B. Moore, M. Smith____      DATE 2/16/05_____

GEN SUPERVISOR
OPS TRAINING      _____RGW_____      DATE _4/21/05__

OPERATIONS
MANAGER      _____NA Exam Security_____      DATE _____

CONFIGURATION
CONTROL      _____NA Exam Security_____      DATE _____

## SCENARIO SUMMARY

Length: 2 hours

Initial Power Level: 96%, above the 100% Rod Line

The scenario begins at 96% reactor power. The crew will add water to the Suppression Pool using the High Pressure Core Spray System (CSH) per normal operating procedure N2-OP-33, High Pressure Core Spray. While water is being added to the Suppression Pool, Recirc Flow Unit input to APRM/RBM fails downscale resulting in APRM high power scram signals inputted into the Power Range Monitoring System logic modules. The crew will bypass the affected instrument per normal operating procedure and annunciator response procedures.

The crew experiences a Reactor Feedwater pump trip and partial automatic Recirc Flow Control Valve (FCV) Runback. The partial runback occurs due to a trip RCS FCV hydraulic power units. The result is slowly lowering reactor water level due to failure of reactor power to be automatically reduced to within the capacity of the single remaining operating Feedwater pump. Reactor water level will slowly approach the automatic scram low water level of 159 inches. The crew will manually insert CRAM rods to reduce power approximately 10% to within the capacity of the single remaining operating Feedwater pump (65%). This action will return reactor water level to the normal band of 178 to 187 inches.

After the plant is stable, the total Steam flow signal to Feedwater Level Control operates erratically resulting in water level transient. The crew will take manual contol of Feedwater to stabilize level. Manual level control will be required for the remainder of the scenario.

An inadvertent opening of an ADS/SRV valve occurs. The crew will take actions required by procedures to close the valve before a manual scram is required at Suppression Pool water temperature of 110°F.

When the ADS/SRV is closed, Main Turbine vibration begins to rise. The crew will manually scram the reactor and trip the Main Turbine when procedure limits of 12 mils are exceeded, since there are no automatic turbine trips associated with turbine vibration. When the reactor is scrammed all control rods will fail to fully insert resulting in reactor power level of approximately 18% to 23% by APRM indication. When MSIVs close on low vacuum, heat will be added to the containment during SRVs operation for pressure control. The transient is complicated by loss of the remaining operating Feedwater pump and the inability to maintain water level above MSCRWL (-39 inches). The crew will perform an RPV Blowdown to lower RPV pressure which allows the use of RHS via Shutdown Cooling line. This is the last remaining preferred injection system. If, in the SRO's judgment, additional injection sources are required to restore and maintain RPV water level above MSCRWL, Alternate Injection systems can now be lined up to restore and maintain level above -39 inches. The crew will execute Alternate Control Rod Insertion procedures to fully insert the stuck control rods, such that the reactor will remain shutdown.

Major Procedures Exercised:    EOP-RPV, PC, C5, C2. SOP-6, 29,101D, 21 and 9.

EOP-6 Attachment 14

EAL Classification:    SAE 2.2.2 Any RPS scram setpoint has been exceeded AND automatic and manual scrams fail to result in a control rod pattern which assures reactor shutdown conditions without boron AND EITHER Power >4% OR Suppression Pool temperature >110°F

Termination Criteria:    RPV Blowdown is complete and RPV level is restored and maintained in normal level band 160 to 200 inches and all control rods are fully inserted.

I. SIMULATOR SET UP

   A. IC Number: IC-20 or equivalent. Reduce power to 96% with RCS flow.

   B. Presets/Function Key Assignments

      1. Malfunctions:

| | | | |
|---|---|---|---|
| a. | RD17 | LOAD COMPOSITE 003 RD17 at 23% power | QUEUED |
| b. | RP12A | RRCS Failure (Div I) | QUEUED |
| c. | RP12B | RRCS Failure (Div II) | QUEUED |
| d. | CU08 | Reactor Water Cleanup Isolation Fail, TRUE | QUEUED |
| e. | RR08B | RR Flow Unit Failure Downscale B | F3 |
| f. | FW03A | Feedwater Pump Trip P1A, TRUE | F4 |
| g. | RR31 | HPU B PMP Number 2 Failure, TRUE<br>TUA 2 seconds | F4 |
| h. | RR30 | HPU B PMP Number 1 Failure, TRUE<br>TUA 2 seconds; TRA 10 seconds | F4 |
| i. | FW35 | Steam Flow Input Fails to FW Control, TRUE<br>RELATIVES USED TO CAUSE ERRATIC OPERATION | F5 |
| j. | TU02 | Main Turbine Vibration High<br>Value 9; Ramp Time 3:00 minutes | F6 |
| k. | MC01 | Main Condenser Air Inleakage<br>Value 15; Ramp Time 3:00 minutes | F6 |
| l. | MC01 | Main Condenser Air Inleakage<br>Value 100; Ramp Time 5:00 minutes | ET02 |
| m. | FW01A | Condensate Pump Trip P1A, TRUE<br>**TUA 8:00 minutes for all 3 FW01s** | ET02 |
| n. | FW01B | Condensate Pump Trip P1B, TRUE | ET02 |
| o. | FW01C | Condensate Pump Trip P1C, TRUE | ET02 |
| p. | RP14A | RRCS ARI Failure/Defeated Div I, TRUE<br>TUA 1:30 minutes | F8 |
| q. | RP14B | RRCS ARI Failure/Defeated Div II, TRUE<br>TUA 1:30 minutes | F8 |
| r. | RP02 | RPS Failure to Scram Automatic, TRUE<br>TUA 1:30 minutes | F9 |

    s. RC02    RCIC Failure Isolation of RCIC, TRUE    ET03

                TUA 1:00 minute

    t. RH08    Group 5 Isolation Failure SDC MOVs, TRUE    F10

                TUA 2:00 minutes

2. Remotes:

    a. RH55    LOAD COMPOSITE 001 RHS SDC A and B    QUEUED

                PIPES FULL

    b. MS06A    Defeat Level 1 MSIV Isolation, DEFEATED    F7

                TUA 1:30 minutes

    c. MS06B    Defeat Level 1 MSIV Isolation, DEFEATED    F7

                TUA 1:30 minutes

    d. MS06C    Defeat Level 1 MSIV Isolation, DEFEATED    F7

                TUA 1:30 minutes

    e. MS06D    Defeat Level 1 MSIV Isolation, DEFEATED    F7

                TUA 1:30 minutes

3. Overrides:

    a. None

4. Annunciators:

    a. None

C. Equipment Out of Service

1. None

D. Support Documentation

1. Working copy of N2-OP-33, H.3.0 for use by crew OR plastic sleeve procedure sections to facilitate placekeeping. An already place-kept copy of F.1.0 is to be made and provided with turnover sheet, since the scenario assumes this section has already been completed.

E. Miscellaneous

1. Red rod line sign posted

2. Reduce power to 96% with RCS flow.

3. At APRM #2 Voter Module ensure Memory reset. At APRM Module, select Trip Status and Reset Memory, to ensure no pre-existing trip lights are in on both the voter module and the APRM.

4. EVENT TRIGGERS/COMPOSITES

   a. ET02 Mode Switch in Shutdown (Event Trigger 8) Initiates increase in MC01 magnitude to 100% AND all three Condensate Pump trip FW01 malfunctions with Ramp Time of 8:00 minutes after Mode Switch is placed in SHUTDOWN for reactor scram.

   b. ET03 RCIC Turbine Speed >72% in auto (Event Trigger 49) Initiates malfunction RC02 RCIC Isolation following RCIC start after 1:30 minutes.

   c. Malfunction Composite 003 RD17 @ 23%. Establishes RD17A at 04, RD17B at 06. The remaining RD17 are at 46 and 48. This results in post ATWS APRM indication of 23% and minimal mismatch with actual thermal power, which can be caused by APRM Gain Adjustments.

   d. Remote Composite 001 RHS SDC A and B Pipes Full. Sets RH55A and RH55B to 100% from default value of 0%. This minimizes observed drop in RPV water level when injecting with SDC lines through RHS*MOV40A and B. Level drop occurs partially because of modeling within RHS piping that assumes SDC pipes are not full.

**SHIFT TURNOVER INFORMATION**

OFF GOING SHIFT:          ☐ N                                          ☐ D   DATE: _____

**PART I:      To be <u>performed</u> by the oncoming Operator <u>before</u> assuming the shift.**

- Control Panel Walkdown (all panels)  (SM, CRS, STA, CSO, CRE)

**PART II:      To be <u>reviewed</u> by the oncoming Operator <u>before</u> assuming the shift.**

- Shift Supervisor Log (SM, CRS, STA)
- CSO Log (CSO)
- Lit Control Room Annunciators
  (SM, CRS, STA, CSO, CRE)

- Shift Turnover Checklist (ALL)
- LCO Status (SM, CRS, STA)
- Computer Alarm Summary (CSO)

Evolutions/General    Information/Equipment Status:

- Reactor Power = 96%
- None

- Loadline = >100%

_____

_____

_____

_____

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

- Raise Suppression Pool Water level to 200 feet using CSH pump per N2-OP-33. Establish CSH pump flow rate of 5500 to 6000 gpm.  N2-OP-33 F.1.0 Standby Condition Status Checks are complete.
- Holding power at 96% while Reactor Engineering verifies process computer Thermal power calculation

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

- Review new Clearances (SM)
- Shift Crew Composition (SM/CRS)

- Test Control Annunciators (CRE)

| TITLE | NAME | TITLE | NAME |
|-------|------|-------|------|
| SRO |  |  |  |
| ATC RO |  |  |  |
| BOP RO |  |  |  |
|  |  |  |  |

| Scenario ID# |
| --- |

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

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

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

III.    PERFORMANCE OBJECTIVES

A. Critical Tasks:

CT-1.0    Given the plant at power and inadvertent opening of an ADS/SRV valve, the crew will close the SRV to preclude a manual scram if Suppression Pool temperature reaches 110°F, per N2-SOP-34

CT-2.0    Given a failure of the reactor to scram and RPV Blowdown required, the crew will avoid exceeding HCTL by a combination of terminating and preventing injection, injecting boron and operating Suppression Pool Cooling per N2-EOP-C5.

CT-3.0    Given a failure of the reactor to scram and the RPV has been blown down per EOP-C2, the crew will resume injection when RPV pressure lowers below the MSCP, to restore and maintain RPV water level between the MSCWL and 202.3 inches.

CT-4.0    Given a failure of the reactor to scram the crew will fully insert all control rods using alternate methods per N2-EOP-6 Attachment 14

B. Performance Objectives:

PO-1.0    Given the plant with direction to raise Suppression Pool water level, the crew will lineup High pressure Core Spray and raise level to 200 feet per N2-OP-33.

PO-2.0    Given downscale failure of a Recirc Flow Unit, the crew will bypass APRM 2 per applicable Annunciator Response Procedures and N2-OP-92.

PO-3.0    Given the reactor plant operating at full power when a Feedwater pump trip and failure of RCS to completely runback, the crew will perform a Rapid Power Reduction, insert cram rods to lower power

and stabilize the plant before a low level scram occurs per N2-SOP-6, SOP-29 and SOP-101D

PO-4.0   Given the plant operating at power and misoperation of FWLC system due to failed steam flow input signal, the crew will take manual control of FWLC and stabilize level per N2-SOP-6

PO-5.0   Given the plant operating at power with an inadvertent opening of an ADS/SRV the crew will close the valve before Suppression Pool temperature reaches 110°F to preclude a manual scram requirement, per N2-SOP-34.

PO-6.0   Given the plant operating at power with high Main Turbine Vibration, the crew will initiate a manual scram and manual turbine trip when vibration exceed 12 mils per applicable Annunciator Response Procedures and N2-SOP-21.

PO-7.0   Given a failure of the reactor to scram, the crew will establish control rod insertion in accordance with EOP-6, Attachment 14.

PO-8.0   Given a failure of the reactor to scram with power 4% or above and reactor water level 100 inches or above, the crew will terminate and prevent injection with the exception of SLS, CRD and RCIC.

PO-9.0   Given a failure of WCS to isolate when SLS is injected, the crew will manually close WCS containment isolation valves from P602.

PO-10.0  Given a failure of the reactor to scram with loss of Feedwater the crew will perform an RPV Blowdown and inject with alternate ATWS injection systems to restore and maintain RPV water level above MSCRWL per EOPs.

Crew

- Crew conducts a pre-brief, walks down the panels, and tests annunciators.

**EVENT 1**

**Suppression Pool Fill Utilizing CSH Pump**

**PO-1.0**

SRO

☐ Directs Suppression Pool fill per N2-OP-33, H.3.0

☐ Enters Tech Spec 3.5.1 (as directed from N2-OP-33) Condition B and initates Required Actions

B.1 Verify by administrative means RCIC System is OPERABLE when RCIC is required to be OPERABLE. (Completion Time is Immediately)

AND

B.2 Restore HPCS System to OPERABLE status. (Completion Time is 14 days)

BOP RO

☐ Verify Subsection F.1.0, Standby Condition Status Checks is complete. (*Actual performance is NOT required because completion was provided in Shift Turnover information.*)

| INSTRUCTOR ACTIONS/ PLANT RESPONSE | OPERATOR ACTIONS |
|---|---|
|  | ☐ Verify SM has declared CSH System inoperable. |
|  | * * * * * * * * * * * * * * * * * * * * * * * * |
|  | **CAUTIONS** |
|  | DO NOT ALLOW THE CSH PUMP TO OPERATE IN A RUNOUT FLOW CONDITION OF > 7175 GPM OR PUMP DAMAGE MAY OCCUR. |
|  | MINIMIZE AMOUNT OF TIME CSH IS OPERATING ON MINIMUM FLOW OR PUMP DAMAGE MAY OCCUR. |
|  | * ** * * * * * * * * * * * * * * * * * * * * * * |
|  | ☐ Start CSH*P1, HPCS PUMP 1. |
| *After the CSH pump is started, Suppression Pool Level (SPL) will rise from initial level of 199.8 feet. It will take about 3 minutes to raise SPL to 200 feet.* | ☐ Verify open CSH*MOV105, MINIMUM FLOW BYPASS VLV. |
|  | ☐ Monitor CST AND Suppression Pool Levels. |
|  | ☐ Raise rate of transferring water from CST to Suppression Pool (5500 to 6000 gpm) by performing the following: |
|  |     ☐ Throttle open CSH*MOV111, TEST RETURN TO SUPPRESSION POOL. |
|  |     ☐ WHEN CSH System Flow is > 634 gpm, verify closed CSH*MOV105, MINIMUM FLOW BYPASS VLV. |

□ WHEN desired Suppression Pool Level is reached, close CSH*MOV111, TEST RETURN TO SUPPRESSION POOL.

□ WHEN HPCS SYSTEM FLOW is less than 634 GPM, verify open CSH*MOV105, MINIMUM FLOW BYPASS VLV.

□ Stop CSH*P1, HPCS PUMP 1.

□ Verify closed CSH*MOV105, MINIMUM FLOW BYPASS VLV.

□ Notify SM that 2CSH*MOV111 is closed AND operability concern per DER 2-98-0557 no longer exist.

□ Restore CST Level, as required, per N2-OP-4.

**EVENT 2**

**Recirc Flow Unit B Failed Downscale**

**PO-2.0**

**CONSOLE OPERATOR**

When directed by Lead Evaluator, **activate malfunction** by depressing F3 key:

**RR08B, RR Flow Unit Failure Downscale B**

**(F3)**

*2/4 MDL 1-4 have received one of the two*

ATC RO

□ Identifies and reports annunciators to SRO

□ Implements ARP actions (Significant ARP 603202 603217)

| INSTRUCTOR ACTIONS/ PLANT RESPONSE | OPERATOR ACTIONS |
|---|---|

*required trips. An additional trip from any unbypassed APRM will cause a reactor SCRAM.*

*Rod withdrawal block.*

*The following annunciators alarm:*

**603202 APRM TRIP SYSTEM UPSCALE/INOPERABLE**
*603208 APRM TRIP SYSTEM UPSCALE*
**603217 FLOW REFERENCE OFF NORMAL**
*603218 OPRM TRIP ENABLED*
*603442 CONTROL ROD OUT BLOCK*

*At P603 Rod Select Matrix Right Side*
*APRM 2 Amber UPSC ALARM lit*
*APRM 2 Red UPSC TRIP OR INOP lit*
*OPRM 2 White TRIP ENABLED lit*
*FLOW White CAMPAR lit*
*Process Computer points alarm consistent with conditions. RDSBC12, NMPUC08, NMPBC47,NMPBC33, NMPBC22, NMPBC17, NMP2C121, NMP2C108*

*At P608 backpanel, APRM 2 Display includes FLOW 0.0% (pre-failure value is 95.5% flow) 2/4 MDL 2 Module (and 1,3,4 modules) indicate APRM 2 HIGH/INOP TRIP red LED lit*

**These are 603202 actions**

□ Determine by Red UPSC/INOP light on 2CEC*PNL603 which APRM Channel has alarmed. (APRM 2 is the affected instrument)

□ IF a SCRAM has occurred, THEN enter N2-SOP-101C, Reactor Scram. *(No scram occurs)*

□ IF NO SCRAM has occurred, THEN perform the following:

　□ Check the other APRM channels to verify that NO SCRAM should have occurred.

　□ IF a SCRAM should have occurred, THEN enter the Emergency Operating Procedures. *(Scram should not have occurred)*

　□ IF NO SCRAM should have occurred, THEN perform the following:

　　□ IF required, THEN lower Reactor Power per N2-OP-101D or N2-SOP-101D. *(Not required because instrument failure is the cause)*

| INSTRUCTOR ACTIONS/ PLANT RESPONSE | OPERATOR ACTIONS |
|---|---|
| | □ Refer to Technical Specifications for actions. (Inform SRO to perform) |
| *Other FLOW indications on APRM 1,3,4 chassis reads about 95.5%.* | □ Bypass the affected APRM per N2-OP-92. (See later Scenario steps for bypassing the APRM) |
| Role Play: If asked report all other Voter Module indications are consistent with Voter module 2 indications. | □ Reset the memory on the following per N2-OP-92, Section F.8.0: • 2/4 MDL 1 • 2/4 MDL 2 • 2/4 MDL 3 • 2/4 MDL 4 |
| | □ Troubleshoot and correct the cause of the alarm. |
| Note ARP actions for 603202 and 603217 will likely be performed concurrently or 603217 actions may be performed before 603202 actions. | ATC RO/BOP RO **These are 603217 actions** □ Determine which channel is in alarm and whether UPSC or COMPAR amber light(s) are illuminated on 2CEC*PNL603. □ COMPAR (generated by RBM) At 2CEC*PNL608 determine |

|  |  |
|---|---|
|  | which flow channel is high/low by comparison of flow indications. |
|  | ☐ IF desired, THEN bypass the affected APRM per N2-OP-92. |
| *Failed Flow Unit is bypassed by bypassing APRM 2* | **ATC RO/BOP RO** Bypass APRM 2with Bypassing Joystick per N2-OP-92 H.2. |
| *After APRM 2 is bypassed all annunciators and P603 indications return to pre-transient conditions.* | APRM channel bypass can be performed by placing the APRM BYPASS joystick to the APRM channel to be bypassed. This action will also bypass the associated Recirculation Flow circuitry and OPRM. Only 1 APRM channel may be bypassed. |
|  | The actions in this section are performed at 2CEC*PNL603 unless otherwise noted. |
|  | * * * * * * * * * * * * * * * * |
|  | **CAUTION** Bypass joysticks can become electrically misaligned after numerous bending motions due to "Metal Creep". Any bypass function should |

be verified by channel BYPASS lights
to ensure that only the intended
channel is bypassed.

* * * * * * * * * * * * * * * *

□ Verify NO other APRM in bypass
for the instrument to be bypassed.

□ Place the APRM BYPASS joystick
to the bypass position 2.

□ IF APRM 2 was bypassed, THEN
verify the following:

   □ APRM 2 BYPASS light is lit on
   2CEC*PNL603.

