

Nine Mile Point 2		Scenario No. RL 1		Operating Test No. 1 (SRO)	
Examiners:			Candidates: SRO: Lange		
<u>Objectives:</u> Evaluate SRO Instant candidates ability to perform in the SRO position, using normal, abnormal and emergency procedures. The candidates will respond to a failed Drywell to Suppression Chamber Vacuum Breaker, a drifting control rod, loss of offsite Line 6 and a steam rupture inside the Drywell. This scenario will be classified as an Alert (EAL 3.1.1)					
<u>Initial Conditions:</u> 1. Plant is operating at 100% power and 100% rod line. (IC-20)					
<u>Turnover:</u> 1. Plant is at 100% reactor power and 100% rod line. 2. Perform Drywell to Suppression Chamber Vacuum Breaker Surveillance Test, N2-OSP-ISC-M@002					
Event No.	Malf. No.	Type	Event Description		
1		N	(BOP/SRO) Perform Drywell to Suppression Chamber Vacuum Breaker Surveillance Test, N2-OSP-ISC-M@002		
2	Overrides	I	(SRO) Drywell to Suppression Chamber Vacuum Breaker 2ISC*RV34A sticks open during testing. Requires entry into Tech Spec 3.6.1.7.		
3	RD05 22-31	C	(RO/SRO) Control Rod 22-32 drifts out from position 12. Requires entry into N2-SOP-8 to reduce power, fully insert and disarm the rod. Tech Spec 3.1.3 entry is required for inoperable control rod.		
4		R	(RO/SRO) Reduce power below 90% with Recirc Flow per N2-SOP-101D. Required by N2-SOP-8		
5	ED02B	C	(RO) Loss of Offsite Power Line 6. Requires entry into N2-SOP-3 to stabilize the plant. Requires entry into Tech Specs 3.7.1 for inoperable Service Water Loop and 3.8.1 for inoperable Offsite Power source.		
6	MS03 MS04	M	(RO/BOP/SRO) Steam leakage inside the Drywell. Requires a manual reactor scram due to rising Drywell pressure. Following scram, leak severity rises requiring entry into EOP-C2 RPV Blowdown and EOP-C4 RPV Flooding		

7	DG02C	C	(RO/BOP/SRO) Division II Emergency Diesel Generator trips resulting in loss of 4160 VAC Emergency Switchgear 2ENS*SWG103 and loss of Division II Low Pressure ECCS systems.
8	Remote RH27 RH16	C	(BOP/SRO) Drywell Spray Valve 2RHS*MOV15A circuit breaker trips resulting in loss of Containment Spray. Local manual opening of MOV15A will result in restoration of the ability to use Containment Spray

NMP SIMULATOR SCENARIO

SCENARIO RL 1

REV. 0

No. of Pages: 22

FAILED DW/SC VACUUM BREAKER/ROD DRIFT/LOSS OF LINE 6/STEAM RUPTURE INSIDE DRYWELL/RPV FLOODING

PREPARER

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DATE 9/20/02

VALIDATED

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DATE 10/10/02

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DATE 10/11/02

OPERATIONS
MANAGER UNIT 2

NA Exam Security

DATE _____

CONFIGURATION
CONTROL

NA Exam Security

DATE _____

SCENARIO SUMMARY

Length: 75 minutes

The scenario begins at rated power. The crew will perform surveillance test N2-OSP-ISC-M@002. During the test, Drywell to Suppression Chamber Vacuum Breaker 2ISC*RV34A will fail partially open. Tech Spec entry is required and the valve must be closed within 72 hours. Following Tech Spec review, control rod 22-31 drifts out from position 12. The crew will enter N2-SOP, Unplanned Power Changes. Power will be reduced below 90%, The rod will be fully inserted and disarmed.

Following completion of the rod drift event, a Loss of Offsite Line 6 occurs. The crew will enter N2-SOP-3, Loss of AC Power and stabilize the Service Water System to allow continued power operations. A steam leak develops inside the Drywell. A manual scram is required due to rising Drywell Pressure. Following the manual scram, the leak worsens to a steam line rupture. The crew will be required to perform an RPV Blowdown and enter RPV Flooding, due to the inability to determine RPV water level with elevated Drywell temperature and reduced RPV pressure. The crew will flood the RPV to achieve target pressure using Feedwater, High Pressure Core Spray and available Low Pressure ECCS systems. The flooding evolution is complicated by the loss of Division I Low Pressure ECCS systems. Containment Spray evolution is complicated by the trip of Drywell Spray valve breaker. Local manual operation of the spray valve will result in restoration of the Containment Spray function.

Major Procedures: N2-SOP-8, N2-SOP-3, N2-EOP-RPV, N2-EOP-PC, N2-EOP-C2, N2-EOP-C4

EAL Classification:

Termination Criteria: RPV flooded to target pressure. Containment Spray in progress.

I. SIMULATOR SET UP

A. IC Number:

B. Presets/Function Key Assignments

1. Malfunctions:

- | | |
|---|-------------|
| a. RD05 2231, 22-31 Control Rod Failure Drift Out, True | F3 |
| b. ED02B, Loss of Off-Site 115KV Line 6, True | F5 |
| c. MS03, Steam Leakage Inside Primary Containment, 3% | F6 |
| d. MS03, Steam Leakage Inside Primary Containment, 10% | ET05 |
| e. MS04, Steam Line Rupture Inside Primary Containment, 100% | ET03 |
| f. MS04, Steam Line Rupture Inside Primary Containment, 75% | F7 |
| g. DG02C, Diesel Generator Number 3 (EDG 102) Trip, True TUA 15 sec | ET03 |

2. Remotes:

- | | |
|--|-------------|
| a. RD08 2231, 22-31 HCU Isolation for Inserted Rod, True | F4 |
| b. RH27, RHS*MOV15A 600 V BKR Status, Open TUA 30 sec | ET03 |
| c. RH16, Manual Handwheel Ops- RHS*MOV15A, Open | F10 |
| d. CS14, OPS-CSH01 PNL625 Test Sw CSH*MOV107, Test | F8 |

3. Overrides:

- | | |
|--|---------------|
| a. P628 Lamp (Pg 3), Vacuum Bkr 2ISC*RV34A Inboard Green, On | Queued |
| b. P628 Lamp (Pg 3), Vacuum Bkr 2ISC*RV34A Inboard Red, On | ET01 |

4. Annunciators:

- | | |
|--|-------------|
| a. AN601556, Drywell Vac Brkr Inbd Disc Open, On | ET02 |
|--|-------------|

C. Equipment Out of Service

1. None

D. Support Documentation

1. N2-OSP-ISC-M@002, complete to step 8.1.2

E. Miscellaneous

1. ET01, 2ISC*RV34A Test Pushbutton, On
2. ET02, 2ISC*RV34A Red Light, On
3. ET03, Drywell Pressure 1.68 psig
4. ET05, Mode Switch in Shutdown

II.