   □ BYP is displayed in inverse
   video in the header for APRM 2
   (2 - 4) Chassis at H13-P608.

   □ Blue BYPASSED LED is lit for
   APRM 1 (2 - 4) on EACH 2/4
   MDL at H13-P608.

□ Report APRM 2 bypassed to SRO

**EVENT 2 SRO Actions**

<u>SRO</u>

□ Directs APRM 2 bypassed

□ Notifies Operations and Plant
Management

□ Contacts WEC SRO for assistance
and work planning

□ Enters Tech Spec 3.3.1.1 RPS
Function 2 APRMs. No action is
required since only 1 APRM

channel is inoperable.

☐ Refer to TRM 3.3.2 Control Rod Block Instrumentation Function 4.

    ☐ 2 channels are required for the "function", which is to initiate a rod block. With 1 channel inoperable, 3 channels are still operable. No other action is required.

☐ Conducts post event brief

**EVENT 3**

**Feedwater Pump A trip with partial RCS**

**FCV runback**                 **PO-3.0**

**CONSOLE OPERATOR**

When directed by Lead Evaluator, **activate malfunction** by depressing F4key:

**FW03A Feedwater Pump Trip P1A, TRUE**

**RR31 HPU B PMP Number 2 Failure, TRUE**
    **TUA 2 seconds**

**RR30 HPU B PMP Number 1 Failure, TRUE**
    **TUA 2 seconds; TRA 10 seconds**

SRO

☐ Directs entry into:
    ☐ N2-SOP-6 Feedwater Failures
    ☐ N2-SOP-29 Sudden Reduction In Core Flow
    ☐ N2-SOP101D Rapid Power Reduction
    ☐ Directs Cram Rod insertion (SOP-29 and SOP-101D action)

| INSTRUCTOR ACTIONS/ PLANT RESPONSE | OPERATOR ACTIONS |
|---|---|

*The following annunciators alarm:*
*851509 REACTOR FEED PUMP1A/1B/1C AUTO TRIP*
*851519 REAC FEED PMP 1A/1B/1C MOTOR ELEC FAULT*
*602210 FCV A PART CLOSURE RFP TRIP*
*602222 FCV B PART CLOSURE RFP TRIP*
*602102 RECIRC FCV B HYDRAULICS INOPERABLE*
*602104 RECIRC FCV B BACK UP HYDR INOPERABLE*
*602106 RECIRC FCV B MOTION INHIBIT*
*603139 REACTOR WATER LEVEL HIGH/LOW*
*At P603*
*RPV water level slowly lowers and reaches its' lowest values of about 170 inches after about 4 minutes (Low Level scram setpoint is 159.3 inches). The operating Feedwater pump flow is pegged high. Power reduction is necessary to restore Feedwater pump flow to acceptable value.*

*APRM power lowers to about 75% and Total Core Flow is reduced to about 74 Mlbm/hr. A successful runback would result in power level of about 65%, which is within the capacity of one Feedwater pump.*

*FWS-LV10B goes to 100% open*

□ When conditions stabilize, enters Tech Spec 3.4.1 Condition B Required Action to "Declare the recirculation loop with lower flow to be "not in operation." With Completion time of 2 hours. With both recirculation loops operating but the flows not matched, the flows must be matched within 2 hours. If matched flows are not restored, the recirculation loop with lower flow must be declared "not in operation," as required by Required Action B.1. This Required Action does not require tripping the recirculation pump in the lowest flow loop when the mismatch between total jet pump flows of the two loops is greater than the required limits. Now the one loop part of the LCO statement applies. Those action (single loop) are required to be completed within 4 hours.

| INSTRUCTOR ACTIONS/ PLANT RESPONSE | OPERATOR ACTIONS |
|---|---|

*At P851*

> *Feedwater Pump B amps rise to about 530 (max) and flow rises to top scale 24,000 gpm*

*At P602*

> *RCS FCV A goes to minimum (correct response)*
> *RCS FCV B goes to about 70% (incorrect response due to HPU trips)*
> *Loop Flow A about 20 Mlbm/hr*
> *Loop Flow B about 55 Mlbm/hr (Flow Mismatch Tech Spec entry is required)*

*When control rods are inserted, reactor power will lower. Inserting the first 4 cram rods results in lowering power from 75% to about 63%. As power is lowered to single Feedwater pump capacity, RPV water level will rise and return to within the normal level band of 178 inches to 187 inches and Feedwater Pump B . FWS-LV10B throttles closed to flow return pump flow and amps to normal values.*

Note

Crew initiates N2-SOP-29 flowchart decision blocks by answering "YES/NO" questions.

## ATC RO

- Reports Feedwater Pump A trip and RPV water level low alarms
- Monitors reactor power, pressure and water level
- Enters N2-SOP-6
  - Places LV10A in MAN and full closes
- When directed, inserts Cram Rods using Continuous Insert button for rapid Power reduction

## SRO/BOP RO/ATC RO

- Enter and implement the flowchart actions per N2-SOP-29
  - Is a Recirc pump in service? **YES**
  - Is core flow to left of natural circ line? **NO**
  - Core flow AND Power within

Scram Region? **NO**

□ Core flow AND power within Exit Region? **NO**

□ Reduce rodline below 100% by inserting CRAM rods. *(Also being inserted to lower power for SOP-101D actions by ATC RO)*

□ > 3 OPRMs operable? **YES**

□ Plant in Heightened Awareness Zone? **NO**

□ Recover per Attachment 2. Note that actual recovery action to reset the motion inhibit cannot be performed until repairs are completed on HPUs)

Note

CRAM rod insertion will likely be directed from N2-SOP-101D, Rapid Power Reduction. Also, with operation above the 100% rod line, the crew will insert CRAM rods. It is expected that the ATC RO will insert the first four cram rods to position 00 using P603 CONTINUOUS INSERT pushbutton. (EVENT 2 Reactivity Manipulation for ATC RO)

*Reactor Power will lower and Rod Line will be reduced below 100% rod line*

## CONSOLE OPERATOR

If directed to remove Condensate Demineralizers from service due to the power reduction, **manually enter REMOTES**, as required to establish the directed number of in-service demineralizers:

## FW01A-H, CONDENSATE DEMINERALIZER, OFF

*Plant should now be stabilized at about 60-65% power. The crew will make notifications and Plant Management will be consulted to establish coordination and overall direction as*

SRO

□ Conducts post event brief

*to how recovery will be implemented.*

*SRO should address*

- ☐ *RCS Flow Mismatch*
- ☐ *RCS FCV motion inhibit requires repairs of HPUs*
- ☐ *Electric Fault trip of Feedwater Pump A*
- ☐ *Bypassed APRM 2 due to failed Flow Unit*

**EVENT 4**

**Steam Flow Signal Failure            PO-4.0**

**CONSOLE OPERATOR**

When directed by Lead Evaluator, **activate malfunction and relatives** by depressing F5 key:

**FW35 Steam Flow Input Fails to FW, TRUE**

*Steam flow signal operation becomes erratic. Feedwater flow and RPV water level becomes unstable.*

*603139 RPV WATER LEVEL HIGH/LOW*

*603307 RWM ROD BLOCK*

**CONSOLE OPERATOR**

After FWLC is placed in MANUAL, manually **activate malfunction:**

**FW35 Steam Flow Input Fails to FW, TRUE**

This will keep the failed signal inputted into FWLC.

**ATC RO**

- ☐ Identifies and reports misoperation of FWLC to SRO
- ☐ Enters N2-SOP-6
- ☐ Places FWS-HIC1010B (LV10B) controller OR Master FWLC controller to MANUAL
- ☐ Stabilizes RPV water level between 160 to 200 inches (178 to 187 inches normal band)

**SRO**

- ☐ Directs entry into N2-SOP-6 for misoperation of FWLC
- ☐ Conducts post event brief
- ☐ Notifies Operations and Plant Management
- ☐ Contacts WEC SRO for assistance

and work planning

**EVENT 5**

**Inadvertent opening of ADS/SRV PSV121**

**PO-5.0**

**This event should proceed while the crew is discussing placing FWLC to single element in response to the previous event.**

**CONSOLE OPERATOR**

When directed by Lead Evaluator, manually enter override:

**P628 SWITCH Page 2 of 3 P628-B22C-S4A-A; P628 ADS Valve PSV121, OPEN**

*The following annunciators alarm:*
*601537* ADS VALVES/SAFETY VALVES LEAKING
*601548* SAFETY/RELIEF VALVE OPEN
*601553* ADS ACC TANK 32/33/34 PRESSURE LOW
*851506* CONDENSATE TRANSFER PUMP 1A/1B
AUTO START
*851507* CNST XFER PMP DISCH HEADER
PRESSURE LOW

*At P601 MSS\*PSV121 red light lit and DIV I MSS\*PSV121 OPEN white postage stamp lit indicating valve is open.*

**SRO**

☐ Directs entry into N2-SOP-34

☐ Declares PSV121 ADS valve inoperable.

☐ Refers to Tech Specs 3.5.1. With one ADS valve inoperable no actions is required. Currently the minimum number of REQUIRED ADS valves is still met with one valve inoperable.

☐ Refers to Tech Spec 3.6.1.7.2 and recognizes requirement to perform N2-OSP-ISC-M@002 within 12 hours.

☐ May direct one loop of RHS placed in Suppression Pool Cooling.

   ☐ IF RHS is placed in Suppression Pool Cooling,

| INSTRUCTOR ACTIONS/ PLANT RESPONSE | OPERATOR ACTIONS |
|---|---|
| *At P603, MWe drop is observed as turbine control valve closes slightly.*<br><br>*Suppression Pool temperature rises and approaches 90°F.* | declares RHS inoperable for LPCI mode and enters Tech Spec 3.5.1 CONDITION A REQUIRED ACTION A.1 with 7 day COMPLETION TIME.<br><br>☐ IF Suppression Pool Temperature exceeds 90°F, enters EOP-PC.<br>☐ Notifies Operations and Plant Management.<br>☐ Contacts WEC SRO for assistance and work planning.<br>☐ Conducts post event brief. |
| **EVENT 5 BOP RO  Actions** | <u>BOP RO</u><br>☐ Reports annunciators<br>☐ Enters and executes N2-SOP-34<br>   ☐ Identify which SRV is open. (PSV121)<br>   ☐ Place the keylock switch for PSV21 to the OFF position.<br><br>   ☐ Did the SRV close?  **NO**<br>   (Detail 1)<br>   Use one or more of following indications to verify SRV status:<br>   ☐ SPDS Computer<br>   ☐ ERF Computer Points MSSZC111; MSSZC128 |

☐ Reactor Power Change

☐ Generator Output Change

☐ Steam Flow/Feed Flow Mismatch

☐ Accoustic Monitor

☐ Reduce power to approximately 85% per N2-SOP-101D. (N/A, currently below 85% power)

☐ **IF** Average Suppression Pool temperature is approaching 110°F...... **THEN** Scram the reactor per N2-SOP-101C and continue here.

☐ Proceeds to back panel P628 with fuse pullers and protective safety equipment (PPE). Using **Detail 2**, remove the fuses for the affected SRV in the following order until the SRV closes:

1. C Solenoid fuse

**2. A Solenoid fuse (CT-1.0)**

*PSV121 remains open after pulling F79 and F80. At P601 position indicating (red and green) lights for PSV121 are now deenergized. PSV 121 closes when F9A and F10A are pulled.*

   ☐ For 2MSS*PSV121 C Solenoid P628 Strip K F79 and F80 pulled

   ☐ **For 2MSS*PSV121 A Solenoid P628 Strip F9A and F10A (CT-1.0)**

☐ Did SRV close? **NO** for C solenoid but **YES** when A solenoid fuses are pulled.

| INSTRUCTOR ACTIONS/ PLANT RESPONSE | OPERATOR ACTIONS |
|---|---|
| *Generator MWe rises and ERF Computer Points indicate SRV is closed.* | Detail 1 Use one or more of following indications to verify SRV status: <br>☐ SPDS Computer <br>☐ ERF Computer Points MSSZC111; MSSZC128 <br>☐ Reactor Power Change <br>☐ Generator Output Change <br>☐ Steam Flow/Feed Flow Mismatch <br>☐ Accoustic Monitor <br><br>☐ Exits SOP-34 and informs SRO SRV is closed. <br>☐ If directed starts RHS in Suppression Pool Cooling. |
| **EVENT 5 ATC RO Actions** | ATC RO <br>☐ Monitors parameters to assist in determining SRV position. <br>☐ Monitors and control RPV water level in directed band in manual. |
| **EVENT 6** <br>**Rising Main Turbine Vibration with minor Main Condenser Air In-leakage PO-6.0** <br><br>**CONSOLE OPERATOR** <br>When directed by Lead Evaluator, **activate malfunction** by depressing F6 key: | |

**TU02 Main Turbine Vibration High     (F6)**

**Value 9; Ramp Time 3:00 minutes**

**MC01 Main Condenser Air Inleakage  (F6)**

**Value 15; Ramp Time 3:00 minutes**

*Main Turbine vibration and Offgas Train flow*
*rise.*
*After about 1:30 minutes Turbine vibration*
*reaches 7 mils and the following annunciators*
*alarm:*
*851140 TURBINE GENERATOR VIBRATION*
*HIGH*
*851306 OFFGAS SYSTEM TROUBLE*

SRO

☐ May direct further power reduction
by Cram rod insertion

☐ When vibration or vacuum limits
are exceeded, directs reactor
scram and turbine trip.

☐ Notifies Operations and Plant
Management

☐ Contacts WEC SRO for assistance
and work planning

☐ Conducts post event brief

BOP RO

☐ Reports and implements
annunciator 851129 actions by
monitoring for condition that
require further actions:

☐ May initiate Process Computer
Group Point 14 to monitor turbine
vibration on CRT display.

☐ IF any Bearing Vibration is 10
mils for 15 minutes. Trip OR
verify Main Turbine Tripped in

|  |  |
|---|---|
|  | accordance with N2-SOP-21, Turbine Trip. |
| *After about 3 minutes Turbine vibration reaches 12 mils requiring a manual reactor scram and turbine trip. The following annunciators alarm:* | □ IF any Bearing Vibration is 12 mils, verify Main Turbine Trip in accordance with N2-SOP-21. |
| *851129 TURBINE GENERATOR VIBRATION HIGH-HIGH* | □ Refer to N2-OP-21 Section H.1.0, Operation With High Vibration in Alarm or High Vibration Trip Disabled. |
|  | □ IF any Bearing Vibration is >9 mils with >3 mils/minute rate of change THEN trip OR verify Main Turbine Tripped in accordance with N2-SOP-21, Turbine Trip. |
|  | □ IF Bearing Vibration is projected to exceed 30 mils following a Turbine Trip THEN break condenser vacuum in accordance with N2-OP-21, Subsection H.1.4. |
|  | □ WHEN any vibration limit is exceeded or when directed, enters N2-SOP-21 and implements flowchart actions |
|  |     □ Has Tubine tripped? **NO** |
|  |     □ Power >25%? **YES** |
|  |     □ **SCRAM** the reactor per N2- |

SOP-101C. (ATC RO to perform action).

- ☐ Manually trip Turbine using TRIP pushbuttons. (BOP RO to perform action).


- ☐ Did the Turbine trip using TRIP pushbuttons? **YES**
- ☐ Verify MSV/ CV/ CIVs closed AND TBVs open to control pressure.
- ☐ Verify the following:
    - ☐ House loads transfer
    - ☐ Megawatts are ~ 0
    - ☐ R230, R925 open
    - ☐ 41M, 41E open
    - ☐ MDS1/233N open

**EVENT 6 ATC RO actions**

ATC RO

- ☐ Monitors reactor power, level and pressure
- ☐ If directed, implements N2-SOP-9 actions for lowering condenser vacuum
    - ☐ If directed, lowers power per N2-SOP-101 D to stabilize vacuum. (Since already operating at reduced power, a further power reduction is not likely to be directed).

□ Verify proper operation of:

□ SJAE per N2-OP-9

□ Off-gas per N2-OP-42

□ Circ Water per N2-OP-10A

□ Reactor Power >25%? **YES**

□ IF Condenser vacuum is approaching 22.1 inches Hg..... THEN....

□ Scram the reactor per N2-SOP-101C

□ Trip the turbine per N2-SOP21

*Tthe crew is directed to manually scram and trip the turbine on either of two parameters during this event.  The crew must take these actions based on high turbine vibration (>12mils) or lowering condenser vacuum (prior to 22.1 inch Hg,  automatic turbine trip setpoint.*

**EVENT 7 and 8            PO-7.0 and 8.0**

**Manual Reactor Scram and ATWS**

The following preset malfunction become active:

**RD17 COMPOSITE 003          QUEUED**

**RP12A RRCS Failure (Div I)     QUEUED**

**RP12B RRCS Failure (Div II)    QUEUED**

*Reactor is manually scrammed by placing the Mode Switch in Shutdown.  RPS trips but Some Control rods insert only to position 04 and 06  due to "hydraulic lock". Reactor power will stabilized at about 18%to 23% on APRMs. Actual thermal power production may be*

SRO

□ Directs Mode Switch placed in Shutdown

□ Repeats back scram report

□ Enters EOP-RPV on low RPV water level (<159 inches) AND Reactor power above 4% when a scram is required.

□ When determines the reactor will not stay shutdown without boron based on current rod positions, EXITS EOP-RPV and ENTER EOP-C5

| INSTRUCTOR ACTIONS/ PLANT RESPONSE | OPERATOR ACTIONS |
|---|---|
| *slightly higher due to APRM GAFs being different than at full power. RPV water level will lower and EOP entry conditions are met. Turbine bypass valves open as pressure rises SRVs are not expected to cycle.* | **NOTE: SRO will direct EOP-C5 LEVEL, PRESSURE and POWER actions concurrently** |
| The following also occur (become active and start timing) when the Mode Switch is placed in Shutdown, Event Trigger ET02: **MC01 Main Condenser Air Inleakage Value 100; Ramp Time 5:00 minutes** **TUA 8:00 minutes for all 3 FW01A, B and C FW01A Condensate Pump Trip P1A FW01B Condensate Pump Trip P1B FW01C Condensate Pump Trip P1C** | ❑ Directs from EOP-C5 Level Actions<br>　❑ Inhibit ADS<br>　❑ Prevent HPCS injection by placing HPCS pump in PTL<br>　❑ May direct EOP-6 Attachment 2 to prevent Main Turbine trip from RCIC injection. (If manual turbine trip is delayed because of the ATWS, this action may be directed).<br>　❑ May direct EOP-6 Attachment 10 to prevent low level MSIV closure. (Since condenser vacuum is lowering, this action may not be directed. MSIVs will automatically close on low vacuum even if low level jumpers are installed).<br><br>　❑ With power >4% and level above 100 inches directs terminating and prevent injection at P603 except boron, CRD and RCIC to standard |

| INSTRUCTOR ACTIONS/ PLANT RESPONSE | OPERATOR ACTIONS |
|---|---|

<table>
<tr>
<td></td>
<td>level band of 50 to 80 inches with Feedwater system.</td>
</tr>
<tr>
<td><i>When SPT reaches 110°F terminate and prevent injection a second time is required.</i></td>
<td>□ Directs terminating and preventing injection at P601.</td>
</tr>
<tr>
<td>NOTE<br>When using Fuel Zone Instruments, the value of -14 inches (TAF) and -39 inches (MSCRWL) is corrected for RPV pressure using Fig. Z curves. Typically at 800 -1000 psig, -14 inches = -55 inches AND  -39 inches = -70 inches. Therefore a level band between -14 and -39 is directed as -55 to -70 inches when corrected using Fig. Z</td>
<td>□ Per override L-5, IF power is >4% AND level > -14 inches (TAF) AND an SRV is open AND SPT >110°F, directs injection terminated and prevents again UNITIL either<br>  □ APRM are dnsc OR<br>  □ RPV Level reaches TAF (about -55 inches corrected per Fig Z)<br>  □ Records Fuel Zone Level<br><br>―――――<br><br>□ Directs injection using only Detail G systems to restore and maintain level above MSCRWL</td>
</tr>
<tr>
<td><i>As the SRO directs initial EOP-C5 actions and the ROs perform those actions, the following conditions should be achieved, before conditions further degrade (loss of Condensate Booster Pumps occurs eight minutes after the Mode Switch is placed in Shutdown:</i></td>
<td>□ Directs from EOP-C5 PRESSURE Actions<br><br>□ RPV pressure stabilized below 1052 psig with EHC (Bypass Valves) and SRVs. Standard pressure band 800 to 1000 psig</td>
</tr>
</table>

| | |
|---|---|
| *Level stabilized and controlled 50 to 80 inches with FW and RCIC. Other injection sources have been "terminated and prevented" from injecting except boron, CRD and RCIC.* | ☐ When MSIV close, standard pressure band 800 to 1000 psig with SRVs |
| *Pressure stabilized and controlled 800 to 1000 psig with BPVs and SRVs. SRVs only after MSIV closure.* | ☐ Restore pneumatics to the Drywell |
| *Both loops of SLS are injecting at 86 gpm. As Suppression Pool water temperature rises, RHS is placed in Suppression Pool Cooling lineup.* | ☐ WAIT until Cold Shutdown boron weight is injected (SLS tank level below 1450 gallons). |

◻ Directs from EOP-C5 POWER Actions

   ☐ Mode switch in Shutdown

   ☐ Initiate RRCS (EOP-6 Att 13)

   ☐ Reduce Recirc to minimum

   ☐ With power >4%, trip the RCS pumps

   ☐ When pressure and level are under control, directs control rod insertion per EOP-6 Attachment 14

   ☐ BEFORE SPT reaches 110°F, directs SLS boron injection

   ☐ WAIT until boron injection is no longer required before terminating SLS injection.

|  |  |
|---|---|
|  | □ WHEN SPT reaches 90°F enters EOP-PC |
|  | □ Directs both loops of RHS placed in Suppression Pool Cooling |
| **EVENT 8 and 9 ATC RO Actions as directed.**       **PO-8.0** | <u>ATC RO</u> |
|  | □ Places Mode Switch in Shutdown |
|  | □ Provides scram report, including APRMs are not downcale and all rods are not fully inserted |
|  | □ Initiates RRCS by arming and depressing manual initiation pushbuttons per EOP-6 Att 13 |
|  | □ Terminates and prevents P603 injection by placing FW control in manual and fully closing LV10s |
|  | □ When level drops below 100 inches, establishes RPV injection by reopening LV10s to maintain level in directed band (50 to 80 inches). |
| **EVENT 7 and 8 BOP RO Actions as directed.** | <u>BOP RO</u> |
|  | □ Inhibits ADS using 2 keylock switches |
|  | □ Places HPCS pump control switch in PTL |
|  | □ If directed, bypasses MSIV low level isolations per EOP-6 |

| INSTRUCTOR ACTIONS/ PLANT RESPONSE | OPERATOR ACTIONS |
|---|---|

**CONSOLE OPERATOR**

**IF** requested to bypass MSIV low level isolations per EOP-6 Attachment 10, **immediately activate remote timer** by depressing **F7** key **THEN WAIT** until the 1:30 minute TUA timer times out and report the jumpers are installed

**MS06A Defeat Level 1 MSIV Isolation, DEFEATED, TUA 1:30 minutes**
**MS06B Defeat Level 1 MSIV Isolation, DEFEATED, TUA 1:30 minutes**
**MS06C Defeat Level 1 MSIV Isolation, DEFEATED, TUA 1:30 minutes**
**MS06D Defeat Level 1 MSIV Isolation, DEFEATED, TUA 1:30 minutes**

Attachment 10

❑ Manually operates SRV to maintain pressure in directed band (800 to 1000 psig)

❑ Restores pneumatics (at P851) to Drywell by using keylocks to override and reopen IAS*SOV166 and 184.

❑ Restores pneumatics (at P601) to Drywell by using keylocks to override and reopen IAS*SOV164 and 165.

❑ Terminates and prevents Div I ECCS injection at P601 by performing:
  ❑ Arm and depress Div I ECCS manual initiation pushbutton.
  ❑ Override closed CSL Injection MOV (amber light stays on).
  ❑ Place CSL pump in PTL.
  ❑ Override closed RHS A Injection MOV (amber light stays on).

**1:00 minute after RCIC starts, ET03 actives malfunction RC02 RCIC FAILURE – ISOLATION OF RCIC, TRUE**

❑ Terminates and prevents Div II ECCS injection at P601 by performing:

|  | |
|---|---|
| | ▫ Arm and depress Div II ECCS manual initiation pushbutton. |
| | ▫ Override closed RHS C Injection MOV (amber light stays on). |
| | ▫ Place RHS C pump in PTL. |
| | ▫ Override closed RHS B Injection MOV (amber light stays on). |
| | ▫ When RCIC isolates, reports RCIC isolation to SRO |

**EVENT 9 WCS Isolation Failure PO-9.0**

**CU08  Reactor Water Cleanup Isolation Fail, TRUE malfunction becomes effective**

*WCS\*MOV102 and 112 isolation valves fail to close when SLS switches are placed in ON. When P602 control switches are used, the WCS isolation MOVs will close.*

▫ Injects SLS boron injection using keylock switches

▫ SLS\*MOV1A and 1B open

▫ SLS\*P1A and 1B start

▫ Explosive Valves fire

▫ Pump pressure and flow rise

▫ SLS tank level begins to lower

▫ Identifies failure of WCS isolation

▫ Manually closes WCS isolation valves MOV102 and 112 at P602

**EVENT 10 Trip of all Condensate Pumps**

**PO-10.0**

Eight minutes after the Mode Switch is placed in Shutdown, ET02 automatically activates the following malfunctions:

**FW01A Condensate Pump  Trip P1A**

**FW01B Condensate Pump  Trip P1B**

**FW01C Condensate Pump  Trip P1C**

ATC RO

☐ Reports loss of all Condensate, Booster and Feedwater Pumps

☐ Reports lowering RPV water level

☐ Closes FWS-LV10s for tripped Feedwater Pumps

☐ Lineup systems as directed

*All three Condensate Pumps trip. Feedwater pump suction pressure drops. Feedwater pumps automatically trip on low suction pressure.*

*RPV water level falls below MSCRWL and cannot be restored until additional systems are lined up for injection. As RPV water level drops, core voiding results in lowering reactor power and pressure.*

SRO

☐ Acknowledges loss of Feedwater

☐ Directs RHS injection through Shutdown Cooling per EOP-6 Attachment 30. (Requires installation of jumpers to defeat RHS Shutdown Cooling interlocks AND RPV pressure reduced below 350 psig)

☐ Per L-10 Conditional Step, determines RPV water level cannot be restored and maintained above MSCRWL with Detail G Preferred

Systems AND EOP-C2 has not been entered yet...... EXITS C5 Level and Pressure legs AND ENTERS EOP-C2 to perform an RPV Blowdown

☐ Executes EOP-C2 as follows:

  ☐ Determines reactor will NOT stay shutdown without boron (Step 2)

  ☐ Determines SPL is above 192 feet (Step 3)

  ☐ Directs terminate and prevent all RPV injection except boron, CRD and RCIC (Step 4)

  ☐ Directs all 7 ADS valves open (Step 5)

  ☐ When all 7 ADS valves are reported open, continues in C2 to WAIT blocks (Step 16 then 17) AND ENTERS (RETURN TO ) EOP-C5 at 10

☐ RETURNS TO EOP-C5 at 10

  ☐ Determines 2 or more SRVs are open (L-12)

  ☐ WAITS until RPV pressure drops below value in Table J (below 165 psig with 7 SRVs open; L-13)

□ Directs injection using only Detail G systems slowly start injecting to restore and maintain level above MSCRWL (RHS through Shutdown Cooling per EOP-6 Attachment 30 should now be established; L-14)

□ Determines capability of RHS to restore and maintain level above MSCRWL (L-15)
SRO may decide that RHS alone will not restore water level above MSCRWL and direct Alternate ATWS System Injection from Detail H systems (L-16 and L-17)
Likely to direct injection with HPCS, LPCS or RHS LPCI

□ Returns to EOP-C5 at 9, since level was intentionally lowered prior to entering EOP-C2

□ Restores and maintains water level between MSCRWL and level recorded in step L-9 number 4 using Detail G and it's OK to use Detail H systems

| INSTRUCTOR ACTIONS/ PLANT RESPONSE | OPERATOR ACTIONS |
|---|---|

**EVENT 10 BOP RO Actions, when directed**

<u>BOP RO</u>

☐ Performs RPV Injection Via Shutdown Cooling Return per EOP-6 Attachment 30 Injection via RHS B (A)

Verify closed the following valves:

☐ RHS*MOV15B (A), OUTLET TO DRYWELL SPRAY

☐ RHS*MOV8B (A), HEAT EXCHANGER 1B (A) INLET BYPASS VLV (WHEN possible)

☐ RHS*MOV33B (A), OUTLET TO SUPPR POOL SPRAY

☐ RHS*FV38B (A), RETURN TO SUPPR POOL COOLING

☐ RHS*MOV24B (A), LPCI B (A) INJECTION VLV

☐ RHS*MOV40B (A), SDC B RETURN

☐ RHS*MOV104, RHR B TO REACTOR HEAD SPRAY

**<u>CONSOLE OPERATOR</u>**

When requested by BOP RO/ATC RO to "defeat Group 5 isolation interlocks for 2RHS*MOV40A or B" per EOP-6 Attachment 30, **<u>immediately activate remote timer</u>** by depressing **F10** key **THEN WAIT** until the 2:00 minute TUA timer times out and report the

Defeat Group 5 isolation interlocks for 2RHS*MOV40B as follows (Figure 30-2): *(2CEC\*PNL622)(NOT actually performed)*

☐ Lift AND tape the lead on terminal point BB-62

| INSTRUCTOR ACTIONS/ PLANT RESPONSE | OPERATOR ACTIONS |
|---|---|

jumpers are installed and leads are lifted.

**RH08 Group 5 Isolation Failure SDC MOVs, TRUE          (F10)**

NOTE

Per EOP-C5 Step L-13 and L-14, injection is NOT allowable until RPV pressure drops below 165 psig with 7 SRVs open. The crew SHALL NOT establish injection when RPV pressure drops below 350 psig. This would violate the EOP step and Critical Task.

**CONSOLE OPERATOR**

When requested by BOP RO/ATC RO to place radiation monitor SWP*RE23B (A) in service (if not already in service), **manually activate remotes**, then report RE23B (A) is in service:
 NOTE: USE REMOTES FOR RE 23A IF APPROPRIATE:

**OPERATOR ACTIONS column:**

- ❑  Install EOP Jumper #9 on terminal points BB-41 AND BB-60
- ❑  Verify RHS*P1B (A), PMP 1B (A) is running.
- ❑  Verify open SWP*MOV90B (A), HEAT EXCHANGER 1B SVCE WTR INLET VLV.
- ❑  WAIT UNTIL reactor pressure has been reduced to less than 350
- ❑  Throttle open RHS*MOV40B (A), SDC B (A) RETURN to a maximum of 7450 gpm on E12-603B (A), RHR B (A) TOTAL FLOW meter to control RPV water level

- ❑  Throttle open SWP*MOV33B (A), HEAT EXCHANGER 1B SVCE WTR OUTLET VLV THROTTLE to establish approximately 7400 gpm on E12-R602B (A), SVCE WTR TO RHR B (A) HX FLOW meter

- ❑  Request Rad Monitor SWP*RE23B (A) placed in service

| INSTRUCTOR ACTIONS/ PLANT RESPONSE | OPERATOR ACTIONS |
|---|---|

**RM02 SWP23B Rad Detector Online/Offline, ON**

**RM03 SWP23B Process Monitor Sample Pump, ON**

- □ EOP-6 Attachment 30 is complete
- □ Confirms P601 system injection to RPV is terminated and prevented

- □ Opens all 7 ADS valves by arming and depressing ADS MANUAL INITIATION pushbuttons on P601
- □ Reports 7 ADS valves are open
- □ Reports when RPV pressure drops below Table J value of 165 psig with 7 SRVs open
- □ **Injects with systems to restore and maintain RPV water level in directed band       (CT-3.0)**
  - □ **RHS Via Shutdown Cooling**
  - □ **HPCS**
  - □ **LPCS**
  - □ **LPCI**

**CONTINGENCY: IF ALL (including Fuel Zone) water level instruments are downscale, the Crew will enter EOP-C4, RPV Flooding temporarily. When RPV water level starts to rise (level can now be determined, EOP-C4 is exited (step 1 override) and EOP-C5 re-entered at 6 and EOP-C2 re-entered at 25.**

| | |
|---|---|
| **Alternate Control Rod Insertion** | <u>ATC RO</u> |
| | ☐ Using EOP-6 Attachment 14 |
| Appropriate sections to be performed are |     Flowchart determines appropriate |
| 3.3 Additional Manual Scram Initiation |     sections (3.3 and 3.5) to be |
| 3.5 Manual Control Rod Insertion (Driving rods |     performed. |
| with RDS). These sections are performed | **Performs section 3.3** |
| concurrently. | ☐ Reset ARI by directing fuses pulled |
| **CONSOLE OPERATOR** |     per 3.3.1 |
| **WHEN** requested to reset ARI per EOP-6 | |
| Attachment 14, **immediately activate remote** | |
| **timer** by depressing **F8** key **THEN WAIT** until | |
| the 1:30 minute TUA timer times out and | |
| report the fuses are pulled | |
| | |
| **RP14A RRCS ARI Failure/Defeated Div I,** | |
| **TRUE TUA 1:30 minutes** | |
| | |
| **RP14B RRCS ARI Failure/Defeated Div II,** | |
| **TRUE TUA 1:30 minutes** | |
| | |
| **CONSOLE OPERATOR** | ☐ Defeat RPS interlocks by |
| **WHEN** requested to defeat RPS per EOP-6 |     directing/installing RPS jumpers |
| Attachment 14, **immediately activate remote** | |
| **timer** by depressing **F9** key **THEN WAIT** until | ☐ Reset RPS by momentarily placing |
| the 1:30 minute TUA timer times out and |     the following switches to RESET: |
| report the jumpers are installed | (*2CEC\*PNL603*) |
| | REACTOR SCRAM RESET LOGIC A |
| **RP02 RPS Failure to Scram Automatic,** | REACTOR SCRAM RESET LOGIC C |
| **TRUE** | REACTOR SCRAM RESET LOGIC B |

| INSTRUCTOR ACTIONS/<br>PLANT RESPONSE | OPERATOR ACTIONS |
|---|---|

**TUA 1:30 minutes**

REACTOR SCRAM RESET LOGIC D

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

**CONSOLE OPERATOR**

**WHEN** RPS is reset, **manually delete all RD17 malfunctions** to ensure rods fully insert when additional scram signal is inserted.

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

□ Ensure the eight white PILOT SCRAM VALVE SOLENOIDS lights are lit.

□ Ensure SCRAM DISH VOLUME VENT VLVS RDS\*AOV124/132 indicate open.

□ Ensure SCRAM DISH VOLUME DRAIN VLVS RDS\*AOV123/130 indicate open.

NOTE:

After RPS is reset and while waiting for indication that the SDV is drained, ATC RO should proceed to section 3.5 to implement action to manually insert rods by driving in using RDS. It takes about 10 minutes for the SDV annunciators to clear, indicating that the SDV is drained

□ Using one OR more of the following, ensure the Scram Discharge Volume (SDV) is drained:

  □ Annunciator 603109, RPS A DISCH VOLUME HIGH LEVEL TRIP, clear

  □ Annunciator 603409, RPS B DISCH VOLUME HIGH LEVEL TRIP, clear

  □ Annunciator 603130, SDV LEVEL HIGH, clear

NOTE:

At the examiners discretion, time compression may be used to shorten the time while waiting for the SDV to drain. This is accomplished by directing the CONSOLE OPERATOR to

ATC RO

**While waiting for SDV to drain performs section 3.5**

| INSTRUCTOR ACTIONS/ PLANT RESPONSE | OPERATOR ACTIONS |
|---|---|
| override OFF SDV annunciator 603109 or 603409, to simulate SDV is drained. | ☐ Verify the following pumps are running (*starts 2$^{nd}$ RDS pump using control switch*):<br><br>☐ RDS-P1A, CRD PUMP 1A<br>☐ RDS-P1B, CRD PUMP 1B<br>☐ Place controller 2RDS-FC107, CRD FLOW CONTROL, in MANUAL<br><br>* * * * * * * * * * * * * * * * * * * *<br><br>**CAUTION**<br>To prevent pump motor damage or tripping the supply breaker, motor current shall not exceed 40 amps for RDS-P1A or RDS-P1B.<br>* * * * * * * * * * * * * * * * * * *<br><br>☐ Depress the OPEN pushbutton on 2RDS-FC107 UNTIL the controller output meter shows 100% OR RDS pump motor current approaches 40 amps<br>☐ Check that RDS System flow rises on C12-R606, CRD SYSTEM FLOW.<br>**NOTE:** In the following step it is expected that RDS System Flow will drop.<br>☐ Close 2RDS-PV101, DRIVE WTR |

PRESS CONTROL MOV, to
maximize Drive Water ΔP.

☐ Ensure RDS Drive Water ΔP rises
on C12-R602, DRIVE WTR DIFF
PRESSURE

☐ Using an SHH 5366 key, bypass
the RWM by taking the RWM
Operator Console
BYPASS/OPERATE/TEST switch
to the BYPASS position

☐ Using Figures 14-2 AND 14-3,
track the status of the control rods,
as the rods are inserted.

☐ Starting with a control rod at OR
near the center, select a control
rod to be driven in on the Rod
Select Matrix

*When the SDV alarms clear the ATC RO will*
*initiate another scram by tripping RPS using*
*manual scram pushbuttons.  All rods will fully*
*insert.*

<u>ATC RO</u>
**Return to Section 3.3**
☐ **WHEN the SDV is drained,**
**initiate a manual scram**
  ☐ **Arm and depress manual**
  **scram pushbutton (CT-4.0)**
☐ Check for control rod motion AND

control rod positions

☐ Confirm all rods fully inserted

☐ Report control rod status to
SRO

**TERMINATION CRITERIA**

RPV Blowdown is complete and RPV level is
restored and maintained in normal level band
160 to 200 inches and all control rods are fully
inserted.

**EVENT 11 SRO Admin JPM 5-1**

SRO

Classify the event as SAE 2.2.2

Evaluator to perform SRO Admin JPM

for emergency classification.