SHIFT TURNOVER INFORMATION

SHIFT: ~ N ~ D DATE: _____

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

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

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

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

Evolutions/General Information/Equipment Status:

- Reactor Power = 100% _____
- Loadline = > 100% _____

PART III: Remarks/Planned Evolutions:

After assuming the shift, continue N2-OSP-ISC-M@002 Drywell Vacuum Breaker Operability Test. Test is complete to step 8.1.1.

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

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

TITLE	NAME	TITLE	NAME
SSS		CRE	
ASSS		E	
STA		E	
CSO		Other	

Scenario ID# O__-OPS-009-____-____-____

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 RPV level indication is no longer valid, the crew will execute EOP-C4 to open SRVs with a minimum of 6 and maximum of 7 ultimately opened.
- CT-2.0 Given RPV Flooding in progress with RPV pressure less than the target (EOP) pressure, the crew will establish injection to the RPV to restore RPV pressure above the target pressure.

B. Performance Objectives:

- PO-1.0 Given a failure of Drywell Vacuum Breaker position indication, the crew will declare the valve inoperable and enter Tech Specs.
- PO-2.0 Given a control rod drifting out, the crew will reduce power below 90%, insert and disarm the control rod per N2-SOP-8.
- PO-3.0 Given a Loss of Line 6, the crew will stabilize the Service Water System to maintain power operation by implementing the immediate actions of N2-SOP-3.
- PO-4.0 Given a steam leak in the Drywell, the crew will manually initiate a manual scram prior to Drywell Pressure reaching the automatic scram setpoint.
- PO-5.0 Given the plant in a condition requiring emergency classification, the SRO shall properly classify the event per EPP-EPIP-02.

INSTRUCTOR ACTIONS/
PLANT RESPONSE

OPERATOR ACTIONS

Instructor – check all queued malfunction, overrides and annunciators have remained active.

Once given shift turnover information, allow no more than five (5) minutes for the crew to perform a walk down of panels.

Begin Scenario.

Event 1 BOP/SRO Normal Evolution

*When RV33A opens Annunciator 601556
DRYWELL VACUUM BRKR INBOARD DISC
OPEN alarms*

CREW

- Complete panel walk down and tests annunciators.
- SRO conducts pre-shift brief.
- Crew assumes the shift

SRO

- Conducts Pre Job Brief for Surveillance Test N2-OSP-ISC-M@002.
- Directs BOP to perform test.

BOP

PO-1.0

- Continues surveillance at step 8.1.2
 - Opens 2IAS*SOV167, IAS to Drywell (P851)
 - Opens 2IAS*SOV185, IAS to Drywell (P851)
 - Opens 2ISC*RV33A using Test Pushbutton (P628)
 - Verifies RV33A open by red light on, computer point and annunciator 601556 alarming.

INSTRUCTOR ACTIONS/
PLANT RESPONSE

OPERATOR ACTIONS

*When RV33A closes Annunciator 601556
DRYWELL VACUUM BRKR INBOARD DISC
OPEN clears.*

Event 2 BOP/SRO Component Failure

*When RV34A opens Annunciator 601556
DRYWELL VACUUM BRKR INBOARD DISC
OPEN alarms.*

*When RV34A Test pushbutton is depressed, the
valve indicates dual position, instead of full open.*

*When the Test pushbutton is released, the valve
remains partially open.*

- Verifies RV33B remains closed by observing green light still lit.
- Closes RV33A by releasing test pushbutton.
- Verifies RV33A closed by green light on red light off, computer point and annunciator 601556 clear.
- Opens 2ISC*RV34A using Test pushbutton.
- Observes RV34A green light remains on and red light lights.
- Releases test pushbutton and observes RV34A still has dual position indication.
- Informs SRO that valve indicates partially open.

SRO

PO-1.0

- Declares RV34A inoperable and enters Tech Spec 3.6.1.7, Condition B, Required Action B.1. The valve must be closed with a Completion Time of 72 hours.
- Notifies plant management
- Notifies I&C of inoperable valve.
- Performs crew update
- Directs system restored to pre-test lineup

INSTRUCTOR ACTIONS/
PLANT RESPONSE

OPERATOR ACTIONS

Event 3 RO/SRO Component Failure

Console Operator Instruction

When directed, activate malfunction by depressing
F3 key:

RD05 2231, Control Rod Failure Drift Out F3

*Annunciator 603443 CONTROL ROD DRIFT
actuates.*

Rod 22-31 Red "Drift" light on Full Core Display.

RWM indicates 22-31 drifting.

*When 22-31 is selected, Four Rod Display position
changes as rod drifts out.*

APRM power rises slightly.

*Rod 22-31 is driven in to 00. Rod will drift out
again after INSERT pushbutton is released.*

Console Operator Instruction/Role Play

When dispatched to isolate HCU 22-31, wait 3
minutes then activate Remote by depressing F4 key:

**RD08 2231, 22-31 HCU Isolation
for Inserted Rod, True F4**

As AO, report valves V101 and V102 are closed at
HCU 22-31.

*Rod 22-31 settles to position 00 after HCU is
isolated and INSERT pushbutton is released.*

RO

PO-2.0

- Announces and responds to annunciator.
- Identifies and reports Rod 22-31 drifting outward, using RWM, Full Core and Four Rod Displays.
- Enters N2-SOP-8
 - Insert 22-31 using INSERT pushbutton
 - When rod is full in, releases pushbutton.
 - Identifies rod drifts outward.
 - Insert 22-31 using INSERT pushbutton and holds until HCU is isolated.
 - Dispatches AO to isolate HCU 22-31.
 - When HCU 22-31 is isolated, release INSERT pushbutton.
 - Observe 22-31 settles at position 00.