V.   POST SCENARIO CRITIQUE

A.  NA, NRC Exam


VI.   REFERENCE EVENTS AND COMMITMENTS

A.  Reference Events

None

B.  Commitments

1.  None


VII.  LESSONS LEARNED

# 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

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

3.  Quantitative Attributes

| 6 | Total Malfunctions |
|---|---|
| 2 | Malfunctions after EOP Entry |
| 2 | Abnormal Events |
| 1 | Major Transients |
| 2 | EOPs Used |
| 2 | EOP Contingency Procedures Used |
|   | Simulator Run Time |
|   | EOP Run Time |
| 4 | 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 2**          Scenario No.: **NRC-02**          Op-Test No.: **NRC-01**

Examiners: _____          Operators: _____

**Initial Conditions:** Simulator IC-20

    1.   Division I Low Pressure ECCS systems CSL and RHS are inoperable for maintenance.

    2.   100% Power Rod Line >100% (106%)

**Turnover:**

    1.   Place RDS-P1B in service

| Event No. | Malf. No. | Event Type* | Event Description |
|---|---|---|---|
| | | | |
| 1 | | N (BOP) N (SRO) | Swap Control Rod Drive Pumps to RDS-P1B in-service. **N2-OP-30** |
| | | | |
| 2 | RR16A @.25 1 min ramp RR16A @ .75 1 min ramp | C (BOP) C, R, TS (SRO) R (ATC) | Recirc Pump (RCS) A outer seal degradation and leakage. The leakage requires removal from service and isolation of RCS Pump A to stop the leak. (TS 3.4.1) Cram Rod insertion is required to reduce rod line below 100%. With inoperable OPRMs additional actions are required to monitor for power oscillations while in the Heightened Awareness Zone. **N2-SOP-29.1, Reactor Recirc Pump Seal Failure** **N2-SOP-29, Sudden Reduction In Core Flow** **Tech Spec 3.4.1** |
| | | | |
| 3 | RD18 RD063419 RD062227 | C (ATC) C, TS (SRO) | Control Rod Drive Pump RDS-P1B trips due to clogged suction strainer with 2 HCU Accumulator Trouble Alarms. The crew will trip Reactor Water Cleanup pumps if warranted and restart an RDS pump after dispatching operators to changeover pump suction filters **N2-SOP-30, Control Rod Drive Failures** **Tech Spec 3.1.5** |
| | | | |
| 4 | ED02A DG04A CS03 | C (ALL) TS (SRO) | Loss of line 5 and Division I and III Diesel Generators (DG) fails to start on bus undervoltage. Division I DG manual start is performed to avoid the requirement to initiate a manual scram. Crew will restore Service Water system to allow continued plant operation per SOP 3. SRO enters Tech Specs and with both High and Low Pressure Core Spray systems inoperable, enters LCO 3.0.3 which requires plant shutdown. High Pressure Core Spray is also unavailable as an injection source later in scenario. **N2-SOP-3, Loss of AC Power** **Tech Specs 3.5.1 LCO 3.0.3 3.7.1, 3.8.1, 3.8.8** **PRA Tasks** |
| | | | |
| 5 | RR20 @1.5% RR20@10% 10 min ramp after scram | M (ALL) | Reactor coolant leak. Rising Drywell Pressure will require a manual scram. RPV Water level lowers but can be restored and maintained above TAF by manually starting failed ECCS systems. Containment Spray is required. **N2-EOP-RPV, N2-EOP-PC** |

| 6 | EG15B | C (BOP) | A failure of NPS-SWG003 to transfer to Line 6 results in Loss of all feedwater and loss of all normal station power except Emergency Bus supplied by the operating DGs. |
|---|---|---|---|
| 7 | RH14B | C (BOP) | Division II Low Pressure ECCS systems fail to autostart. Manual Start and injection is required to restore RPV water level above TAF. Failure also complicates ability for the crew to initiate Drywell Sprays **PRA Tasks**. |
| 8 | | C (BOP) | Division I Low Pressure ECCS systems (Low Pressure Core Spray and RHR A) inoperable results in unavailability for injection and Containment Spray. This reduces available injection and containment spray to RHR B system. |
| 9 | | | Perform RPV Blowdown to allow Low Pressure ECCS injection. **N2-EOP-C2** |
| 10 | | | SRO ADMIN JPM 5-2  SRO classifies the event as Alert 3.1.1 |

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

| Facility: **Nine Mile Point 2** | Scenario No.: **NRC-02** | Op-Test No.: **NRC-01** | |
|---|---|---|---|
| 1      TARGET QUANTITATIVE ATTRIBUTES (PER SCENARIO; SEE SECTION D.5.d) | ACTUAL ATTRIBUTES | | |
| 1. Total malfunctions (5-8)<br>Events 2,3,4,5,7 | 5 | | |
| 2. Malfunctions after EOP entry (1-2)<br>Events 7,8* | 2 | | |
| 3. Abnormal events (2-4)<br>Event 2 SOP-29.1 and SOP-29, Event 3 SOP-30<br>Event 4 SOP-3 | 3 | | |
| 4. Major transients (1-2)<br>Event 5 | 1 | | |
| 5. EOPs entered/requiring substantive actions (1-2)<br>Event 5 EOP-RPV, EOP-PC | 2 | | |
| 6. EOP contingencies requiring substantive actions (0-2)<br>Event 9 EOP-C2 | 1 | | |
| 7. Critical tasks (2-3) | 2 | | |
| **CRITICAL TASK DESCRIPTIONS:**<br>**CT-1.0: Restart CRD pump within 20 minutes with inoperable control rod accumulators.**<br>**CT-2.0: Restore and maintain RPV water level above TAF with LP ECCS systems** | | | |

Event 8* Not counted in Total Malfunctions but counted as Malfunction After EOP entry per Appendix D C.2.c page 9. System out of service influences the mitigation strategy by reducing the number of available injection and containment spray systems to one. Crew must now prioritize use of remaining system to inject to restore water level before using RHR B for containment spray.

## NMP SIMULATOR SCENARIO

### NRC Scenario 2        REV. 0        No. of Pages:__42__

## RDS PUMP SWAP/RCS SEAL LEAK/LOSS OF LINE 5 WITH EDG FAILURES/RCS LEAK WITH DEGRADED ECCS REQUIRES RPV BLOWDOWN

| | | |
|---|---|---|
| PREPARER | G. Bobka | DATE ____2/1/05 |
| VALIDATED | B. Weaver, B. Moore, P. Brennan | DATE ____3/7/05 |
| GEN SUPERVISOR OPS TRAINING | *[signature]* | DATE __4/21/05__ |
| OPERATIONS MANAGER | NA Exam Security | DATE _____ |
| CONFIGURATION CONTROL | NA Exam Security | DATE _____ |

### SCENARIO SUMMARY

Length: 2 hours

Initial Power Level: 100%, above the 100% Rod Line

The scenario begins at 100% reactor power. The crew will swap Control Rod Drive Pumps to return RDS-P1B to service and remove RDS-P1A from service. After the normal evolution is complete, an outer seal leak develops on Recirc Pump (RCS) A. N2-SOP-29.1 is entered RCS pumps is removed from service and isolated. The crew will also enter N2-SOP-29 due to reduced core flow and insert Cram Rods to lower rod line below 100%. The crew will stabilize the plant in single loop and the SRO will implement the required single loop Tech Spec actions.

With the plant now stable, Control Rod Drive suction filter clogging results in the trip of the operating RDS pump and several accumulator trouble alarms. The crew will enter N2-SOP-30, trip Reactor Water Cleanup due to loss of pump seal cooling, swap RDS pump suction filters and restart an RDS pump.

A loss of one offsite 115 KV power Line 5 will occur. The Division I and Division III EDGs will fail to start. Manual operator action will be required to start the Division I EDG and preclude a manual scram. The Division III High Pressure Core Spray EDG cannot be started. The crew will implement the actions required by N2-SOP-3 to restore Service Water System flow to the Turbine and Reactor Building non safety related headers which have isolated due to the off site power loss.

A small reactor coolant leak develops inside the Drywell. This results in rising drywell temperatures and pressure. The crew will take manual action and scram the reactor. N2-EOP-RPV, PC are entered. The event is complicated by degraded ECCS response and loss of

electrical power. An RPV Blowdown is required to establish injection with the only remaining Low Pressure ECCS systems RHR B and C. Suppression Chamber Spray and Drywell Spray should be established to control primary containment pressure and temperature, as the LOCA becomes more severe. Drywell and Suppression Chamber Sprays will be complicated by loss of electrical power and degraded ECCS systems. The only remaining system that can be used for sprays, will also be required for RPV injection.

Major Procedures Exercised:    EOP-RPV, PC, C-2. SOP-29.1, 29,30 and 3

EAL Classification:    ALERT 3.1.1 Primary containment pressure cannot be maintained <1.68 psig due to coolant leakage.

Termination Criteria:    RPV Blowdown is complete and RPV level is maintained above TAF. Drywell Spray is initiated.

I. SIMULATOR SET UP

   A. IC Number:   IC-20 or equivalent.

   B. Presets/Function Key Assignments

     1. Malfunctions:

| | | | |
|---|---|---|---|
| a. | DG04A | DG 1 UV LOCA Fail to Start, TRUE | QUEUED |
| b. | RH14B | ECCS Fails to Initiate (DivII), TRUE | QUEUED |
| c. | CS03 | HPCS Diesel Engine Failure, TRUE | QUEUED |
| d. | EG15B | No Transfer to Reserve SWG003, TRUE | QUEUED |
| e. | RR16A | RR Pump Upper Seal Failure (P1A), Value 0.25; Ramp Time 1:00 minute | F3 |
| f. | RR16A | RR Pump Upper Seal Failure (P1A), Value 0.75; Ramp Time 1:00 minute | F4 |
| g. | RD18 | CRD Suction Filter Clogged, TRUE | F5 |
| h. | RD063419 | 34-19 Rod Failure Accum Trouble, TRUE TUA 2:00 minutes | F5 |
| i. | RD062227 | 22-27 Rod Failure Accum Trouble, TRUE TUA 2:20 minutes | F5 |
| j. | ED02A | Loss of Off-Site 115KV Line 5, TRUE | F6 |
| k. | RR20 | RR Loop Rupture – DBA LOCA Value 1.5 | F7 |
| l. | RR20 | RR Loop Rupture – DBA LOCA Value 10; Ramp Time 10:00 minutes | ET01 |

     2. Remotes:

| | | | |
|---|---|---|---|
| a. | RH33 | 2RHS*MOV24A 600V BKR STATUS, OPEN | QUEUED |
| b. | CS17 | 2CSL*MOV104 600V BKR STATUS, OPEN | QUEUED |
| c. | RH48 | 2RHS*MOV15B EOP Jumper, TRUE | F8 |
| d. | RH50 | 2RHS*MOV25B EOP Jumper, TRUE | F8 |

     3. Overrides:

| | | |
|---|---|---|
| a. | P601 LAMP RHS A /LPCS RTN TO SUPP POOL MOV30A GREEN,OFF    (PAGE 42) | QUEUED |

4.  Annunciators:

    a.  None

C.  Equipment Out of Service

    1.  Division I Low Pressure ECCS

        a.  CSL with Red Clearance applied to components

            i.  CSL*P1 Pump in PTL

            ii.  CSL*MOV104 Injection Valve Breaker open

        b.  RHS Div I with Red Clearance applied to components

            i.  RHS*P1A Pump Red Clearance PTL

            ii.  RHS*MOV24A Injection Valve Breaker open

            iii.  RHS*MOV30A closed using keylock switch

        c.  RDS-P1B caution yellow tag applied to control switch

D.  Support Documentation

None

E.  Miscellaneous

    1.  Red rod line sign posted

    2.  EVENT TRIGGERS

        a.  ET01  Mode Switch in Shutdown (Event Trigger 8) Initiates increase in RR20 magnitude to 10% with Ramp Time of 10:00 minutes after Mode Switch is placed in SHUTDOWN for reactor scram.

II. **SHIFT TURNOVER INFORMATION**

OFF GOING SHIFT:          ☐ N                          ☐ D    DATE: _____

**PART I:     To be <u>performed</u> by the oncoming Operator <u>before</u> assuming the shift.**

● Control Panel Walkdown (all panels)  (SM, CRS, STA, CSO, CRE)

**PART II:    To be <u>reviewed</u> by the oncoming Operator <u>before</u> assuming the shift.**

● Shift Supervisor Log (SM, CRS, STA)
● CSO Log (CSO)
● Lit Control Room Annunciators (SM, CRS, STA, CSO, CRE)

● Shift Turnover Checklist (ALL)
● LCO Status (SM, CRS, STA)
● Computer Alarm Summary (CSO)

Evolutions/General    Information/Equipment Status:

● Reactor Power = 100%
● Loadline = >100%
● Division I Low Pressure ECCS systems are INOPERABLE (pre-planned)

Corrective Maintenance on broken motor operator for RHS*MOV30A Return to Suppression Pool. Scheduled return to service is late on the next shift.

TS 3.5.1 Required Action C.1 was entered 12 hours ago.  Required Action C.1 Action to restore one subsystem with 72 hour Completion Time.

TS 3.6.1.6 Drywell Spray Required Action A.1 with 7 day Completion Time

TS 3.6.2.3 Suppression Pool Cooling Required Action A.1 with 7 day Completion Time

TS 3.6.2.4 Suppression Pool Spray Required Action A.1 with 7 day Completion Time

● Corrective Maintenance has been completed on RDS-P1B and it is to be placed in service for Post Maintenance Testing.  When the pump is running contact the WEC to dispatch the assembled PMT crew to the pump to obtain all required data.

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

● Place RDS-P1B in service for Post Maintenance Testing.

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

● Review new Clearances (SM)
● Shift Crew Composition (SM/CRS)

● Test Control Annunciators (CRE)

| TITLE | NAME | TITLE | NAME |
|-------|------|-------|------|
| SRO | | BOP RO | |
| ATC RO | | | |

Scenario ID#

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

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

III. PERFORMANCE OBJECTIVES

    A. Critical Tasks:

        CT-1.0    **Given the plant at power with RPV pressure >900 psig and two inoperable scram accumulators, the crew will restore charging water pressure >940 psig within 20 minutes of meeting conditions for entering TS 3.1.5 Condition B, by restarting an RDS pump and avoiding the requirement to immediately scram the reactor per N2-SOP-30 and Tech Spec 3.1.5.**

                CT Justification: Failure to restore Charging Header Pressure by restarting RDS pump results in "direct adverse consequences and a challenge to plant safety" by requiring a manual scram transient to be initiated. Per Tech Spec Basis 3.1.5 "With two or more control rod scram accumulators inoperable and reactor steam dome pressure >900 psig, adequate pressure must be supplied to the charging water header. With inadequate charging water pressure, all of the accumulators could become inoperable, resulting in a potentially severe degradation of the scram performance. Therefore, within 20 minutes from discovery of charging water header pressure < 940 psig concurrent with Condition B, adequate charging water header pressure must be restored. The allowed Completion Time of 20 minutes is considered a reasonable time to place a CRD pump into service to restore the charging header pressure, if required. This Completion Time also recognizes the ability of the reactor pressure alone to fully insert all control rods."

        CT-2.0    **Given degraded RPV injection sources, the crew will establish RPV injection using available Preferred Injection Systems listed in Table E1 of EOP-RPV to RESTORE AND MAINTAIN RPV water level above MSCRWL (-39 inches Fig Z) to preclude executing EOP-C3 or Flooding the Drywell by entering SAPs, per N2-EOP-RPV.**

<u>CT Justification</u>:  Failure to restore and maintain RPV water level above -39 inches by implementing actions per EOP-RPV will result in "adverse consequences" to the plant by abandoning the EOP injection strategy and implementing Drywell Flooding (from EOP-RPV Step L-16) used in the SAPs.  It is expected that proper implementation of EOP-RRV will result in performing an RPV Blowdown by opening 7 ADS valves to reduce RPV pressure and manual injecting RHS Pump B and RHS Pump C (either both or any one pump) which are capable of recovering level above -39 inches and ultimately above -14 inches (TAF). Water level is expected to drop below -39 inches for several minutes while executing the steps to blowdown and establish injection.  There is no specific time constraints attached to this CT.  As long as the crew recovers level without entering EOP-C3, Steam Cooling or the SAPs, this would demonstrate satisfactory completion of the CT.

B.  Performance Objectives:

PO-1.0   Given the plant with direction to swap Control Rod Drive pumps, the crew will start RDS-P1B and secure RDS-P1A per N2-OP-30

PO-2.0   Given the plant with an RCS pump seal leak, the crew will remove the pump from service per N2-SOP-29.1 and N2-SOP-29, then continue to operate the plant in single loop per with N2-OP-29.

PO-3.0   Given the plant operating at power and a Control Rod Drive pump trip with accumulator trouble alarms, the crew will restart an RDS pump within 20 minutes per N2-SOP-30

PO-4.0   Given the reactor plant operating at power when a loss of offsite line 5 with EDG failures occurs, the crew will take action to start the

failed EDG and stabilize service water in accordance with N2-SOP-03. (Operator actions with PRA significance)

PO-5.0    Given a reactor plant operating at power with a LOCA in progress, the crew will manually scram the reactor plant prior to reaching 1.68 psig in the Containment.

PO-6.0    Given a loss of all high pressure injection the crew will restore and maintain RPV water level above TAF after performing an RPV Blowdown per N2-EOP-RPV and N2-EOP-C2. (Operator actions with PRA significance)

PO-7.0    Given a failure of Low Pressure ECCS pumps to start on high drywell pressure signal, the crew will manually start the Low Pressure ECCS pumps per EOP Bases and Operations Manual

PO-8.0    Given the plant with a LOCA and conditions met for containment spray, the crew will initiate Containment Spray per N2-EOP-PC and EOP-6 Attachment 22.

Crew

- Crew conducts a pre-brief, walks down the panels, and tests annunciators.

**EVENT 1**                                          SRO

**RDS Pump Swap**                       **PO-1.0**   □ Directs RDS-P1B started and RDS-P1A placed in standby per N2-OP-30, F.2.0

□ After RDS-P1B is placed in service, contacts WEC to dispatch team to perform Post Maintenance Testing requirements.

BOP RO

□ Dispatches AO to perform prestart lineup

Role Play
When dispatched as additional operators to support the pump swap with activities such as performing prestart verifications and monitoring, respond as required.  There will be no unusual conditions or readings to be reported for this evolution.

□ IF RDS is supplying WCS pump seal cooling, THEN station personnel at locations to simultaneously monitor WCS pump seal parameters during RDS pump changeover.

□ Start the standby CRD pump

2RDS-P1B  CRD PUMP 1B by placing its control switch to START, THEN release to Normal-After-START.

□ Stop the CRD pump to be shutdown 2RDS-P1A, CRD PUMP 1A by taking its control switch to STOP AND releasing to Normal-After-STOP.

□ Directs local monitoring of operating WCS pump(s) seal cavity temperatures

□ IF WCS pump seal cooling is being supplied from RDS, THEN directs verification of seal cooling flow between 1-4 gpm as indicated locally.

□ As required, directs adjusting RPV Level Instrumentation Backfill

□ Reports RDS-P1B in service and RDS-P1A in standby.

**EVENT 2**

| | |
|---|---|
| **RCS Pump A outer seal leakage** | **PO-2.0** |

**CONSOLE OPERATOR**

When directed by Lead Evaluator, **activate malfunction** by depressing F3 key:

| | |
|---|---|
| **RR16A, 0.25, Ramp Time 1:00 Min** | **(F3)** |

*RRP1A upper seal cavity press lowers to about 220 psig*

*Annunciator 602109 Recirc Pump 1A Outer SL Leak High alarms after about 1 minute.*

**BOP RO**

☐ Identifies and reports annunciator 602109 to SRO

☐ Implements ARP 602109 actions

   ☐ Monitor DW Equipment Drain Tank leak rate. Refer to ITS 3.4.5 RCS Operational Leakage.

   ☐ Monitor upper and lower seal cavity pressures using P602 pressure indicators.

   ☐ Monitor upper and lower seal cavity temperatures using P614 recorder points 8 and 9 and Process Computer points RCSTA15 and RCSTA17.

   ☐ Enter N2-SOP-29.1 and performs concurrently with ARP actions.

SRO/BOP RO

☐ Implements SOP-29.1 Actions
while monitoring Seal Action leg
conditions that may require pump
trip

   ☐ Establish periodic monitoring of
    pump conditions.

   ☐ If applicable, monitor DER/DFR
    leakage for indication of
    degradation (TS 3.4.5).

   ☐ If conditions warrant, shutdown
    the affected pump per N2-OP-29,
    G.2.0.

   ☐ Refer to N2-OP-29, H.4.0, if both
    seal injection and cooling water
    are lost.