INSTRUCTOR ACTIONS/
PLANT RESPONSE

OPERATOR ACTIONS

Event 4 RO/BOP Reactivity

Event 5 BOP/SRO Component Failure

Console Operator Instruction

When directed, activate malfunction by depressing
F5 key:

ED02B, Loss of Off-Site Line 6, True F5

SRO

PO-2.0

- Acknowledges report of rod drift.
- Directs entry into N2-SOP-8.
- Directs power reduced below 90% using Recirc Flow.
- Notifies Reactor Engineering of event.
- When rod is fully inserted and isolated, conducts crew update.
- Enters Tech Spec 3.1.3, Condition C, Required Action C.1. Rod must be fully inserted with 3 hour Completion Time AND rod must be disarmed with 4 hour Completion Time.
- Notifies plant management.

BOP/RO

PO-2.0

- When directed, perform Rapid Power Reduction with Recirc Flow.

INSTRUCTOR ACTIONS/
PLANT RESPONSE

OPERATOR ACTIONS

*Line 6 trips, EDG103 starts and reenergizes ENS*SWG103 after about 10 seconds. Division I SWP Non Essential MOVs close, then Div II Non Essentials close after EDG energizes bus. This results in loss of SWP to CCP and CCS heat exchangers.*

RO

PO-3.0

- Determine and report loss of Line 6
- After entry into N2-SOP-3 performs immediate actions for EDG start
 - Verifies EDG103 started and re-energizes ENS*SWG103
 - Verifies EDG maintains about 4160 VAC and 60 Hz.
 - Dispatches AO to monitor EDG operation.
 - Verifies > 780 gpm SWP flow to EDG

BOP

PO-3.0

- Performs Immediate Actions per N2-SOP-3, section D.1.2.
 - Verify closing of Division I SWP Non Essential MOVs
 - Dials HIC54B to zero
 - Throttles SWP Pump discharge MOVs to maintain < 10,000 gpm pump flow
 - When EDG output breaker closes, verify Division II SWP Non Essential MOVs close
 - Verify one Division II SWP Pump restarts
 - Opens Division I and II SWP Non Essential MOVs
 - Starts 3rd SWP in Division I.

INSTRUCTOR ACTIONS/
PLANT RESPONSE

OPERATOR ACTIONS

*When EDG energizes bus, one previously running Div II SWP pump automatically restarts. Reactor Building Ventilation System isolates and both GTS trains start. Control Building Ventilation shifts to Emergency Mode with HVC*FN2B running. Drywell Unit Coolers trip.*

When SWP Non Essentials are re-opened, SWP flow is re-established to CCS and CCP heat exchangers.

SRO

PO-3.0

- Acknowledges Loss of Line 6
- Directs entry into N2-SOP-3 and directs BOP in performance of Immediate Actions per section D.1.2.
 - Closing of Division I SWP Non Essential MOVs
 - HIC54B dialed to zero
 - Throttling SWP Pump discharge MOVs to maintain < 10,000 gpm pump flow
 - When EDG output breaker closes, Division II SWP Non Essential MOVs close
 - A Division II SWP Pump restarts
 - After pump restarts, opening Division I and II SWP Non Essential MOVs
 - Directs start of 3rd SWP in Division I.
 - When conditions stabilize, direct performance of D.2.2 Subsequent Actions
 - Enters Tech Spec 3.7.1 Condition C and declares Div II SWP inoperable AND 3.8.1 Condition A for Line 6. (72 hours to restore)
 - Reopening of IAS*SOV165 and 184.

INSTRUCTOR ACTIONS/
PLANT RESPONSE

OPERATOR ACTIONS

Note: SRO may refer to N2-OP-52 H.5.0 with Reactor Building Ventilation isolated and all unit coolers operating. No action is required if SWP temperature is above 50°F

Event 6 Major Transient

Console Operator Instruction

When conditions are stabilized and all briefings and notifications are complete, activate malfunction by depressing F6 key:

MS03, Steam Leakage Inside Containment, 3%
*Annunciator 851254 PROCESS AIRBORNE RADN
MON ACTIVATED alarms*
Drywell pressure (DWP) begins to slowly rise.
After about 2 minutes, DWP reaches 0.75 psig and
Annunciator 603140, DRYWELL PRESSURE
HIGH/LOW alarms.

SRO

- Performs crew update
- Notifies plant management
- Assigns RO and BOP responsibilities related to performance of SOP-3 sections for Fault Identification and Subsequent Actions, to restore plant systems affected by the power loss.

RO/BOP

- Reports and responds to annunciator 851254
 - Determines Containment CMS10s alarming
 - Notifies Rad Protection
- Reports and responds to annunciator 603140
 - Checks Drywell Pressure
 - Monitors Primary Containment parameters, such as DWT, DW leakage and radiation levels
 - If directed, starts GTS train with suction on Drywell per N2-OP-61A.

INSTRUCTOR ACTIONS/
PLANT RESPONSE

OPERATOR ACTIONS

Drywell Pressure continues to rise and approaches 1.68 psig scram setpoint. Drywell pressure is expected to remain below 1.68 psig until after initial scram actions are complete.

When manual scram is initiated, RPS trips and all rods fully insert. Reactor power lowers. RPV water level lowers below 159 inches requiring entry into EOP-RPV. Feedwater system automatically responds to recover RPV water level to 159 to 202 inches.

RO

- If directed, performs Rapid Power Reduction per N2-SOP-101D

SRO

PO-4.0

- Conducts crew brief
- May direct Rapid Power Reduction
- Directs a manual scram prior to DWP reaching 1.68 psig
- Following the manual scram
 - Acknowledges scram report.
 - Enters EOP-RPV on low water level.
 - Directs RO to perform N2-SOP-101C.
 - Directs RPV water level restored and maintained between 159 inches to 202 inches using Condensate/Feedwater.
 - Directs RPV pressure stabilized and maintained between 800 psig and 1000 psig with EHC (Bypass Valves in automatic).