BOP RO

☐ Implements SOP-29.1 Seal
Actions

   ☐ **IF ANY of THESE OCCUR**

    ☐ **Upper seal cavity pressure
     < 100 psig**

    ☐ Upper seal cavity pressure >
     920 psig

    ☐ Lower seal cavity pressure >
     1200 psig

    ☐ Outer seal leakage > 1.2
     gpm

**CONSOLE OPERATOR**

After the crew enters N2-SOP-29.1 and is
monitoring parameters activate malfunction by
depressing F4 key:

**RR16A, 0.75, Ramp Time 1:00 Min     (F4)**

*Upper Seal pressure drops below 100 psig
which requires the RCS pump to be tripped*

| INSTRUCTOR ACTIONS/ PLANT RESPONSE | OPERATOR ACTIONS |
|---|---|

*Annunciator 602115, Recirc Pmp 1A seal staging flow high/low*

- □ Seal staging flow > 1.8 gpm
- □ DFR > 1 gpm rise

*RCS Pump A is manually tripped and isolated by closing RCS\*MOV10A and 18A with the following alarms*
*602207 RECIRC PMP 1A LOW SPEED AUTO TRANSFER NOT AVAILABLE*
*603139 REACTOR WATER LEVEL HIGH/LOW*
*603218 OPRM TRIP ENABLED*
*Reactor Water Cleanup is manually realigned for single loop by lowering system flow and closing WCS\*MOV105. When WCS flow is lowered, the in-service filter demineralizer HOLD Pumps start with the following P602 alarms*
*602317 RWCU FILTER DEMIN 1 TROUBLE*
*602318 RWCU FILTER DEMIN 1 TROUBLE*

.....**THEN CONTINUE AT A (when seal pressure drops below 100 psig)**
- □ **Trip the affected pump AND enter N2-SOP-29.** Recirculation pump should be tripped by opening RECIRC PMP 1A(1B) MOTOR BRKR 5A by placing control switch to STOP or PTL.

- □ Lower WCS flow to < 450 gpm (by throttling MOV200)
- □ Close WCS\*MOV105.
- □ Close RCS\*MOV10A
- □ Close RCS\*MOV18A
- □ When time permits, perform N2-OP-29, H. (Single Loop Operations

Note
Crew initiates N2-SOP-29 flowchart decision blocks by answering "YES/NO" questions.

SRO/BOP RO/ATC RO
- □ Enter and implement the flowchart actions per N2-SOP-29 when directed from SOP-29.1
  - □ Is a Recirc pump in service?
  **YES**

□ Is core flow to left of natural circ line? **NO**

□ Core flow AND Power in Scram Region? **NO**

**Note**

With operation above the 100% rod line, the crew will insert CRAM rods.  It is expected that the ATC RO will insert the first four cram rods to position 00 using P603 CONTINUOUS INSERT pushbutton. (EVENT 2 Reactivity Manipulation for ATC RO)

□ Core flow AND Power in Exit Region? **NO**

□ Reduce rodline below 100% by inserting CRAM rods. ***(EVENT 2 Reactivity Manipulation for ATC RO)***

□ > 3 OPRMs operable?  **YES**

□ Plant in Heightened Awareness Zone? **YES**

*Reactor Power will lower and Rod Line will be reduced below 100% rod line*

□ Recover per Attachment 2

**SOP-29 Attachment 2 actions**

IF one Recirc. Pump tripped AND NOT in Natural Circulation, perform the following:

□ Verify Recirc Flow Controller in LOOP MANUAL for BOTH loops

□ Close Flow Control valve for the tripped pump

□ Reduce flow rate of operating loop to less than 41,800 gpm

as indicated by flow recorder at 2CEC*PNL602

□ Notify I&C to perform APRM Scram AND Rod Block AND rod block monitor setpoint change

□ Reduce thermal power to less than 70% of rated

□ IF pump speed does NOT indicate 0 rpm one minute AFTER pump trip, close 2RCS*MOV18A OR 2RCS*MOV10A

□ IF NOT able to start the tripped pump, perform N2-OP-29, Subsection H.6.0, Single Recirculation Loop Operation AND exit this attachment.

**EVENT 2 SRO ACTIONS**

SRO

□ Direct trip of RCS Pump A and ensure actions of SOP-29, Attachment 2 and OP-29, G.2.0 are taken to place in shutdown condition.

□ Enters N2-SOP-29.

□ Directs cram rods inserted.

□ Refer to ITS 3.4.5 for RCS leakage requirements.

□ Refer to ITS 3.4.1 for single loop operation. Condition C LCO requirements are currently not met until actions are complete to adjust APLHGR, MCPR, RPS APRM Scram and Rod Block settings for single loop operation. The Completion Time is 4 hours

□ Notify I&C to reduce APRM scram and rod block monitor trip setpoints. May be done by contacting WEC SRO.

□ Notifies Operations and Plant Management

□ Contacts WEC SRO for assistance and wok planning.

**EVENT 3**                                    **PO-3.0**

**Operating Control Rod Drive Pump trip**


**CONSOLE OPERATOR**

When directed by Lead Evaluator, **activate**

**malfunction** by depressing F5 key:


**RD18      CRD Suction Filter Clogged**, TRUE

**RD063419    34-19**  Rod Failure Accum

Trouble, TRUE, TUA 2:00 minutes

**RD062227    22-27**  Rod Failure Accum

Trouble, TRUE, TUA 2:20 minutes          **(F5)**

**ATC RO**

☐  Acknowledge and report

☐  Enter N2-SOP-30

☐  Monitor for override conditions and performs actions if required


**IF THESE OCCUR ....**

☐  RPV pressure is >900 psig AND

☐  Two or more accumulators for withdrawn control rods are inoperable AND

☐  Charging water header pressure <940 psig for 20 minutes

**THEN**

☐  **SCRAM** the reactor per N2-SOP-101C.

*RDS P1A trips*

*RDS flow and charging pressure drop to 0*


*The following annunciators alarm:*

*603318 CRD Pmp Suction Fltr Diff Press*

*High (first alarm)*

*After the RDS pump trips then:*


*603308 CRD Pmp 1A/1B Auto Trip*

*603309 CRD Pmp 1A Suct Press Low*

*603311 CRD Charging Wtr Press Low*

*603315 CRD PMP 1B Suct Press Low*

*603446 CRD Pmp Disch Hdr Press Low*

| INSTRUCTOR ACTIONS/ PLANT RESPONSE | OPERATOR ACTIONS |
|---|---|

*After 2:00 minutes, 603441 Rod Drive Accumulator Trouble alarms*

*Rod and Detector Display Amber Trouble light is lit for the affected accumulators*

*Accumulator 34-19 after 2:00 minute delay*

*Accumulator 22-27 after 2:20 minute delay*

□ Dispatches operator to report accumulator pressure for 34-19 and 22-27

□ Implements pump recovery actions

Note

While executing actions to restart an RDS pump the crew will monitor the "flowchart override" conditions and initiate a manual scram, if required. It is NOT expected to meet any of the required manual scram conditions.

**ROLE PLAY**

**Report as operator dispatched that both accumulator 34-19 and 22-27 pressure read 900 psig.**

□ Is RDS pump operating? **NO**

*Annunciator 602324, RWCU PUMP CLG WTR TEMP HIGH, is expected to be received after several minutes with no operating RDS pump.*

IF Annunciator 602324, RWCU PUMP CLG WTR TEMP HIGH, is received. **THEN** ..... Remove WCS from service as follows:

□ Throttle WCS*MOV200 until in service filters on hold.

□ Trip WCS pumps.

| INSTRUCTOR ACTIONS/ PLANT RESPONSE | OPERATOR ACTIONS |
|---|---|
| **NOTE**<br>RDS pump restoration is expected to be completed in less than 15 minutes. | **IF** An RDS pump can NOT be restored to service within 15 minutes OR indications of system breech exist.<br>**THEN**......Isolate RDS backfill by closing 2RDS-V20 (preferred) OR 2RDS-V2058. |
| **CONSOLE OPERATOR**<br>WHEN dispatched to swap RDS suction filter **DELETE malfunction RD18** WAIT 3 minutes and report to control room that suction filters are swapped. | □ Shift 2RDS-FC107 (RDS flow controller) to Manual.<br>□ Close FCV to minimum position.<br>□ Determines trip is caused by low suction pressure<br>□ Dispatches operator to swap RDS suction filters per N2-OP-30, Section F.1.0. |
| **AFTER RDS pump is operating delete malfunction RD06 to clear accumulator trouble condition.** | □ **Start a RDS pump (within 20 minutes of 2$^{nd}$ inoperable accumulator with Charging header pressure < 940 psig. (CT-1.0)**<br>□ WHEN a RDS pump is running, perform the following: |
| *Following RDS pump restart and flow control valve operation, system flow and pressure are restored to normal. Associated alarms will clear.* | □ Adjust RDS flow using 2RDS-FC107 to approximately 63 gpm.<br>□ Place 2RDS-FC107 in Auto.<br>□ IF WCS OR RPV backfill |

was removed from service,
THEN restore per SM/CRS.

❏  Verify WCS/RCS seal flows
and backfill flows per N2-
OP-30, Sections F.2.5
through F.2.9

❏  WHEN charging water
header pressure has been
restored above 940 psig,
exit this procedure (N2-
SOP-30).

❏  Report RDS pump is restarted

**EVENT 3 SRO Actions**

SRO

❏  Directs entry into SOP-30

❏  Declares two accumulators
inoperable with their pressure
below 940 psig and enters Tech
Spec 3.1.5 Condition B and
implements the REQUIRED
ACTIONS

B.  Two or more control rod scram
accumulators inoperable with
reactor steam dome pressure >900
psig.

B.1 Restore charging water header
pressure to >940 psig. Completion

Time is 20 minutes from discovery of Condition B concurrent with charging water header pressure < 940 psig

AND

B.2.1     Declare the associated control rod scram time "slow." Completion Time is 1 hour.

   OR

B.2.2     Declare the associated control rod inoperable. Completion Time is 1 hour.

**EVENT 4                          PO-4.0**

**Loss of Line 5 with EDG Failures**

**CONSOLE OPERATOR**

When directed by Lead Evaluator, **activate malfunction** by depressing F6 key:

**ED02A, Loss of Off-Site 115KV Line 5, TRUE**

**DG04A, DG 1 UV LOCA Start Failure is now in effect**

*Multiple 86 devices and annunciators actuate on P852. Div I and Div III EDG fail to start on undervoltage. 4160 VAC Emergency Switchgear ENS\*SWG101 and 102 deenergize. HPCS is now unavailable due to*

BOP RO

- ▢ Recognize and report Loss of Line 5 and Division I and Division III EDGs failed to start.
- ▢ Enters and executes N2-SOP-3
  - ▢ Determines that both Divisions (I and II) have not lost power
  - ▢ Determines Division I EDG did not energize the bus
  - ▢ Starts Division I EDG from P852 and reports EDG started

| INSTRUCTOR ACTIONS/ PLANT RESPONSE | OPERATOR ACTIONS |
|---|---|
| *SWG102 loss and is not recoverable.* <br><br> *SWP Non Essential MOVs close, isolating* <br><br> *SWP flow to CCS and CCP heat exchangers.* <br><br> *The Div I EDG will start when manually started* <br><br> *fro P852.* | □ Verifies output breaker 101-1 closes and observes ENS*SWG101 is energized <br><br> □ At P601, verifies Div II SWP Non-Essential MOVs close <br><br> □ After EDG energizes ENS*SWG101, verifies: <br>   □ Div I SWP Non-Essential MOVs close <br>   □ One Div I SWP pump restarts <br><br> □ WHEN SWP Pump restarts <br>   □ Open ALL SWP Non-Essential MOVs <br>   □ Throttle SWP Pump Discharge MOV74's to maintain pump flow below 10,000 gpm <br>   □ Start a 3$^{rd}$ Div II SWP Pump and reopen MOV74's <br><br> □ Verify proper operation of EDG <br>   □ Voltage 4160 VAC <br>   □ Frequency 60 Hz <br>   □ SWP flow > 780 gpm <br> □ Restore pneumatics to Drywell <br>   □ At P851 open IAS*SOV166 <br>   □ At P601 open IAS*SOV164 <br> □ Refer to Attachment 1 for subsequent actions and fault |

identification

Role Play: If dispatched to perform switchyard
to electrical power distribution panel
walkdowns, wait approximately 5 minutes then
report back that all indications are good and
only targets found were Div I under voltage
trips.

## ATC RO

Subsequent Actions (N2-SOP-3
Attachment 1)

☐ Reports GTS running on the
  Reactor Building

☐ Restores drywell cooling by
  restarting unit coolers on P873.

☐ Secures CWS blowdown if
  required.

☐ Restores CMS.

    ☐ Open 2CMS*SOV62B

    ☐ Open 2CMS*SOV60A

    ☐ Open 2CMS*SOV62A

    ☐ Open 2CMS*SOV60B

    ☐ Restart or verify in standby the
       Div I H2/O2 Monitor in

**CONSOLE OPERATOR**

**WHEN** requested to start CMS10 sample
pumps, **manually activate** remotes as
requested

**RM03 for CMS*RE10A, ON**

       accordance with N2-OP-82

       (May not be performed)

    ☐ Notify Rad Protection to start
       2CMS*RE10A AND verify the
       monitor is on line and working
       properly

    ☐ Notify Rad Protection to start
       2CMS*RE10B AND verify the
       monitor is on line and working
       properly

## SRO

| INSTRUCTOR ACTIONS/ PLANT RESPONSE | OPERATOR ACTIONS |
|---|---|
| | ☐ Directs entry into N2-SOP-3 |
| | ☐ Directs subsequent and fault identification actions |
| *Line 5 loss with CSH EDG failing to start results in loss of power to HPCS. HPCS is now inoperable and with LPCS already inoperable for maintenance, Tech Spec 3.5.1 Condition H is entered. This is the most restrictive LCO.* | ☐ Declares HPCS inoperable AND with LPCS already inoperable enter Tech Spec 3.5.1 Condition H |
| | Condition H not met for HPCS and Low Pressure Core Spray (LPCS) Systems inoperable. REQUIRED ACTION H.1 Enter LCO 3.0.3 COMPLETION TIME Immediately |
| | ☐ Enters Tech Spec LCO 3.0.3 LCO 3.0.3 When an LCO is not met and the associated ACTIONS are not met, an associated ACTION is not provided, or if directed by the associated ACTIONS, the unit shall be placed in a MODE or other specified condition in which the LCO is not applicable. Action shall be initiated within 1 hour to place the unit, as applicable, in: |
| | a.     MODE 2 within 7 hours; |
| | b.     MODE 3 within 13 hours; and |
| | c.     MODE 4 within 37 hours. |
| | ☐ Enters Tech Spec 3.5.1 Condition B |

|  |  |
|---|---|
|  | for HPCS inoperable |
|  | ❑ High Pressure Core Spray (HPCS) System inoperable. |
|  | ❑ REQUIRED ACTIONS |
|  | B.1    Verify by administrative means RCIC System is OPERABLE when RCIC is required to be OPERABLE. Completion Time is Immediately AND |
|  | B.2    Restore HPCS System to OPERABLE status. Completion Time is 14 days |
| TS 3.8.1 Condition D is most restrictive after LCO 3.0.3 considerations, with 12 hour completion time for line or EDG restoration. Then 72 hours for the other component. | ❑ Enters Tech. Spec. 3.8.1 and Condition A |
|  | ❑ Condition A not met for Line 5 |
|  | ❑ REQUIRED ACTION A.1 directs N2-OSP-LOG W001 performed within 1 hour and every 8 hours thereafter. |
|  | ❑ AND A.2 is not applicable under current conditions |
|  | ❑ AND A.3 Restore required offsite circuit to OPERABLE status. Completion Time 72 hours |

    ❑  Condition B not met for Div III EDG

    ❑  Condition D not met Line 5 AND Div III EDG

One required offsite circuit inoperable.

AND

One required DG inoperable.

REQUIRED ACTION

D.1    Restore required offsite circuit to OPERABLE status. Completion Time 12 hours

OR

D.2    Restore required DG to OPERABLE status. Completion Time 12 hours

❑  Conducts crew briefing

❑  Notifies Operations and Plant Management

❑  Contacts WEC SRO for assistance and wok planning.

**EVENT 5 RCS Coolant Leakage into the**

**Drywell                          PO-5.0**

**CONSOLE OPERATOR**

When directed by Lead Evaluator, **activate**

**malfunction** by depressing F7 key:

**RR20 RR Loop Rupture – DBA LOCA**

**Value 1.5**

*RCS coolant leakage into DW is initiated. IF*

*CMS\*RE10s have been returned to service*

*following power loss, annunciator 851254*

*PROCESS AIRBORNE RAD MONITOR*

*ACTIVATED alarms.*

*DRMS computer indicates CMS\*RE10s*

*alarming.*

*Drywell floor drain leak rate rising.*

*Drywell pressure begins to rise.*

*DWP slowly rises and 603140 DRYWELL*

*PRESSURE HIGH/LOW alarms at about 0.78*

*psig*

*A manual scram should be directed prior to the*

*automatic high drywell pressure RPS trip*

*setpoint of 1.68 psig*

BOP RO

❑ Reports alarm 851254 and

   implements actions

   ❑ Determine the source(s) of the

      alarm by reviewing the status of

      the DRMS monitors using the

      STATUS GRID function of the

      DRMS console. Color-coded

      identification is used for status

      of normal (green), alert alarm

      (yellow), high radiation (red),

      suspect data (white), and

      equipment failure (blue). For

      applicable alarm response refer

      to Table 851254. For alert

      response refer to step e.

   ❑ If there has been an increase in

      containment activity as

      evidenced by an alert or High

      Rad alarm on the gaseous or

      particulate channel of

CMS\*RE10A or B:

- ☐ Notify the SM.

- ☐ Notify the Rad. Prot.
  Department.

- ☐ Attempt to identify the cause
  of the increase, notify
  Chemistry to sample
  containment.

- ☐ Verify Reactor Coolant
  leakage is within Tech.
  Spec. limits (see Tech.
  Spec. 3.4.3.2). {ITS 3.4.5}

**EVENT 5 and 6 SRO Actions**

**PO-5.0 and 6.0**

**CONSOLE OPERATOR**

**WHEN** Mode Switch is placed in Shutdown ,
**verify** change in status of malfunction RR20

**RR20 RR Loop Rupture – DBA LOCA Value
10; Ramp Time 10:00 minutes          ET01**

ET01  Mode Switch in Shutdown.

IF ET01 fails to trigger RR20 ......MANUALLY
enter RR20, 10%, Ramp Time 10:00 minutes

SRO

- ☐ Updates crew and identifies the
  threshold DWP value that the
  reactor will be scrammed at when
  reached.

- ☐ When DWP threshold is reached,
  directs manual scram

- ☐ Receive and repeat back scram
  report

- ☐ Enters EOP-RPV on low RPV
  water level at 159 inches

- ☐ Directs initial level restored and
  maintained 160 inches to 200
  inches with Feedwater, CRD, RCIC
  (L-3)

□ Directs RPV pressure band 800 to 1000 psig with EHC in automatic using BPV (P-5)

□ Enters EOP-PC on high Drywell pressure when DWP reaches 1.68 psig

    □ May direct Suppression Chamber and Drwyell spray initiation. If this is directed, the SRO will have to redirect RHS for injection, when level drops below TAF -14 inches.

□ When loss of high pressure feed systems occurs determines RPV water level cannot be maintained above -14 inches (TAF)

□ May direct SLS injected from Boron Tank

□ Transition to EOP-RPV at (2)

□ Directs ADS inhibited (L-5)

□ Directs level restored and maintained above -14 inches (Fig Z) with Preferred Injection Systems from Detail E1  (L-6)

□ Are 2 or more Subsystems Detail F lineup? (L-7) YES; LPCI B and LPCI C

□ WAIT until level drops to -14 inches (Fig Z) (L-9)

**Detail E1 Preferred Injection Systems**

- Condensate/Feedwater (tripped)
- RCIC (available)
- HPCS (power loss)
- LPCS (not available)
- LPCI (B and C only available)
- RHS through Shutdown Cooling (RHS B after depressurizing)

| INSTRUCTOR ACTIONS/ PLANT RESPONSE | OPERATOR ACTIONS |
|---|---|

**OPERATOR ACTIONS**

☐ Is any Subsystems Detail F lineup with a pump running? (L-10) YES; LPCI B and LPCI C

☐ Is any injection source lineup with a pump running? (L-12) YES; LPCI B and LPCI C

**INSTRUCTOR ACTIONS/PLANT RESPONSE**

**Detail F Injection Subsystems**

- Condensate/Feedwater (NO)

- HPCS (NO)

- LPCI A (NO)

- LPCI B (YES)

- LPCI C (YES)

- LPCS (NO)

*After applying Fuel Zone Correction using Fig Z, TAF -14 inches is about -52 inches AND MSCRWL -39 inches is about -72 inches at 800 psig.*

☐ BEFORE water level drops to -39 inches (Fig Z) .......ENTER EOP-C2 RPV Blowdown while continuing here (EOP-RPV step L-16)

☐ Executes EOP-C2 as follows:

☐ Determines reactor WILL stay shutdown without boron (Step 2)

☐ Drywell Pressure? Above 1.68 psig (Step 9)

☐ Prevent LPCS and LPCI injection not needed for core cooling. (Step 10) Current conditions require injection, so NO system injection is to be prevented.

☐ Determines SPL is above 192 feet (Step 11)

☐ Directs all 7 ADS valves open (Step 12)

☐ When all 7 ADS valves are reported open, continues in C2 to WAIT blocks (Step 16 then 17)

| INSTRUCTOR ACTIONS/ PLANT RESPONSE | OPERATOR ACTIONS |
|---|---|
| *When RPV injection is established with RHS B and C systems, RPV water level will turn and be restored above -39 inches. After level is restored, SRO should direct RHR system A lined up for Containment Spray* | ☐ **Continues EOP-RPV actions at step L-16 and directs RPV water level restored and mainatained above -39 inches (Fig Z) with Preferred Injection Systems from Detail E1** |
| | ☐ **RHS B and RHS C (LPCI) are to be injected (CT-2.0)** |
| | ☐ Determines RPV water level can be restored and maintained above -14 inches (Fig Z) per Step L-4 override and returns to EOP-RPV at ①  |
| | ☐ Directs RPV water level is restored and maintained 160 to 200 inches using RHS C and RHS B |
| | ☐ WHEN water level is restored above -14 inches, directs RHS B lined up for Containment Spray |
| SRO Actions directed from EOP-PC | These actions are directed from EOP-PC |
| | ☐ Directs RHR Loop B placed in Suppression Chamber Spray but only if pump is not needed fore core cooling. |
| | ☐ WAIT until Suppression Chamber Pressure is above 10 psig |

| INSTRUCTOR ACTIONS/ PLANT RESPONSE | OPERATOR ACTIONS |
|---|---|
| | □ Verify DW parameters are inside Drywell Spray Initiation Limit (EOP-PC Fig K) |
| | □ Directs tripping RCS Pumps (Should already be tripped) |
| | □ Directs Drywell Unit Coolers tripped (Should already be tripped) |
| Defeating Drywell Spray interlocks is necessary due to Div II ECCS initiation logic failure (malfunction RH14B). | □ Directs RHS B lined up for Drywell Spray per EOP-6 Attachment 22 |
| |    □ Defeating Drywell Spray interlocks is necessary |
| **EVENT 5 and 6 ATC RO/BOP RO as directed** **PO-5.0 and PO-6.0** | <u>ATC RO</u> |
| | □ WHEN DWP reaches pre-determined value and when directed by the SRO, places Mode Switch in Shutdown |
| | □ Provides scram report to SRO |
| | □ Performs Scram Actions per N2-SOP-101C |
| |    □ Verify automatic responses: |
| |       □ All rods full in |
| |       □ Rx power lowering |
| |       □ Turbine tripped/TSVs & TCVs shut |
| |       □ Generator tripped and house loads transferred |
| |       □ SDV Vents &Drain valves closed |

- ☐ RCS pumps downshift
- ☐ RPV pressure on TBVs OR SRVs
- ☐ FWLC controlling level > 159.3 inches
- ☐ IF all Feedwater pumps have tripped THEN place all FWS-LV10 and 55 controllers in manual and verify valves are full closed
- ☐ IF scram cannot be reset, if directed by SRO closes RDS-V28 Charging Header Isol by dispatching operator.
- ☐ Perform the following as time permits:
  - ☐ Fully insert IRMs AND SRMs.
  - ☐ Energize 2WCS-MOV107 (2NHS-MCC008-2E).
  - ☐ If required, secure makeup to the Cooling Tower.
  - ☐ At 2CEC-PNL842, shutdown HWC.
- ☐ **IF** WCS is in one pump three filter lineup.....**THEN** throttle close 2WCS*MOV200 (AND if required, throttle open 2WCS-M0V110) to obtain approximately 225 gpm WCS

flow.

❑ Maintains RPV water level in directed band

❑ Reports NPS-SWG003 de-energized and resulting loss of Feedwater system

**BOP RO Actions performed as directed**

*When RPV water level drops to 108.8 inches RCIC starts and water Level 2 containment isolation occurs. Standby Gas Treatment systems and Control Building Special Filter Trains start.*

**EVENT 7 Division II Low Pressure ECCS Systems fail to start        PO-7.0**

BOP RO

❑ When RPV level drops to 108 inches report RCIC start

❑ Inhibits ADS using 2 keylock switches

❑ When DWP reaches 1.68 psig

   ❑ Inform SRO of EOP entry condition

   ❑ Verify Div II ECCS systems start

      ❑ Report failure to start

      ❑ **Manually start RHS C Pump (CT-2.0)**

      ❑ **Manually start RHS B Pump (CT-2.0)**

      ❑ Report pumps started

❑ Opens all 7 ADS valves by arming and depressing ADS MANUAL INITIATION pushbuttons on P601

❑ Reports 7 ADS valves are open

❑ **Injects with systems to restore**

**After RPV Blowdown, RHS Injection MOVs**

must be opened from P601 to establish injection. When level begins to rise and transitions from Fuel Zone to Wide Range instruments, action should be taken to close RHS LPCI injection MOVs to prevent overfilling the RPV (control level below 202 inches). This will also allow RHS B loop to be diverted to Containment Spray.

.

**Containment Spray**
**PO-8.0**

**CONSOLE OPERATOR**

**WHEN** requested to defeat Drywell Spray valve interlocks per EOP-6 Attachment 22, **WAIT 2 minutes then activate remote** by depressing **F8** key. Report the jumpers are installed

**RH48  2RHS*MOV15B EOP Jumper, TRUE**

**F8**

**RH50  2RHS*MOV25B EOP Jumper, TRUE**

**F8**

and maintain RPV water level in directed band   (CT-2.0)

☐  **RHS Via Shutdown Cooling**

☐  **LPCI B (RHS), opens MOV24B**

☐  **LPCI C (RHS), opens MOV24C**

☐  When directed initiates Drywell Spray using RHS B per EOP-6 Attachment 22  step 3.2.2 (*2CEC*PNL601*).

☐  IF Drywell spray valve interlocks are not met, defeat the RHS*MOV15B/25B interlock by performing the following:

**NOTE:** Dispatches another operator to install jumpers

☐  At 2CEC*PNL704A, install EOP Jumper #33 from terminal strip TC110, TB2 terminal 7 to terminal strip TC112, TB2 terminal 19. (Figure 22-2)

☐  At 2CEC*PNL704A, install EOP Jumper #34 from

terminal strip TC108, TB1
terminal 2 to terminal strip
TC108, TB1 terminal 4.
(Figure 22-3)

**NOTE:** Verifying SWP*MOV90B open
may be delayed until after sprays
are in service.

- ☐ Verify open SWP*MOV90B,
  HEAT EXCHANGER 1B SVCE
  WTR INLET VLV

- ☐ Verify closed AND IF possible
  overridden, RHS*MOV24B,
  LPCI B INJECTION VLV

- ☐ Verify running RHS*P1B, PMP
  1B

- ☐ IF Suppression Chamber
  Sprays are required
  concurrently with Drywell
  Sprays, perform the following:

  - ☐ Open RHS*MOV33B,
    OUTLET TO SUPPR POOL
    SPRAY

  - ☐ Verify approximately 450
    gpm on SUPPR SPRAY
    HEADER FLOW
    (2RHS*FI64B)

- ☐ Verify closed, RHS*FV38B,
  RETURN TO SUPPR POOL
  COOLING

- ☐ Verify open, RHS*MOV4B,

|  |  |
|--|--|
|  | PMP 1B MINIMUM FLOW VLV |
|  | ☐ Open RHS\*MOV25B, OUTLET TO DRYWELL SPRAY |
|  | ☐ Open RHS\*MOV15B, OUTLET TO DRYWELL SPRAY |
|  | ☐ Verify closed, RHS\*MOV4B, PMP 1B MINIMUM FLOW VLV |
|  | ☐ Verify approximately 7450 gpm on DRYWELL SPRAY HEADER FLOW (*2RHS\*FI63B*) |
|  | ☐ Verify open SWP\*MOV90B, HEAT EXCHANGER 1B SVCE WTR INLET VLV |
|  | ☐ Throttle open SWP\*MOV33B, HEAT EXCHANGER 1B SVCE WTR OUTLET VLV to establish Service Water flow to RHR Heat Exchanger 1B of approximately 7400 gpm (*E12-R602B*) |
|  | ☐ WHEN possible, close RHS\*MOV8B, HEAT EXCHANGER 1B INLET BYPASS VLV |
| **CONSOLE OPERATOR**<br><br>When requested by BOP RO/ATC RO to place radiation monitor SWP\*RE23B in service (if not already in service), **manually activate remotes,** then report RE23B is in service:<br><br>**RM02 SWP23B Rad Detector Online/Offline, ON**<br><br>**RM03 SWP23B Process Monitor Sample Pump, ON** | ☐ Request Rad Monitor SWP\*RE23B placed in service. |

| INSTRUCTOR ACTIONS/ PLANT RESPONSE | OPERATOR ACTIONS |
|---|---|

**TERMINATION CRITERIA**
RPV Blowdown is complete and RPV level is maintained above TAF. Drywell Spray is initiated.

**EVENT 8 SRO Admin JPM 5-2**

<u>SRO</u>

Classify the event as ALERT 3.1.1

Evaluator to perform SRO Admin JPM for emergency classification.

V.  POST SCENARIO CRITIQUE

    A.  After the second caucus, convene the crew in the classroom for a facilitative critique on:

        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

1.  10CFR55.45

2.  10CFR55.59


VII.  LESSONS LEARNED


<u>None</u>

| Facility: **Nine Mile Point 2** | Scenario No.: **NRC-03** | Op-Test No.: **NRC-01** |
|---|---|---|

Examiners: _____    Operators: _____

Initial Conditions: Simulator IC-10 with additional rods withdrawn to raise power to about 4.5%. Reactor startup in progress per N2-OP-101A.

Turnover:  Continue power ascension; N2-OP-101A; Section E.3.0, Step 3.3.

Continue the startup, transfer the reactor mode switch to run after APRM downscale condition is cleared (above 4%). EHC Pump B is out of service for motor repairs.

| Event No. | Malf. No. | Event Type* | Event Description |
|---|---|---|---|
| 1 |  | R (ATC) R (SRO) | Withdraw control rods raise reactor power to above 5%. Several control rods must be withdrawn to raise power to clear the APRM downscale condition. **N2-OP-101A** |
| 2 | NM09A | I (ATC) I (SRO) | IRM A Failure – Inop Trip. The crew will bypass the failed instrument and reset the resulting RPS channel trip. (TS determination for SRO). Tech Spec 3.3.1.1 |
| 3 | CW01A | C (BOP) TS (SRO) | Service Water Pump A trip occurs requiring a standby pump to be placed in service. With less than 4 operating pumps, an additional pumps must be started with 72 hour COMPLETION TIME. **N2-OP-11** **Tech Spec 3.7.1** |
| 4 | RD05 34-27 | C (ATC) C (SRO) | Control Rod 34-27 Drift Out.  N2-SOP-8 will be executed to fully insert and isolate the control rod.  With power level below RWM setpoint the RWM must be bypassed to insert the drifting rod. **N2-SOP-8** **Tech Spec 3.1.5** |
| 5 |  | N (ALL) | Transfer Reactor Mode Switch in RUN. **N2-OP-101A** |
| 6 | FW30A FW16A | I (ATC) I (SRO) | Feedwater Pump A minimum flow valve fails open with RPV Narrow Range level input to FWLC failed as-is.  RPV water level transient results requiring crew to take manual control of level control valve to prevent an automatic protective function then transfer to redundant Narrow Range transmitter before returning FWLC to automatic control. **N2-SOP-6** **N2-OP-3** |
| 7 | Override | TS (SRO) | (SRO) MCC 302 Feeder Breaker to ICS*MOV128 RCIC Steam Line Containment Isolation Valve trips open.  Prevents isolation valve from closing on subsequent steam leak. · **Tech Spec 3.6.1.3** |

| 8 | RC12<br>25% 10<br>min<br>ramp<br>RC11<br>TC15A<br>TC15B | M (ALL) | RCIC Steam Leak into Reactor Building with Failure to isolate. Automatic and manual attempts to isolate the RCIC steam line will be unsuccessful. Entry in EOP-SC is required and the reactor will be manually scrammed. EHC Pump trip results in loss of Bypass Valve capability, if used to anticipate RPV Blowdown.<br>**N2-EOP-RPV**<br>**N2-EOP-SC** |
|---|---|---|---|
| | | | |
| 9 | PC06 | C (BOP) | Reactor Building Ventilation System failure to isolate on high radiation level. Requires action to close Secondary Containment Isolation Dampers and manually start Standby Gas Treatment systems to terminate a potential ground level release pathway.<br>**N2-OP-52** |
| | | | |
| 10 | AD08C | C (BOP) | When Reactor Building temperatures exceed 212°F an RPV Blowdown is required. ADS/SRV PSV 126 fails to open during RPV Blowdown due to Loss of $N_2$ supply. Requires operator action to open an additional SRV to obtain the number directed by EOP-C2<br>**N2-EOP-C2** |
| | | | |

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

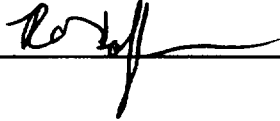| Facility: **Nine Mile Point 2** | Scenario No.: **NRC-03** | Op-Test No.: **NRC-01** | |
|---|---|---|---|
| TARGET QUANTITATIVE ATTRIBUTES<br>(PER SCENARIO; SEE SECTION D.5.d) | ACTUAL ATTRIBUTES | | |
| 1. Total malfunctions (5-8)<br>Events 2,3,6,7,9,10 | 6 | | |
| 2. Malfunctions after EOP entry (1-2)<br>Events 8,10 | 2 | | |
| 3. Abnormal events (2-4)<br>Event 4 SOP-8 Event 6 SOP-6 | 2 | | |
| 4. Major transients (1-2)<br>Event 8 | 1 | | |
| 5. EOPs entered/requiring substantive actions (1-2)<br>Event 8 EOP-RPV, EOP-SC | 2 | | |
| 6. EOP contingencies requiring substantive actions (0-2)<br>Event 10 EOP-C2 | 1 | | |
| 7. Critical tasks (2-3) | 3 | | |
| | | | |

**NRC Scenario 3**       **REV. 0**        **No. of Pages:__37_**

## TRANSFER MODE SWITCH TO RUN/CONTROL ROD DRIFT/UNISOLABLE RCIC STEAM LEAK WITH RPV BLOWDOWN

PREPARER _____G. Bobka_____  DATE 2/10/05_____

VALIDATED _____R. Lange, B. Moore, M. Smith____  DATE 2/16/05_____

GEN SUPERVISOR
OPS TRAINING ___*[signature]*_____  DATE 4/21/05_____

OPERATIONS
MANAGER _____NA Exam Security_____  DATE _____

CONFIGURATION
CONTROL _____NA Exam Security_____  DATE _____

## SCENARIO SUMMARY

Length:  2.5 hours

Initial Power Level:    4.5% with Mode Switch in STARTUP

The scenario begins at about 4.5% reactor power, during plant startup.  The crew will continue the startup by withdrawing control rods to raise power above 5% with subsequent Mode Switch transfer to RUN.  IRM A failure due to an inop trip occurs resulting in a trip if RPS trip system A.  The crew will bypass the failed instrument and reset the resulting RPS channel trip.

Service Water Pump A trips occurs requiring a standby pump to be placed in service.  With less than four operating Service Water pumps, Tech Spec entry is required.  Control Rod 34-27 will drift out.  N2-SOP-8 will be executed to fully insert and isolate the control rod.  With power level below RWM setpoint the RWM must be bypassed to insert the drifting rod.  The startup now continues and the crew completes steps until the Mode Switch is transferred to RUN. The scenario can continue regardless of whether the crew actually places the Mode Switch to RUN.

Feedwater Pump A minimum flow valve fails open with a concurrent failure of RPV Narrow Range level input to Feedwater Level Control System (FWLC). With the level transmitter failed as-is, an RPV water level transient results requiring crew to take manual control of level control valve to prevent an automatic protective trip function per N2-SOP-6.  When level is stabilized the crew will then transfer to redundant Narrow Range transmitter per normal operating procedures and subsequently return FWLC to automatic control.

The major transient begins when a RCIC Steam Leak into Reactor Building occurs.  Automatic and manual attempts to isolate the RCIC steam line will be unsuccessful.  Entry in EOP-SC is required and the reactor will be manually scrammed. Reactor Building Ventilation System fails to isolate on high radiation level.  This requires action to close Secondary Containment Isolation Dampers and manually start Standby Gas Treatment systems to terminate a potential ground level release pathway. When Reactor Building temperatures exceed 212°F in more than one area, an RPV Blowdown is required.

EHC Pump A trips to disable the Bypass Valves as a means of rapidly reducing RPV pressure to mitigate the steam leak. ADS/SRV PSV 126 fails to open during RPV Blowdown due to Loss of $N_2$ supply, requiring operator action to open an additional SRV to obtain the number directed by EOP-C2.

Major Procedures Exercised: EOP-RPV, SC, C-2. N2-SOP-6 and N2-SOP-8

EAL Classification:        SAE 3.4.1 Main Steam Line, RCIC steam line or Reactor Water Cleanup isolation failure AND release pathway, outside normal process system flowpaths from unisolable system exists outside primary containment

                          SAE 4.1.1 Primary system is discharging into RB resulting in RB area temperatures >212°F in more than one area, N2-EOP-SC

Termination Criteria:RPV Blowdown is complete and RPV level is maintained above TAF.

I. SIMULATOR SET UP

A. IC Number:   IC-10 or equivalent. (IC-48)
- ❏ RWM Step 29
- ❏ Pull rods to raise power to about 4.5%. Initial IC power level is 2.5%. Start of RWM step 31 will result in the proper initial scenario power level.
- ❏ Reset CSH HI WTR LEVEL SEAL IN
- ❏ Place EHC Pump B (TME-P1B) in P-T-L and hang red clearance tag on control switch.

B. Presets/Function Key Assignments

1. Malfunctions:

   a. PC06, Secondary Containment Isolation Failure, TRUE        QUEUED

   b. RC11, RCIC Isolation Failure, TRUE        QUEUED

   c. AD08C, ADS Valve $N_2$ Supply Severed (MSS*PSV126), TRUE        QUEUED

   d. NM09A, IRM Channel Failure INOP (A), TRUE        F3

   e. CW01A   Service Water Pump Trip A, TRUE        F4

   f. RD05 3427, Control Rod Failure Drift Out, TRUE        F5

   g. FW30A, Reactor NR Level Transmitter Failure As Is (4A), TRUE        F7

   h. FW16A, FW Pump Recirc Valve Failure Open (FV2A), TRUE        F7
   TUA 3 seconds

   i. RC12, RCIC Steam Leak in RB 215' Elevation
   25% Ramp Time 10 minutes        F9

   j. RC12, RCIC Steam Leak in RB 215' Elevation
   60%        F10

   k. TC15A, EHC Pump A Trip, TRUE        ET02

   l. TC15B, EHC Pump B Trip, TRUE        ET02

2. Remotes:

   a. MS03 Cond Low Vac Bypass OFF        QUEUED

   b. RD08 34-27 HCU Isolation, CLOSED        F6

3. Overrides:

   a. MOV 121, Switch Steam Supply Line Isolation (Outboard), OPEN   QUEUED

   b. MOV 128, Switch Steam Supply Line Isolation (Inboard), OPEN        QUEUED

   c. MOV 128, Light Steam Supply Inboard Isolation INOP Amber, ON        F8

   d. MOV 128, Light Steam Supply Line Isolation (Outboard) Green, OFF        F8

e. MOV 128, Light Steam Supply Line Isolation (Outboard) Red, OFF     F8

    f. MOV 121, Light Steam Supply Line Isolation (Outboard) Green, ON   ET01

    g. MOV 121, Light Not Fully OPEN, Amber , ON         ET01

4. Annunciators:

    a. AN601305, RCIC System Inoperable, ON          F8

    b. AN601319, RCIC Valves Motor Overload, ON       F8

C. Equipment Out of Service

    a. TMB-P1B EHC Pump B in P-T-L with red clearance on control switch

D. Support Documentation

    a. N2-OP-101A, Plant Startup complete through E.3.3

E. Miscellaneous

1. EVENT TRIGGERS

    a. ET01 ANN 601157 RB GEN TEMP HIGH IN ALARM (Event Trigger 68) When alarm actuates this results in indications of cause of the isolation failure.

    b. ET02 650 psig PAM A (Event Trigger 001). Trips EHC pump resulting in loss of Turbine Bypass Valves.