INSTRUCTOR ACTIONS/
PLANT RESPONSE

OPERATOR ACTIONS

Console Operator Instruction

When Mode Switch is in Shutdown, verify
malfunction severity changes to 10% from ET05

MS03, Steam Leakage Inside Drywell, 10%

*Steam leakage inside Drywell increases. Drywell
pressure will now exceed 1.68 psig.*

RO

PO-4.0

- When directed, places Mode Switch to Shutdown and provides scram report
 - APRMs downscale
 - RPV water level (below 159 inches and EOP entry condition).
 - RPV pressure
 - All rods fully inserted
- Restores and maintains RPV water level in directed band with Feedwater system.
 - If required, closes FWS-MOV47A,B and C to isolate Feedwater Pumps.
- Performs actions per N2-SOP-101C
 - Verify Mode Switch locked in Shutdown.
 - Place HWC System Shutdown Switch to Shutdown at P842.
 - Establish 225 gpm WCS flow by throttling WCS*MOV200.
 - Fully inserts SRM and IRM detectors and selects on recorders.

INSTRUCTOR ACTIONS/
PLANT RESPONSE

OPERATOR ACTIONS

Event 7 BOP/RO/SRO Component Failure

Console Operator Instruction

When Drywell Pressure reaches 1.68 psig, verify
malfunction activates from ET03

**MS04, Steam Rupture Inside Drywell, 100%
DG02C, EDG 103 Trip, Trip TD 15 sec**

*Drywell pressure reaches 1.68 psig. Low Pressure
ECCS systems and all three Emergency Diesel
Generators (EDG) start, but Div II EDG103 trips,
resulting in loss of RHR B and C as injection
sources.*

*Steam Line Rupture occurs. The Main Turbine and
Feedwater Pumps trip as level rapidly rises above
202 inches.*

*Drywell Pressure rapidly rises to about 25 psig as
the RPV depressurizes.*

*Following the Turbine trip, Normal 13.8KV Bus
SWG003 de-energizes (since Line 6 previously
tripped).*

BOP

- Report rapid rise in DWP and rapid lowering of RPV pressure.
- Confirm Div I ECCS starts
 - RHR Pump A running
 - CSL Pump running
- Confirm Div II ECCS starts
 - RHR Pump B and C running
- Reports loss of Div II ECCS systems after EDG103 trips.
- Confirms CSH Pump start. CSH is running with Injection MOV closed due to high RPV level.

INSTRUCTOR ACTIONS/
PLANT RESPONSE

OPERATOR ACTIONS

Drywell temperature rises into the BAD Region of EOP-RPV (and EOP-PC) Fig A, RPV Water Level Instruments. The crew determines RPV water level is "unknown" as a result of high Drywell temperature and low Reactor pressure.

SRO

CT-1.0, CT-2.0

- Enters EOP-PC when DWP exceeds 1.68 psig.
- EOP-PC actions will be delayed due to need for RPV Flooding.
- Assesses Drywell temperature and RPV pressure against EOP-RPV (or EOP-PC) Fig. A and determines all level instruments are not useable.
- When RPV level is determined to be "unknown", exits EOP-RPV and enters EOP-C4, RPV Flooding
 - Confirms all rods full in
 - Determines SPL above 192 feet
 - **(CT-1.0) Directs 7 ADS Valves opened.**
 - Directs MSIVs, MSL Drains and RCIC Steam Line isolated.
 - **(CT-2.0) Directs RPV injection established to obtain RPV pressure at least 38 psig above Suppression Chamber Pressure (SCP).** This is target pressure.
 - Condensate, CRD, CSH (requires defeat of Hi Level interlock) and LPCI and CSL

Console Operator Instruction

When directed to place HPCS INJ VLV LEVEL 8 BYPASS TEST SWITCH in TEST, activate remote by depressing F8 key:

CS14, OPS-CSH01 PNL625 Test Sw

CSH*MOV107, Test

F8

THEN report the Test switch is in TEST.

As additional RPV injection sources are established, RPV pressure begins to rise. Target pressure can be established by injecting with RHR B, CSL, CSH and Condensate Booster Pumps. If injecting with Condensate/Feedwater system, Hotwell level lowers and the Booster Pumps eventually trip on low suction pressure.

BOP

CT-1.0, CT-2.0

- **When directed, opens 7 ADS Valves** by Arming and Depressing Div I ADS Logic A and E Manual Initiate pushbuttons
 - Observe and report P601 white lights lit for 7 ADS valves (Div I)
- When directed, establishes injection with CSL and RHR Pump A.
- When directed to inject with CSH per EOP-6 Att 20, defeats Hi Level
 - Places HPCS INJ VLV LEVEL 8 BYPASS TEST SWITCH in TEST. (Notifies Console Operator to perform this action)
 - Depresses HI WTR LEVEL SEAL IN RESET pushbutton and confirms CSH injection MOV107 opens to inject to RPV.

INSTRUCTOR ACTIONS/
PLANT RESPONSE

OPERATOR ACTIONS

Console Operator Instruction:

When RPV pressure exceeds target pressure (about 70 psig), activate malfunction by depressing F7:

MS04, Steam Line Rupture, 75%

THEN DELETE MS04 ,100% on ET03.

ENSURE MS04 is now in at 75%

Note: Restarting a Feedwater Pump is not necessary, as RPV will be sufficiently depressurized to allow Booster Pump injection. Booster Pumps will inject when RPV pressure is below about 650 psig.

Console Operator Instruction:

If directed to defeat Feedwater Pump Level 8 trips, manually activate remote:

FW11, RFP Level 8 Trip, Override

Then report Feedwater Pump Level 8 trips are bypassed.

After MS04 leak rate is reduced to 75%, RPV pressure rises significantly above target pressure. Now, SRO is expected to direct removal of RHR A as an injection source and lineup for Containment Spray per EOP-PC.

RO

- When directed, injects with Condensate/Feedwater (Condensate Booster Pumps) by throttling open FWS-LV10A.
- If directed to restart a Feedwater Pump performs the following:
 - Confirms 2 Condensate and 2 Condensate Booster Pumps running.
 - Verifies all Feed LV controllers in manual and 0% open.
 - Defeats Feedwater Level 8 trips per EOP-6 Att 20. (Notifies Console Operator to perform)
 - Reset 3 Level 8 Reset pushbuttons
 - Starts Feedwater Pump.

RO/BOP

- Recognize and report when RPV pressure reaches target pressure.

SRO

- When target pressure is reached, identifies time on EOP-C4
- Calculates required Flooding Time (57 minutes with 7 ADS Valves open).