## II.                   SHIFT TURNOVER INFORMATION

OFF GOING SHIFT:          ☐ N                          ☐ D    DATE: _____

**PART I:      To be <u>performed</u> by the oncoming Operator <u>before</u> assuming the shift.**

- Control Panel Walkdown (all panels)  (SM, CRS, STA, CSO, CRE)

**PART II:      To be <u>reviewed</u> by the oncoming Operator <u>before</u> assuming the shift.**

- Shift Supervisor Log (SM, CRS, STA)
- CSO Log (CSO)
- Lit Control Room Annunciators (SM, CRS, STA, CSO, CRE)

- Shift Turnover Checklist (ALL)
- LCO Status (SM, CRS, STA)
- Computer Alarm Summary (CSO)

Evolutions/General    Information/Equipment Status:

- Reactor Power = 4.5% approx
- RWM Step 31
- RPV Pressure 925 psig
- Bypass Valve #1 is full open and #2 is partially open
- Feedwater Pump A in service with FWS-LV55A in AUTO (HIC137)
- EHC Pump B is out of service for motor repair.  Red clearance issued.
Scheduled return to service date is May 20.

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

- Continue plant startup to place the reactor mode switch to RUN per N2-OP-101A. Currently at step E.3.3

_____

_____

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

- Review new Clearances (SM)
- Shift Crew Composition (SM/CRS)
- 

- Test Control Annunciators (CRE)

| TITLE | NAME | TITLE | NAME |
|-------|------|-------|------|
| SRO | | | |
| ATC RO | | | |
| BOP RO | | | |
| | | | |

| Scenario ID# |
|---|

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

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

PERFORMANCE OBJECTIVES

A. Critical Tasks:

CT-1.0    Given a condition requiring automatic isolation of Secondary
         Containment  and a failure of Ventilation isolation, the crew will
         manually isolate the reactor building by closing Secondary
         Containment isolation dampers and start GTS.

CT-2.0    Given an unisolable RCIC steam leak and secondary containment
         temperature approaching maximum safe values in one area, the
         crew will enter EOP-RPV and initiate a manual reactor scram
         before performing an RPV Blowdown.

CT-3.0    Given an unisolable RCIC steam leak and secondary containment
         temperature above maximum safe values in more than one area,
         the crew will perform an RPV Blowdown per EOP-C2.

B. Performance Objectives:

PO-1.0    Given the plant during startup and an IRM INOP trip, the crew will
         bypass the failed IRM and reset RPS trip systems per N2-OP-92
         and N2-OP-97.

PO-2.0    Given a Service Water Pump trip the crew will start a standby
         pump to restore the plant to 4 operating pumps per N2-OP-11.

PO-3.0    Given the reactor plant during startup and a control rod drifting out,
         the crew will fully insert and disarm the control rod per N2-SOP-8.

PO-4.0    Given a failed open Feedwater pump minimum flow valve with RPV
         level instrument failure resulting in lowering RPV water level, the
         crew will manually control level to avoid a reactor scram per N2-
         SOP-6 and N2-OP-3.

PO-5.0 Given a RCIC steam leak and temperatures approaching 212°F, the crew will manually scram per N2-EOP-SC and EOP-RPV.

PO-6.0 Given a RCIC steam leak and temperatures in two areas exceeding 212°F, the crew will perform an RPV Blowdown per N2-EOP-C2.

Crew

- Crew conducts a pre-brief, walks down the panels, and tests annunciators.

**EVENT 1  Continue Startup**

SRO

☐  Directs plant startup continued

ATC RO

The crew continues the startup per N2-OP-101A E.3.3

☐  Continue to withdraw control rods UNTIL APRM downscale lights have cleared.

☐  Verify APRMs reading greater than 5% by placing IRM/APRM recorder select switch to APRM.

☐  In EACH Reactor Protection Division leave one IRM/APRM recorder select switch placed in the APRM position.

**EVENT 2**

**IRM A Failure Inop Trip            PO-1.0**

**CONSOLE OPERATOR**

When power is above 5% or when directed by Lead Evaluator, **activate malfunction** by depressing F3 key:

**NM09A, IRM  CHANNEL  FAILURE-INOP  (A), TRUE,                                    (F3)**

SRO

☐  Acknowledges report of IRM A INOP trip and RPS A half scram

☐  Directs IRM A bypassed

☐  Directs RPS trip system A reset

☐  Notifies Operations and Plant Management

| INSTRUCTOR ACTIONS/ PLANT RESPONSE | OPERATOR ACTIONS |
|---|---|
| *IRM A channel fails upscale resulting in RPS trips system A trip. On left side of P603, the 4 white RPS scram lights are off. For IRM A the RED UPSC TR OR INOP light is on, indicating the effected channel. Rod withdrawal block.*<br><br>*The following annunciators alarm:*<br>*603102 RPS A NMS TRIP*<br>*603110 RPS A AUTO TRIP*<br>*603201 IRM TRIP SYSTEM A UPSCALE/INOPERABLE*<br>*603442 CONTROL ROD OUT BLOCK* | ▫ Contacts WEC SRO for assistance and work planning<br>▫ Enters Tech Spec 3.3.1.1 RPS Function 1 IRMs. No action is required since only 1 IRM channel is inoperable. (NOTE Also see TRM 3.3.2 Control Rod Block Instrumentation Function 2)<br>▫ Conducts post event brief<br>▫ May place startup activities on hold to resolve IRM failure<br><br>ATC RO<br>▫ Identifies and reports annunciators to SRO<br>▫ Implements ARP 603102 actions. 603110 actions are similar.<br><br>**These are 603102 actions**<br>▫ IF a SCRAM has occurred, THEN enter N2-SOP-101C, Reactor Scram. (Scram should NOT have occurred)<br>▫ IF NO SCRAM has occurred, THEN perform the following:<br>  ▫ Check the other IRM channels to verify that NO SCRAM should have occurred. |

□ IF a SCRAM should have occurred, THEN enter the Emergency Operating Procedures. (Scram should NOT have occurred)

□ IF NO SCRAM should have occurred, THEN perform the following:

□ Troubleshoot AND correct the cause of the alarm.

□ Refer to Technical Specifications for actions.

□ IF desired, THEN bypass the applicable IRM per N2-OP-92.

□ WHEN the initiating signal is cleared OR bypassed, THEN reset the half SCRAM per N2-OP-97.

ATC RO

These are 603201 actions

□ At P603 determine by red UPSCL/INOP light which IRM channel is tripped. (Determines IRM A is INOP)

□ Verify associated range switch setting is correct.

□ Consult with S.S.S. and bypass faulty channel.

| INSTRUCTOR ACTIONS/ PLANT RESPONSE | OPERATOR ACTIONS |
|---|---|
| ATC RO Bypass IRM A | ATC RO |
| | **These actions are taken to bypass IRM A, when directed** |
| | * * * * * * * * * * * * * * * * * * * * * * * * * * * |
| | **CAUTION** |
| | Bypass joysticks can become electrically misaligned after numerous bending motions due to "Metal Creep". Any bypass function should be verified by channel BYPASS lights to ensure that only the intended channel is bypassed. |
| | * * * * * * * * * * * * * * * * * * * * * * * * |
| | ☐ Verify NO other IRM in bypass for the instrument to be bypassed. |
| *When IRM is bypassed the following annunciators clear:* | ☐ Place the IRM BYPASS joystick to the bypass position. |
| *603102 RPS A NMS TRIP* | ☐ IF IRM A was bypassed, THEN verify the IRM A BYPASS light is lit on 2CEC*PNL603 OR H13-P606 |
| *603201 IRM TRIP SYSTEM A UPSCALE/INOPERABLE* | |
| *603442 CONTROL ROD OUT BLOCK* | |
| ATC RO Reset of Tripped Protective System Channel (RESET HALF SCRAM) | ATC RO |
| | **These actions are taken to reset the RPS trip, when directed** |
| | ☐ Determine which protective channel is tripped by verifying which SCRAM solenoid lights on 2CEC*PNL603 are de-energized. |
| | ☐ At 2CEC*PNL603, reset SCRAM signals by momentarily placing the |

| INSTRUCTOR ACTIONS/ PLANT RESPONSE | OPERATOR ACTIONS |
|---|---|
| | applicable switches to RESET as follows: |
| *When RPS A trip system is reset the following PILOT SCRAM VALVE SOLENOID white lights A, C, E AND G light and 603110 RPS A AUTO TRIP clears..* | For RPS A: <br> □ REACTOR SCRAM RESET LOGIC A <br> □ REACTOR SCRAM RESET LOGIC C <br> □ Verify PILOT SCRAM VALVE SOLENOID white lights A, C, E AND G are lit. |
| **EVENT 3** <br><br> **Service Water Pump A Trip      PO-2.0** | |
| **CONSOLE OPERATOR** <br> When power directed by Lead Evaluator, **activate malfunction** by depressing F4 key: <br><br> **CW01A, Service Water Pump Trip (P1A), TRUE,                                (F4)** <br><br> *Service Water (SWP) Pump A trips. Flows rise on the remaining operating SWP pumps.* <br><br> *The following annunciators alarm:* <br> *601113 Service Water Pump 1A/1C/1E PUMP AUTO TRIP/FAIL TO START* <br> *601114 Service Water Pump 1A/1C/1E Motor / Feeder Electrical Fault.* | **SRO** <br> □ Refers to Tech Spec 3.7.1 Service Water (SW) System and Ultimate Heat Sink (UHS) <br><br> LCO 3.7.1 Division 1 and 2 SW subsystems and UHS shall be OPERABLE. <br> AND <br> **Four OPERABLE SW pumps shall be in operation.** <br> APPLICABILITY: MODES 1, 2, and 3 <br> CONDITION E. One required SW pump not in operation. |

| INSTRUCTOR ACTIONS/ PLANT RESPONSE | OPERATOR ACTIONS |
|---|---|
|  | REQUIRED ACTION E.1 Restore required SW pump to operation. COMPLETION TIME 72 hours |
|  | ❑ Notifies Operations and Plant Management |
|  | ❑ Contacts WEC SRO for assistance and work planning |
|  | ❑ Conducts post event brief |
|  | **BOP RO** |
|  | ❑ Recognizes and reports condition of the SWP\*P1A tripped to the SRO. |
| Role Play IF dispatched to perform prestart checks when starting pump per N2-OP-11 E.2.0, WAIT about 2 minutes and report ready to start the standby pump. | ❑ Performs actions required by N2-ARP-01, 601113 (or 601114 actions are the same): |
|  | ❑ IF required, throttle 2SWP\*MOV74A(B,C,D,E,F) to maintain running SWP Pump flow 10,000 gpm. *(Pumps B, C and D will require throttling)* |
|  | ❑ Start additional Service Water Pumps, as required, at P601 as follows: |
|  | • IF time permits per N2-OP-11 Section E.2.0, OR |
|  | • Place associated pump control switch to START |
| Role Play: As the AO, wait three minutes and report that Service Water Pump P1A, 86-lockout relay is tripped. | ❑ Place the tripped Service Water Pump control switch in "PULL-TO-LOCK", at P601. |

|                                                      | OPERATOR ACTIONS |
|------------------------------------------------------|------------------|
|                                                      | ☐ Notifies SRO to refer to Technical Specifications. |
|                                                      | ☐ Dispatches AO to investigate the cause of P1A trip. |
|                                                      | ☐ Reopen any MOV74's previously throttled |

**EVENT 4**                                    **PO-3.0**

**Control Rod 34-27 Drift**

**CONSOLE OPERATOR**

When directed by Lead Evaluator, **activate malfunction** by depressing F5 key:

**SRO**

**RD05 3427, Control Rod Failure Drift Out,**    ☐ Directs entry into N2-SOP-8
**TRUE**                                    **F5**    ☐ Provides reactivity oversight

☐ Refer to TS 3.1.3, Control Rod Operability.

*Control Rod 34-27 slowly drifts outward and*    ☐ Refer to TS 3.1.5, Control Rod
*power slowly rises.  RWM Display indicates*    Scram Accumulator Operability.
*34-27 is drifting out.*
*The following annunciators alarm*    ☐ Notifies Operations and Plant
*603307 RWM ROD BLOCK*    Management
*603443 CONTROL ROD DRIFT*    ☐ Contacts WEC SRO for assistance and work planning

☐ Conducts post event brief

☐ May place startup continuation on hold to resolve current equipment deficiencies.

| INSTRUCTOR ACTIONS/ PLANT RESPONSE | OPERATOR ACTIONS |
|---|---|
| | <u>ATC RO</u><br><br>❑ Reports alarms and implements Annunciator 603443 actions<br>    ❑ Determine whether alarm is valid by checking the Full Core Display AND Four Rod Display.<br>    ❑ IF alarm is valid, enter N2-SOP-08, Unplanned Power Changes, AND execute concurrently with this ARP.<br>    ❑ Refer to N2-OP-95A, F.3.0, Rod Drift Indication, to reset Drift alarm. |
| Note<br>Crew initiates N2-SOP-8 flowchart decision blocks by answering "YES/NO" questions. | ❑ Enters N2-SOP-8<br>    ❑ IF More than one control rod has scrammed OR drifted,<br>    ❑ THEN SCRAM the reactor per N2-SOP-101C. Scram not required, only 1 rod is drifting<br>    ❑ Power change due to Recirc FCV motion? **NO**<br><br>    ❑ Power on APRMs rising OR expected to rise? **YES**<br><br>    ❑ Reduce Reactor power to approximately 85% per N2-SOP-101D. **NA, Power is below 5%**<br>    ❑ Monitor Offgas AND Main Steam Line Radiation Monitors |

for evidence of Fuel Element
Failure.

□ IF Cause due to Control Rod
Drift ....THEN Continue at A (of
SOP-8)

ATC RO

**These are "A" actions**

□ Identify which control rod is
drifting and in what direction
CR _____ IN / OUT

□ Using INSERT pushbutton, fully
insert drifted control rod.

□ Bypass the RWM if necessary.
Uses keylock switch and
bypasses RWM.

*Rod will insert to full in after bypassing RWM
and using INSERT pushbutton.*

□ Can control rod be fully
inserted? **YES**

*After releasing the insert pushbutton, the rod
will drift out again.*

□ Release the insert pushbutton.

□ Did the control rod remain fully
inserted? **NO**

□ Depress and hold INSERT
pushbutton to maintain control
rod fully inserted.

**CONSOLE OPERATOR**

When dispatched to isolate HCU 34-27,

**activate REMOTE** by depressing F6 key :

□ When control rod is fully
inserted, close the following
valves at the HCU for the

**RD08 34-27, HCU Isolation for Inserted Rod**

                                                    **F6**

Wait one minute, then report HCU 34-27

drifting control rod.
2RDS*V103

| INSTRUCTOR ACTIONS/ PLANT RESPONSE | OPERATOR ACTIONS |
|---|---|
| isolated. | 2RDS*V105 |
| | ☐ Release INSERT pushbutton. |
| | ☐ Is the control rod drifting out? **NO** |
| \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* CAUTION FOR CONSOLE OPERATOR IF Instructor Station locks up with REMOTE RD08 core grid displayed THEN select rod 31-18 on the map. This should release the grid and allow continued console operation. \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* | |
| *After isolating the HCU, and the INSERT pushbutton is released, 34-27 no longer drifts out. With rod fully inserted, APRM power is lower. Annunciator 603215 APRM TRIP SYSTEM DOWNSCALE may alarm intermittently (at 4%).* | ☐ IF required, disarm the control rod per N2-OP-30. ☐ Refer to TS 3.1.3, Control Rod Operability. ☐ WHEN directed by the SM, exit this procedure. ☐ Refer to TS 3.1.5, Control Rod Scram Accumulator Operability. ☐ Contact Maintenance for troubleshoot/repair plan as required. |
| **EVENT 6 Feedwater Pump A Minimum Flow Valve fails open with RPV Narrow Range A level transmitter failed as is. PO-4.0** | |
| **CONSOLE OPERATOR** When directed by Lead Evaluator, **activate malfunction** by depressing F7 key: | <u>ATC RO</u> ☐ Reports alarms ☐ Monitors RPV water level and identifies difference between RX |

| INSTRUCTOR ACTIONS/ PLANT RESPONSE | OPERATOR ACTIONS |
|---|---|
| **FW16A, FW PUMP RECIRC VALVE FAILURE – OPEN (FV2A), TRUE** F7<br><br>**FW30A, REACTOR NR LEVEL TRANSMITTER FAILURE – AS IS (C33-N004A), TRUE** F7 | LEVEL NARROW RANGE A indicator and B and C indicators<br><br>□ Determines FWR-FV2A is ramped to 100% open<br><br>□ Enter SOP-6 due to lowering water level<br><br>□ Places FWS-LIK1055A (LV55A) to manual |
| *RX LEVEL NARROW RANGE A indicator is now failed at current value of about 183 inches. Feedwater Pump A minimum flow valve opens diverting feedflow from the RPV. RX LEVEL NARROW RANGE B and RX LEVEL NARROW RANGE C indicators slowly lower. With A failed, FWLC does not compensate for the transient.* | □ Restores water level as directed. (178 to 187 inches)<br><br>□ Determines RX LEVEL NARROW RANGE A indicator is malfunctioning. Recommends changeover to RX LEVEL NARROW RANGE B<br><br>□ If directed, inserts control rods to lower power |
| *The following annunciator alarm:*<br>*851456 CNST SYSTEM TROUBLE/ NO BACKUP PMP AVAILABLE*<br><br>*851457 CNST BSTR PMP SYS TROUBLE/NO BACKUP PMP AVAILABLE*<br>*851546 CNST PUMP DISCH HEADER FLOW LOW* | □ Per N2-OP-3 F.8.5, change Narrow Range Level Instruments as follows:<br><br>□ IF "B" Level Instrument is required, place LEVEL A/B CONTROL switch REACTOR WTR LEVEL C33A-S1 in LEVEL B position |
| NOTE:<br>May have to prompt SRO to use N2-OP-3 steps E.3.27 – E.3.30 to place FWLC in AUTO | □ As directed, place FWLC in auto (N2-OP-3 E.3.27 – E.3.30) |

| INSTRUCTOR ACTIONS/ PLANT RESPONSE | OPERATOR ACTIONS |
|---|---|
| with HIC137 controlling FWS-LV55A. | ☐ Adjust adjust 2CNM-HIC137, FEEDWATER LO FLOW CONTROLLER, tape setpoint to obtain equal signals as read in the input (vertical) AND output (horizontal) signal on 2FWS-LV55A(B) controller. |
| | ☐ Verify 2CNM-HIC137 indicator is in the green band. |
| | ☐ Depress Auto (A) pushbutton on 2FWS-LV55A(B) controller. |
| | ☐ Verify that Reactor water level is being maintained at the desired setpoint. |
| | **SRO** |
| | ☐ Directs entry into SOP-6 due to malfunctioning FWLC |
| | ☐ Determines RX LEVEL NARROW RANGE A instrument is inoperable |
| | ☐ Refers toTech Spec 3.3.2.2 for Feedwater System and Main Turbine High Water Level Trip Instrumentation |
| | LCO 3.3.2.2 Three channels of feedwater system and main turbine high water level trip nstrumentation shall be OPERABLE. |
| | APPLICABILITY: THERMAL POWER ≥ 25% RTP. |