INSTRUCTOR ACTIONS/
PLANT RESPONSE

OPERATOR ACTIONS

Console Operator Instruction

If directed to make RHR A Injection Valve
throttleable manually activate remotes

**RH33, RHS*MOV24A 600V BKR, Open
RH10, RHS*MOV24A Injection Throttle
WAIT 2 minutes, then RH33 to Close.**

Then report RHR A Injection Valve is throttleable.

SRO

CT-2.0

- Directs RHR A injection stopped. May direct Injection MOV made throttleable
- **Ensures RPV pressure is maintained above target pressure and realigns RHR for injection, if needed.**
- Executes steps of EOP-PC which were delayed while establishing target pressure.
 - Directs RHR A lined up for SC Spray
 - Determines SCP is above 10 psig
 - Determines SPL is above 192 feet
 - Confirms parameters are inside Drywell Spray Initiation Limit Curve (Fig K)
 - Directs Recirc Pumps tripped
 - Directs DW Unit Coolers tripped
 - Directs RHR A placed in DW Sprays (EOP-6 Att 22)
 - Directs RHS*MOV15A locally opened (after failure).
 - Recognize entry into EOP-C2 RPV Blowdown is required, but not implemented because already in EOP-C4, RPV Flooding

INSTRUCTOR ACTIONS/
PLANT RESPONSE

OPERATOR ACTIONS

Event 8 BOP/SRO Component Failure

Console Operator Instruction:

When directed to locally open RHS*MOV15A, wait 2 minutes, then activate remote by depressing F10 key:

RH16, Manual Handwheel Ops RHS*MOV15A

Then report RHS*MOV15A has been manually opened.

Termination Criteria

RPV pressure maintained at least 38 psig above Suppression Chamber Pressure. Drywell Sprays aligned at least once.

EVALUATOR NOTE: After Simulator is placed in Freeze direct SRO applicant to classify the event.

RO

- When directed for DW Spray, trips Recirc Pumps and DW Unit Coolers.

BOP

- When directed, initiate SC/DW Sprays:
 - Verify RHS*MOV24A closed
 - Opens RHS*MOV33A (SC Spray)
 - Opens SWP*MOV90A and 33A (SWP flow)
 - Opens RHS*MOV25A
 - Reports failure of RHS*MOV15A
 - Dispatches AO to locally open MOV15A
 - Confirms DW Spray header flow

SRO

- If target pressure cannot be maintained, (ie loss of CBPs due to empty Hotwell) secures DW spray and re-aligns system to regain target pressure.

SRO

PO-5.0

- Classify event as Alert 3.1.1

V. REFERENCE EVENTS AND COMMITMENTS

A. Reference Events

1. None

B. Commitments

1. None

VI. 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
75	Simulator Run Time
NA	EOP Run Time
2	Crew Critical Tasks (if applicable per Attachment 6.)

4. Developmental Checks:

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

Is Criteria given for sequencing to subsequent events?

Is termination criteria clear and unambiguous?

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

Nine Mile Point 2		Scenario No. RL 2		Operating Test No. 1 (RO)	
Examiners:			Candidates: RO: Lange		
Objectives: Evaluate SRO Instant candidates ability to perform in the RO position, using normal, abnormal and emergency procedures. The candidates will respond to Recirc Flow signal failure to the APRM system, Reactor feedwater flow transmitter failure, Lowering Main Condenser vacuum due to air in-leakage, Reactor Mode Switch failure and Failure to scram with degraded Standby Liquid Control (Boron) injection and Turbine Bypass Valve failure. This scenario will be classified as a Site Area Emergency. (EAL 2.2.2)					
Initial Conditions: 1. Plant is operating at 100% power and 100% rod line. (IC-20) 2. EHC Pump B is out of service for motor replacement					
Turnover: 1. Plant is at 100% reactor power and 100% rod line. 2. EHC Pump B is out of service for motor replacement. Clearance has been issued.					
Event No.	Malf. No.	Type	Event Description		
1	RR07B	I	(RO) Recirc Flow input to APRM 2 signal fails upscale. Requires event diagnosis and bypassing APRM 2, per N2-OP-92.		
2	FW34B	I	(RO) Feedwater Flow Transmitter "B" fails intermittently downscale. Requires placing Feedwater Level Control System in manual and stabilizing water level per N2-SOP-6.		
3		N	(RO) Transfer Feedwater Level Control System to Automatic, following repairs of the Feedwater Flow Transmitter "B", per N2-OP-3		
4	MC01	C	(Crew) Lowering of Condenser Vacuum. Requires entry into N2-SOP-9		
5		R	(RO) Perform Rapid Power Reduction using Recirc Flow and Control Rods to stabilize condenser vacuum, per N2-SOP-101D		
6	Override	C	(RO) Mode Switch failure during manual scram on lowering condenser vacuum. Requires initiation of manual scram using RPS trip pushbuttons, per N2-SOP-101C		
7	RD17Z SL03A	M	(RO) ATWS Hydraulic Lock of Control Rods at Position 17 (25% power), with loss of Standby Liquid Control System A.		

8	Override	C	(BOP) EHC Pump A trip following scram. Results in closure of Turbine Bypass Valves and heat addition to the Suppression Pool.
9	RP11A & B	C	(RO) Recirc Pumps fail to trip on RRCS/ATWS signal. Requires manual tripping of Recirc Pumps

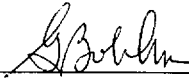
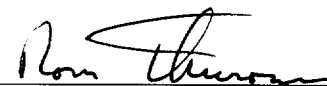
NMP SIMULATOR SCENARIO

SCENARIO RL 2

REV. 0

No. of Pages: 21

RECIRC FLOW SIGNAL FAILURE/FEEDWATER FLOW TRANSMITTER FAILURE/LOSS OF VACUUM/ ATWS WITH BYPASS VALVE FAILURE

PREPARER		DATE	9/16/02
VALIDATED	Dobiac, MacEwen, Nichols	DATE	10/10/02
GEN SUPERVISOR OPS TRAINING		DATE	10/11/02
OPERATIONS MANAGER UNIT 2	NA Exam Security	DATE	
CONFIGURATION CONTROL	NA Exam Security	DATE	

SCENARIO SUMMARY

Length: 75 minutes

The scenario begins at rated power. EHC Pump B is out of service. An upscale failure of the Recirc Flow signal to APRM#2 occurs, resulting in a control rod block. The crew will bypass APRM#2. Following APRM bypass, Feedwater flow transmitter "B" begins to intermittently fail, due to an air bound transmitter. The crew will respond by taking manual control of the Feedwater Level Control System (FWLC) and stabilizing water level in the normal operating band, per N2-SOP-06. The crew will dispatch a repair team to determine the cause of the FWLC malfunction. After receiving a report from the field that the transmitter has been repaired, the crew will place FWLC back to automatic control.