| INSTRUCTOR ACTIONS/<br>PLANT RESPONSE | OPERATOR ACTIONS |
|---|---|
| | No action is required since power is below 25%. |
| NOTE:<br><br>May have to prompt SRO to use N2-OP-3 steps E.3.27 – E.3.30 to place FWLC in AUTO with HIC137 controlling FWS-LV55A. | ☐ May direct control rods inserted to lower power<br>☐ Directs FWLC system placed on RX LEVEL NARROW RANGE A instrument and FWLC returned to automatic control per N2-OP-3<br><br>☐ Notifies Operations and Plant Management<br>☐ Contacts WEC SRO for assistance and work planning<br>☐ Conducts post event brief |
| **EVENT 7 SRO Tech Spec**<br>**2ICS\*MOV128 Breaker Trip, Containment Isolation Valve Failed Open**<br><br>**CONSOLE OPERATOR:**<br>When directed by the Lead Evaluator, insert the following overrides for ICS\*MOV128 breaker trip, by depressing F8 key:<br>**MOV\*128, Steam Supply Line Isolation (Inboard) Green "OFF"**<br>**MOV\*128, Steam Supply Line Isolation (Inboard) Red "OFF"** | **BOP RO**<br>☐ Recognizes and reports RCIC Inboard Isolation Valve failure.<br>**These are 601305 actions**<br>☐ At 2CEC\*PNL601, determine IF any INOP Status Lights are energized.<br>☐ IF any INOP Status Lights are |

| INSTRUCTOR ACTIONS/ PLANT RESPONSE | OPERATOR ACTIONS |
|---|---|
| **MOV*128, Steam Supply Inboard Isolation – INOP Amber "ON"** | energized, refer to their applicable Alarm Response Procedure. |
| **AN601305, RCIC System Inoperable "ON"** **AN601319, RCIC Valve Motor Overload "ON"** | ❑ Determines INOP status light lit for TURB STM SPLY INBD ISOL VLV ICS*MOV128 |
| **All on F8** | **These are MOV128 Inop Status light actions** |
| **MOV*128 Steam Supply Line Isolation (Inboard) – "OPEN"** **Queued** | ❑ Using the energized red OR green indicating lights, confirm power |
| | ❑ available to ICS*MOV128, TURBINE STM SUPPLY INBOARD ISOL VLV. |
| | ❑ IF power is NOT available, dispatch an operator to 2EHS*MCC302. |
| | ❑ Confirm 2EHS*MCC302 Bkr. 14A, 2ICS*MOV128 Power Supply, is ON. |
| | SRO |
| | ❑ Acknowledges BOP RO report. |
| | ❑ Refers to T.S. 3.6.1.3, Primary Containment Isolation failure. |
| | From Bases B.3.6.1.3 The power operated, automatic isolation valves are required to have isolation times within limits and actuate on an automatic isolation signal. The valves covered by this LCO are listed with their associated stroke times in Ref. 1. (TRM) |

| INSTRUCTOR ACTIONS/ PLANT RESPONSE | OPERATOR ACTIONS |
|---|---|
| | CONDITION A One or more penetration flow paths with one PCIV inoperable except due to leakage not within limit. |
| | REQUIRED ACTION |
| | A.1 Isolate the affected penetration flow path by use of at least one closed and de-activated automatic valve, closed manual valve, blind flange, or check valve with flow through the valve secured. |
| | • COMPLETION TIME (for A.1) 4 hours except for main steam line. (Determines penetration must be isolated within 4 hours.) |
| | AND |
| | REQUIRED ACTION |
| | A.2 Verify the affected penetration flow path is isolated. |
| | COMPLETION TIME (for A.2) Once per 31 days for isolation devices outside primary containment |
| | ❑ Refer to TRM If necessary TRM 3.6.1 Primary Containment Isolation Valves |
| | The Primary Containment Isolation |

|  |  |
|---|---|
|  | Valves and, if applicable, valve groups, isolation signals, and isolation times are listed in Table T3.6.1-2. |
|  | □ May enter Tech. Spec. 3.5.3 for RCIC inoperable. |
|  | □ Notifies Operations and Plant Management |
|  | □ Contacts WEC SRO for assistance and work planning |
|  | □ Conducts post event brief |

Role Play: When dispatched by the BOP RO, ask for panel and breaker numbers.
Wait two (2) minutes and report breaker in the tripped condition. "No cause is apparent."

**EVENT 8 and 9 Unisolable RCIC Steam Reactor Building Ventilation Fails to isolate**

CONSOLE OPERATOR:
After Tech Specs are reviewed by the SRO for MOV*128 failure or when directed by Lead Evaluator, insert the following malfunction by depressing F9 key:
**RC12, RCIC Steam Leak in Reactor Building, 25% over 10 minute ramp            F9**

*The following annunciator alarms:*

BOP RO
□ Check DRMS CRT Display to determine RB HVR*RE32A/B alarming.
**These are 851254 Corrective Actions**

| INSTRUCTOR ACTIONS/ PLANT RESPONSE | OPERATOR ACTIONS |
|---|---|
| *851254 Process Airborne Rad Monitor* *Activated* | On High Radiation Level<br><br>☐ Verify Automatic Response has occurred, as applicable.<br><br>**Gaseous Rad Level High initiates the following (CT-1.0, also redirected from EOP-SC):**<br><br>☐ **RX Bldg Vent Emergency \*UC413A(B) starts. Suction Test DMPR\*AOD34A(B) will be open after manual start.**<br><br>☐ **Shuts RX Bldg Ventilation Supp Air Isol DMPR \*AOD1A/B.**<br><br>☐ **Shuts RX Bldg Ventilation Exh Air Isol DMPR \*AOD9A/B.**<br><br>☐ **Shuts RX Bldg Ventilation Refuel Area Exh Air Isol DMPR \*AOD10A/B.**<br><br>☐ **Initiates Standby Gas Treatment Filter Train A or B Start Signal.**<br><br>☐ Identify Area affected, and verify level reading.<br><br>☐ Refer to Emergency Plan Procedure EPIP-EPP-21. Evacuates Reactor Building, when directed.<br><br>☐ Refer to N2-EOP-SC (SRO). |
| **Malfunction PC06 becomes active**<br><br>**PC06, Secondary Containment Isolation Failure, TRUE**<br><br><br>*Reactor Building Ventilation fails to isolate* | |
| **Event 8 SRO enters and directs EOP-SC actions.** | SRO<br><br>☐ Enters and directs actions per EOP-SC when HVR Exhaust radiation is above an isolation |

## INSTRUCTOR ACTIONS/ PLANT RESPONSE

*Annunciator 601157 Reactor Building General Areas Temperature High is received and RCIC Steam Line should isolate as temperature rises above 135°F. WCS system isolates.* WHEN 601157, Reactor Building General Areas Temperature High is received, Event Trigger ET01 activates:

**MOV*121, Steam Supply Line Isolation (Outboard) – Green – "ON"**

**MOV*121, Not Fully Open – Amber – "ON"**

**ET01**

**MOV*121 Steam Supply Line Isolation (Outboard) – "OPEN"** **Queued**

**(Prevents valve from closing)**

*MOV*128 has no power and MOV*121 appears to be closing.*

*However, RCIC steam line pressure stay up and temperatures in the area are still rising. Thus, no isolation of the RCIC Steam Line has occurred. Fire panel 849107 FIRE DETECTED PNL103 SE QUAD 215 alarms as a result of*

## OPERATOR ACTIONS

setpoint (HVR*RE32A/B exceed DRMS Red setpoint)

❑ **IF HVR Exhaust radiation exceeds an isolation setpoint THEN verify (Override SC-1) (CT-1.0)**

　　❑ **HVR isolates**

　　❑ **HVR*UC413A or B starts**

　　❑ **GTS starts**

　　❑ **HVR Unit Coolers start**

❑ IF any area temperature is above the isolation setpoint THEN GO to 28 (Step SC-2)

❑ Isolate all discharges into affected areas except systems needed for fire fighting or other EOP actions (Step SC-4)

　　❑ Directs BOP RO to manually isolate RCIC Steam Line.

❑ IF "primary system" is discharging into the Reactor Building (YES RCIC, Conditional Step SC-4)....THEN GO to 29

| INSTRUCTOR ACTIONS/ PLANT RESPONSE | OPERATOR ACTIONS |
|---|---|
| *steam discharging into the area.* | |
| | □ **BEFORE any area temperature reaches Maximum Safe Value (Detail S; 212°F) (Step SC-7 and SC-8)....ENTER RPV Control, while continuing in EOP-SC (CT-2.0)** |
| *Event 8 SRO enters and directs EOP-RPV actions.* **PO-5.0** | **These actions are directed by the SRO from EOP-RPV** |
| | □ ENTER SCRAM PROCEDURE N2-SOP-101C, while continuing in EOP-RPV (Step 3) |
| | □ Executes LEVEL and PRESSURE legs concurrently |
| EOP-RPV Detail E1 Systems | LEVEL ACTIONS DIRECTED BY SRO |
| □ Condensate/Feedwater | |
| □ CRD | □ Restore and maintain RPV water level between 159.3 inches and 202.3 inches using one or more Preferred Injection Systems (Detail E1) Step L-3. *SRO should direct control between 159 to 200 inches.* |
| □ RCIC | |
| □ HPCS | |
| □ LPCS | |
| □ LPCI | |
| □ RHS through Shutdown Cooling | □ IF level cannot be restored and maintained above 159.3 inches....THEN maintain level above -14 inches (Fig Z) |
| EOP-RPV Detail E2 Systems | |
| □ RHS Service Water Crosstie | |
| □ Fire Systems | |
| □ ECCS Keep-Full | □ OK to augment with Alternate Injection systems if needed (Detail E2) *(Use of these is NOT expected)* |
| □ SLS, test tank | |
| □ SLS, boron tank | |
| □ Condensate Transfer | |

| INSTRUCTOR ACTIONS/ PLANT RESPONSE | OPERATOR ACTIONS |
|---|---|
| | **PRESSURE ACTIONS DIRECTED BY SRO** |
| | ❑ IF RPV Blowdown (EOP-C2) is anticipated.....THEN Rapidly depressurize the RPV using the Main Turbine Bypass Valves. OK to exceed 100°F/hr cooldown. (Step P-1 Override). *(This is an expected action because EOP-C2 will be necessary due to rising Reactor Building temperatures).* |
| | ❑ Is any SRV Cycling? **NO** (Step P-2) |
| | ❑ Stabilize RPV Pressure below 1052 psig using Main Turbine Bypass Valves. (Step P-4). *SRO should direct control between 800 to 1000 psig with BPVs.* |
| |    ❑ Use Alternate Pressure Control Systems, if needed. |
| |    ❑ Restore pneumatics to drywell, if necessary. |
| | ❑ WAIT until shutdown cooling pressure interlock clears 128 psig (Step P-7) BEFORE proceeding to Step P-8. While in Step P-7 or sooner, the SRO will likely return to EOP-SC actions and may be waiting for 2 areas to reach 212°F |

INSTRUCTOR ACTIONS/
PLANT RESPONSE                                    OPERATOR ACTIONS

| **SRO enters and directs EOP-SC actions.** | **These actions are directed by SRO when returning to EOP-SC** |
| --- | --- |
| | ❑ WAIT until 2 or more areas are above Maximum Safe Value for the same parameter (Step SC-9 and 10), THEN proceed to SC-10 to enter EOP-C2. |
| **Event 8 BOP RO Actions** | <u>BOP RO</u> |
| | ❑ Recognize and reports increasing area temperatures and in the Reactor Building. |
| *At back panel LDS Temperature Monitoring Panels P632 and P642 the first area in alarm and to reach 212°F* | ❑ Uses EOP-6 Attachment 28 to monitor and report temperature conditions. |
| *E31-N619A and N620A* | |
| *E31-N619B and N620B* | ❑ Confirms WCS and RHR isolation. |
| | ❑ Reports failure of RCIC to automatically isolate. |
| | ❑ Attempts to manually isolate the RCIC Steam Line by closing MOV*121 using keylock switch. |
| | ❑ Monitors back panels for trending area temperatures and radiation levels. |
| | ❑ Reports levels and trends to the SRO. |
| *If "anticipating" RPV Blowdown, all 5 BPVs are* | ❑ IF directed to rapidly depressurize the RPV using the Main Turbine Bypass Valves, opens all 5 BPVs using the BYPASS JACK INCREASE pushbutton. OK to exceed 100°F/hr cooldown. (Step |

| INSTRUCTOR ACTIONS/<br>PLANT RESPONSE | OPERATOR ACTIONS |
|---|---|
| *opened. RPV pressure lowers. RPV pressure drops to about 650 psig, the following malfunction activate from ET02:*<br><br>**TC15A, EHC Pump A Trip, TRUE**<br><br>**TC15B, EHC Pump B Trip, TRUE**<br><br>*EHC Pump A trips and as EHC pressure lowers, the BPVs will close to to loss of fluid pressure.* | P-1 Override). *(This is an expected action because EOP-C2 will be necessary due to rising Reactor Building temperatures).*<br><br>☐ Reports trip of EHC pumps and loss of BPVs, if used for rapid depressurization. |
| **Event 8 ATC RO Scram Actions** | <u>ATC RO</u><br><br>**These are N2-SOP-101C Scram Actions**<br><br>☐ IF Automatic Scram is anticipated AND time permits......THEN Reduce Recirc Flow to 55 mlbm/hr per N2-SOP-101D. (NA, at 4% power)<br>☐ **IF Mode switch is NOT in REFUEL position.....THEN Place MODE Switch to SHUTDOWN position. (CT-2.0)**<br>  ☐ Provides Scram report to SRO<br>☐ IF RPS is NOT tripped......THEN Arm AND depress BOTH Manual Scram pushbuttons on either side of 2CEC*PNL603. (NA, RPS trips) |

OPERATOR ACTIONS

□ Verify automatic responses.

   □ All rods full in

   □ Rx power lowering

   □ Turbine tripped/TSVs & TCVs
      shut

   □ Generator tripped and house
      loads transferred

   □ SDV V&D valves closed

   □ RCS pumps downshift

   □ RPV pressure on TBVs OR
      SRVs

   □ FWLC controlling level > 159.3"


□ IF All feedwater pumps have
   tripped...THEN Place ALL 2FWS-
   LV10 and LV55 controllers to
   "manual" and verify the valves are
   full closed.


□ IF the Reactor scram can be
   promptly reset (and remain
   reset).... THEN Reset the scram.

□ IF the Reactor scram CANNOT be
   reset....THEN Close 2RDS-V28 if
   directed by the SM/CRS.

□ Performs LEVEL control actions as
   directed by SRO from EOPs

□ Performs PRESSURE control
   actions as directed by SRO from
   EOPs

□ WHILE continuing, perform the
   following as time permits:

|  | OPERATOR ACTIONS |
|---|---|

□ Fully insert IRMs AND SRMs.

□ Energize 2WCS-MOV107 (2NHS-MCC008-2E).

□ If required, secure makeup to the Cooling Tower.

□ At 2CEC-PNL842, shutdown HWC.

□ IF WCS is in one pump three filter lineup....THEN Throttle close 2WCS*MOV200 (AND if required, throttle open 2WCS-M0V110) to obtain approximately 225 gpm WCS flow.

IF Feedwater Pumps trip on high level (above 202.3 inches), an FWS Pump Restart can be performed per N2-SOP-101C, Level Control Actions Detail 1. Since RPV pressure will drop below 500 psig during the scenario (RPV Blowdown), Condensate Booster Pump injection can be used instead of Feedpump restart.

These actions are used to restart a tripped Fedwater pump, if directed

□ Is at least 1 condensate pump running? **YES**

□ Verify the following:

   □ Out of service condensate, booster and feedpumps in PTL.

   □ 2 condensate pumps running.

   □ 2 booster pumps running.

   □ 2FWR-FV2s closed.

   □ The following controllers in manual with 0% output:

      □ 2FWS-HIC55s

      □ 2FWS-HIC1010s

      □ 2FWS-HIC1600

□ IF required, reset Level 8 pushbuttons.

| INSTRUCTOR ACTIONS/<br>PLANT RESPONSE | OPERATOR ACTIONS |
|---|---|
| | ▫ Start feedwater pump as follows: |
| |    ▫ Confirm suction pressure > 500 psi. |
| |    ▫ Verify aux oil pump running. |
| |    ▫ Place pump switch to red flag. |
| |    ▫ WHEN 2FWS-FV2A/B/C ~ 15% open, confirm pump start. |
| |    ▫ Confirm flow ~ 8000 gpm. |
| |    ▫ Inject with 2FWS-LV55A/B (open 2FWS-V103A/B if required) |
| |    ▫ OR verify open 2FWS- MOV47 A/B/C AND inject with 2FWS-LV10A/B/C as required. |
| |    ▫ IF required, reset setpoint setdown per N2-OP-3, H.1.0. |
| |    ▫ For automatic control, refer to N2-OP-3, H.9.12 OR H.9.13. |
| |    ▫ Verify aux oil pump stops. |
| **Event 10 Second Area Temperature reaches 212°F**         **PO-6.0**<br><br>*Second area temperature reaches 212°F (E31-N601E and N601F). RPV Blowdown is required.* | |
| **Event 10 BOP RO actions** | <u>BOP RO</u> |
| | ▫ Report second area temperature reaching 212°F. |
| | ▫ If required restore pneumatics to drywell |

|  |  |
|---|---|
|  | ❑  At P851 IAS*SOV166 and 184 |
|  | ❑  At P601 IAS *SOV164 and 165 |
|  | ❑  **When directed, open seven (7) ADS / SRVs by using keylock switch for EACH ADS valve at control room back panel P631 and P628.  (CT-3.0)** |
|  | ❑  Recognizes and reports failed ADS / SRV to the SRO. |
|  | ❑  Open additional non-ADS SRV from P601 control switch to achieve 7 open valves. |
| *Event 10 SRO enters and directs EOP-C2 actions.* | **These actions are directed by the SRO from EOP-C2** |
|  | ❑  Will the reactor stay shutdown without boron? **YES** all rods are fully inserted (Step 2) |
|  | ❑  Drywell Pressure? **Below 1.68 psig** (Step 9, then bypass step 10) |
|  |    ❑  Suppression Pool Level? **Above El 192 ft** (Step 11) |
| **EVENT 10 ADS Valve fails to open** | ❑  **Open all 7 ADS Valves (Step 12) (CT-3.0)** |
| **When ADS Valves are opened AD08C, ADS Valve N₂ supply severed becomes active.** | ❑  OK to exceed 100°F/hr |
|  | ❑  Restore pneumatics to drywell if necessary |
| *PSV 126 does not indicate open at P601, even* | ❑  *Per Ops Manual, with no RHS* |

| INSTRUCTOR ACTIONS/ PLANT RESPONSE | OPERATOR ACTIONS |
|---|---|
| *though back panel indication is that the valve opened (ADS solenoid is energized).* | *pumps running, opening the 7 ADS valves is performed by placing individual keylock switch for EACH ADS valve to open at control room back panel P631 and P628.*<br><br>□ Can all 7 ADS Valves be opened? **NO** (Step 13)<br><br>□ Open other SRVs until a total of 7 are open (Step 14)<br><br>□ WAIT until shutdown cooling pressure interlock clears 128 psig (Step 16) BEFORE proceeding to Step 17. |
| **TERMINATION CRITERIA**<br>RPV Blowdown is complete and RPV level is maintained above TAF.<br>**EVENT 11 SRO Admin JPM 5-3** | <u>SRO</u><br>Classify the event as SAE 3.4.1 (SAE 4.4.1 with RB area temperatures >212°F in more than one area) Evaluator to perform SRO Admin JPM for emergency classification. |

V.  POST SCENARIO CRITIQUE

   A.  NA, NRC Exam


VI.  REFERENCE EVENTS AND COMMITMENTS

   A.  Reference Events

      None

   B.  Commitments

      1.  None



VII.  LESSONS LEARNED