After FWLC is returned to automatic, a small increase in Condenser air in-leakage occurs and Condenser vacuum slowly degrades. The crew will perform a power reduction to stabilize vacuum per N2-SOP-09. The reduction in power will stabilize condenser vacuum. Vacuum will again begin to lower and the crew will initiate a manual scram, prior to the automatic turbine trip. The Mode Switch fails in the RUN position and a manual scram using the RPS pushbuttons is required. Control rod pattern after the scram will result in reactor power remaining about 25%. The crew will enter and execute N2-EOP-C5, Failure To Scram.

During the transient, EHC Pump A trips, resulting in a loss of EHC fluid pressure. The Turbine Bypass Valves will initially open to control reactor pressure, but subsequently fail closed on the loss of hydraulic fluid pressure. The SRVs will be required for reactor pressure control. The Condenser vacuum will continue to degrade, resulting in an automatic closure of the MSIVs. This will add heat to the Suppression Pool and Heat Capacity Temperature (HCTL) will be challenged. During the transient, failures of Standby Liquid Control System A and Recirc Pumps to automatically trip will complicate efforts to lower power and shutdown the reactor. The crew will use a combination of lowering RPV water level, control rod insertion, boron injection and operation of Suppression Pool Cooling to prevent exceeding HCTL.

Major Procedures: N2-SOP-06, N2-SOP-09, N2-EOP-C5, N2-EOP-6 Attachment 14.

EAL Classification: SITE AREA EMERGENCY EAL 2.2.2

Termination Criteria: All Control Rods are fully inserted per N2-EOP-6 Attachment 14.

I. SIMULATOR SET UP

IC Number: IC-20 (100% power and > 100% rod line)

A. Presets/Function Key Assignments

1. Malfunctions:

- | | |
|---|---------------|
| a. RD17Z, RD 17 for all Banks, All at position 17. | Queued |
| b. RP11A, RRCS Failure of Recirc Pump Trip (Div I), True | Queued |
| c. RP11B, RRCS Failure of Recirc Pump Trip (Div II), True | Queued |
| d. SL03A, SLC Pump Suction MOV1A Fails To Open , True | Queued |
| e. RR07B, RR Flow Unit Failure Upscale (B) APRM 2, True | F3 |
| f. FW34B, Feedwater Loop Flow Transmitter Output fails to ZERO (B),
(This event is cyclic and occurs six (6) times once started. | F4 |
| g. MC01, Main Condenser Air Inleakage, 5% | F5 |
| h. MC01, Main Condenser Air Inleakage, 100% Ramp Time 5 minutes. | F6 |
| i. RP14A, RRCS/ARI Failure/Defeated (Div I) | F10 |
| j. RP14B, RRCS/ARI Failure/Defeated (Div II) | F10 |
| k. RP02, RPS Failure To Scram-Automatic | F10 |

2. Remotes:

- | | |
|--|-----------|
| a. MS06A, Defeat Level 1 Isolation, Defeated | F7 |
| b. MS06B, Defeat Level 1 Isolation, Defeated | F7 |
| c. MS06C, Defeat Level 1 Isolation, Defeated | F7 |
| d. MS06D, Defeat Level 1 Isolation, Defeated | F7 |

3. Overrides:

- | | |
|---|---------------|
| a. Mode Switch (RUN), P603 Switch page 13 P603-C72A-S1A, ON | Queued |
| b. Mode Switch (SHUTDOWN), P603-C72A-S1A, OFF | Queued |
| c. Mode Switch (REFUEL), P603-C72A-S1A, OFF | Queued |
| d. Mode Switch (STARTUP), P603-C72A-S1A, OFF | Queued |
| e. EHC FLUID PMP 1B Control Switch P-T-L | Queued |
| f. EHC FLUID PMP 1A Control Switch P-T-L | ET01 |

- 4. Annunciators:
 - a. NONE
- C. Equipment Out of Service
 - 1. EHC Pump B out of service with red clearance tag hung
- D. Support Documentation
 - 1. None
- E. Miscellaneous
 - 1. ET01 = RPS B tripped.

II.

SHIFT TURNOVER INFORMATION

SHIFT: ~ N ~ D DATE: _____

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

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

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

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

Evolutions/General

Information/Equipment Status:

- Reactor Power = 100%
- Loadline = > 100%

EHC Pump B is out of service for motor replacement. Return to service in next 24 to 36 hours.

PART III: Remarks/Planned Evolutions:

Continue full power operations.

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

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

TITLE	NAME	TITLE	NAME
SSS		CRE	
ASSS		E	
STA		E	
CSO		Other	

III. PERFORMANCE OBJECTIVES

A. Critical Tasks:

- CT-1.0 Given a failure to scram and RPV level below 17.8 inches, the crew will inhibit ADS to prevent automatic ADS activation.
- CT-2.0 Given a failure to scram transient with power above 4% or unknown and RPV water level above 100 inches, the crew will terminate and prevent all injection except SLS, CRD and RCIC.
- CT-3.0 Given a failure to scram transient with power above 4% or unknown and RPV water level above TAF and an SRV open or Drywell pressure above 1.68 psig and Suppression Pool temperature above 110°F, the crew will terminate and prevent all injection except SLS, CRD and RCIC.
- CT-4.0 Given a failure to scram with power generation and Suppression Pool temperature above 110°F, the crew will use SLS injection, suppression pool cooling and control rod insertion and RPV pressure control to preclude violating HCTL (Fig M).

B. Performance Objectives:

- PO-1.0 Given a failure of Recirc Flow input to APRM 2, the crew will byapss APRM 2 per N2-OP-92.
- PO-2.0 Given a Feedwater Flow transmitter failure the crew shall take manual control of the Feedwater Level Control System and stabilize RPV water level between 178 inches and 187 inches per N2-SOP-06.
- PO-3.0 Given Main Condenser air in-leakage resulting in a lowering condenser vacuum the crew shall perform a Rapid Power Reduction to stabilize vacuum per N2-SOP-09 and N2-SOP-101D.
- PO-4.0 Given Main Condenser air in-leakage resulting in a lowering condenser vacuum the crew shall perform a manual reactor scram prior to the automatic turbine trip setpoint.

- PO-5.0 Given a failure to scram transient with power above 4% the crew shall operate Suppression Pool Cooling systems to prevent exceeding the Heat Capacity Temperature Limit (HCTL) per N2-EOP-PC.
- PO-6.0 Given a failure to scram transient with power above 4% the crew shall insert control rods by manually driving control rods and initiating additional manual scrams to prevent exceeding the Heat Capacity Temperature Limit (HCTL) per N2-EOP-6 Attachment 14.
- PO-7.0 Given the plant in a condition requiring emergency classification, the SRO shall properly classify the event per EPP-EP-02.

INSTRUCTOR ACTIONS/
PLANT RESPONSE

OPERATOR ACTIONS

Instructor – check all queued malfunctions, overrides and annunciators have remained active.

Once given shift turnover information, allow no more than five (5) minutes for the crew to perform a walk down of panels.

Begin Scenario.

Event #1 RO Instrument Failure

Console Operator Instruction

When directed, activate malfunction by depressing F3 key:

RR07B, RR Flow Unit B Upscale Failure F3

Annunciators 603217, Flow Reference Off Normal and 603442, Control Rod Block actuate.

At P603, Amber "FLOW #2 UPSC" and two white "COMPAR" lights illuminate.

At back panel P608, Flow indicates 125% for APRM 2

Role Play: When APRMs modules are checked for %Flow readings, if asked, report APRM 1,3 and 4 indicate 100% Flow.

CREW

- Complete panel walk down and tests annunciators.
- SRO conducts pre-shift brief.
- Crew assumes the shift.

RO:

PO-1.0

- Reports alarms
- Identifies flow signal to APRM#2 is upscale by observing P603 lights
- Checks Flow values on APRM drawers (reading 125% flow on APRM 2 drawer).
- Recommends bypassing APRM#2.

When APRM joystick is placed in APRM bypass 2 position, Annunciators 603217, Flow Reference Off Normal and 603442, Control Rod Block clear.
At P603, Amber "FLOW #2 UPSC" and two white "COMPAR" lights extinguish. White BYPASS light for APRM 2 illuminates.
At back panel APRM 2 drawer P608, Blue "BYPASSED" LED light illuminates.

SRO:

- Acknowledges RO report of "APRM and Rod Block" annunciators.
- Directs I&C be contacted to investigate and troubleshoot APRM #2
- Consults Technical Specifications to determine minimum required channels.
 - T.S. 3.3.1, Table 3.3.1-1
 - NO action required at this time
- Directs APRM#2 bypassed per N2-OP-92
- Notifies plant management of APRM failure.

RO:

- Enter N2-OP-92, Neutron Monitoring, and bypass the affected APRM using Section H.2.0.
 - Verify no other APRM in bypass
 - Place APRM bypass joystick to APRM # 2 position.
 - Verify APRM # 2 bypass light on P603 is "lit"
 - Verify "BYP" is displayed in inverse video on APRM # 2 Chassis (P608)
 - Verify "blue" BYPASSED LED on 2/4 Module is lit (P608)

Event #2 RO Instrument Failure

Console Operator Instruction:

When APRM actions are complete, activate malfunction by depressing F4 key:

**FW34B, Feedwater Loop Flow Transmitter
Output Fails to Zero (B)**

F4

NOTE: This malfunction will activate and deactivate six times over about a one minute span. This is being done to ensure confirmatory recognition of the problem that exists and to ensure a high level alarm is received without causing a plant trip.

603139, Reactor Water Level High/Low actuates. Reactor Water Level will rise each time the transmitter fails low.

No automatic action will occur because level will not exceed 202.8 inches and the failure is not long enough in duration.

Role Play: Inform SRO that time compression is being used.

I&C reports that the "B" Feedflow transmitter was air-bound and has been vented, tested and recommend FWLC placed back in automatic control. Work Order directs performing N2-OP-3, F.8.4.8 thru F.8.4.13 to return FWLC to AUTO.

RO

PO-2.0

- Recognize and reports transmitter problem to the SRO.
- Enters and performs appropriate actions of N2-SOP-06, Section 4.2.
 - Place FWLC Master Level Controller to Manual
 - Operates FWLC to stabilize RPV level between 178 inches and 187 inches.
 - Reports FWLC in Manual.

SRO

- Acknowledges RO report.
- Directs entry into N2-SOP-06.
- Requests assistance from I&C.

SRO

- Direct RO to place FWLC in automatic control.
- Perform pre-evolution brief.

Event #3 RO Normal Evolution

Role Play: When voltage differential is checked, report that differential is +4 mVDC.

FWLC will go into automatic operation and Reactor Water level will remain relatively unchanged.

Event #4 Crew Component Failure

Console Operator Instruction:

When FWLC has been returned to automatic, activate malfunction by depressing F5 key:

MC01, Main Condenser Air Inleakage, 5% F5

RO

- Enters and performs steps of N2-OP-03, Section F.8.4.8 through 13.
 - At CEC-PNL612, Bay A; Checks voltage differential (using portable voltmeter) between AUTO and MAN.
 - Adjust Master Controller HIC1600 setpoint thumbwheel until level needle is in the green band.
 - Depress Master Controller HIC1600 AUTO (A) pushbutton and verify green light is on.
 - Verify RPV level is stable.
 - Adjust Master Controller HIC1600 setpoint thumbwheel, if necessary approx. 183 inches.
 - Report FWLC is in automatic.

BOP

- Recognizes and reports higher than normal off-gas flowrates and a lowering Condenser vacuum.
- Dispatches AO to Offgas Panel to investigate.

INSTRUCTOR ACTIONS/
PLANT RESPONSE

OPERATOR ACTIONS

*About 2 minutes later, Annunciator 851306 Offgas
Trouble actuates
Off-Gas flowrate rises.
Condenser vacuum lowers.*

Event #5 RO Reactivity Manipulation

*Reactor Power lowers.
Main Condenser vacuum appears to be stabilizing.*

Console Operator Instruction:

When Reactor Power is lowered and vacuum is stabilized **OR if crew manually scrams before leakage is increased**, activate malfunction by depressing F6 key:

**MC01, Main Condenser Air Inleakage,100%,
Ramp Time 5 minutes. F6**

SRO

PO-3.0

- Acknowledges BOP report.
- Directs entry into N2-SOP-09.
- Directs RO to reduce Reactor Power using N2-SOP-101D to stabilize vacuum.

RO

PO-3.0

- Lowers Reactor Power using Reactor Recirculation flow.
- Inserts CRAM Rods as directed.

BOP

- Recognizes and reports that Main Condenser vacuum appears to be stabilizing with the power reduction.

SRO

- Acknowledges BOP report.
- Directs a hold on the power reduction to observe vacuum trend.
- Notifies plant management of power reduction.

Reactor Power is lowering and Main Condenser vacuum continues to get worse.

Main Condenser vacuum is approaching the Main Turbine trip setpoint.

Event #6,8,9 Component Failures

Event #7 Major Transient

**After RPS is tripped, the following are effective:
RD17Z, RD17 for all Banks Position 17 Queued
RR11A & B, RRCS Failure of Recirc Pump Trip
EHC FLUID PMP 1A P-T-L**

RPS channels fail to trip when Mode Switch is placed in Shutdown

When RPS manual scram pushbuttons are used, RPS channels trip, Control Rods insert, but only to position 17, due to hydraulic lock.

Reactor Power lowers to about 25%. RPV water level lowers, then recovers to about 180 inches with Feedwater.

Condenser vacuum continues to lower at a faster rate.

BOP

- Recognizes and reports off-gas flowrates rising again and that Condenser vacuum is lowering and approaching the Main Turbine trip setpoint.

SRO

PO-4.0

- Acknowledges BOP report.
- Directs the RO to enter N2-SOP-101C and manually SCRAM the Reactor.

RO

PO-4.0

- Enters and executes N2-SOP-101C.
- Places the Mode Switch to "shutdown".
 - Recognizes and reports that RPS is not tripped
 - Arms and depresses RPS manual scram pushbuttons
 - Reports APRM power, level, RPV pressure and all rods not full in.

When RPS channels trip, EHC Pump A trips resulting in Main Turbine Trip. Reactor pressure rises and initially controls on Turbine Bypass Valves.

As EHC fluid pressure drops, the Bypass Valves begin to close. SRVs will cycle as pressure rises to 1103 psig.

Suppression Pool Temperature begins to rise

Console Operator Instruction:

IF directed to bypass MSIV Low Level isolations, activate Remotes by depressing F7 key:

MS06A, Defeat Level 1 Isolation, Defeated F7

MS06B, Defeat Level 1 Isolation, Defeated F7

MS06C, Defeat Level 1 Isolation, Defeated F7

MS06D, Defeat Level 1 Isolation, Defeated F7

SRO

- Acknowledges RO report.
- Enters N2-EOP-RPV, then exits.
- Enters N2-EOP-C5
 - Directs BOP to “inhibit ADS” and “prevent HPCS injection”
 - Directs RO to “initiate RRCS”, N2-EOP-6, Attachment 13
 - Directs the RO to trip the Reactor Recirculation Pumps.
 - May direct MSIV isolations bypassed per EOP-6 Attachment 10.
 - Directs RPV injection terminated/prevented and level lowered to below 100 inches (50 inches to 80 inches expected band).
 - Directs pressure band 800 psig to 1000 psig using SRVs. May initially direct use of BPVs, until failure is reported

BOP

CT-1.0

- **Inhibits ADS using keylock switches**
- Places HPCS Pump switch in the Pull-to Lock position.
- Report Bypass Valves are unavailable.
- Operates SRVs as required to maintain RPV pressure in directed band (800 psig to 1000 psig expected band).

- When directed to terminate and prevent injection;
 - Arm and depress Division I Low Pressure ECCS Initiation pushbutton
 - Places Low Pressure Core Spray Pump in P-T-L
 - Override closed Low Pressure Core Spray and RHR A Injection Valves by momentarily placing valve control switches to CLOSE. Amber Override light for each valve remains on.
 - Arm and depress Division II Low Pressure ECCS Initiation pushbutton
 - Places RHR Pump C in P-T-L
 - Override closed RHR A and C Injection Valves by momentarily placing valve control switches to CLOSE. Amber Override light for each valve remains on.

RO

CT-2.0

- Manually initiates RRCS.
- Trips the Reactor Recirculation Pumps.
- Reports control rods are still NOT fully inserted.

When RPV water level drops below 108 inches RCIC automatically starts and injects.

- Maintains RPV level in the directed band (50 inches to 80 inches expected):
 - **Terminates and prevents P603 Feedwater injection by closing Feedwater LV 10s and lowers RPV level below 100 inches.**
- Reports Reactor Power level.
- Recommences Feedwater injection to maintain level in the directed band.

SRO

- Acknowledges RO and BOP reports.
- When level and pressure are being controlled, directs RO to enter and perform N2-EOP-6, Attachment 14.

RO

- Reports MSIV closure.

Main Condenser vacuum is still lowering and reaches 8.5 inches. The MSIVs automatically close.

Suppression Pool temperature (SPT) continues to rise and exceeds 90 °F, due to heat addition from SRV use.

SRO: **CT-4.0, PO-5.0**

- Directs BOP to maintain Reactor pressure band 800 psig to 1000 psig using SRV's.
- When SPT exceeds 90°F enters EOP-PC.
 - **Directs BOP to initiate Suppression Pool Cooling.**

*Suppression Pool Temperature rises and exceeds
110°F*

Note: RPV water level can drop out of the level band low, during closure of SRVs for pressure control. Crew will restore level into band when all SRVs remain closed.

BOP CT-4.0, PO-5.0

- **Places both RHR Loops in
Suppression Pool Cooling.**

Monitors and reports Fuel Zone water level during level lowering evolution, when required.

SRO CT-3.0

- When SPT exceeds 110° (if power is still above 4%, level is above –18 inches and SRVs are still open:
 - **Directs RPV injection terminated and prevented until either:**
 - **APRMs are downscale**
 - **RPV water level reaches -18 inches (expected corrected level of –55 inches at 800 psig)**
 - **SRVs remain closed**
 - Then directs RPV injection reestablished. Level band should be between –42 inches and –18 inches (expected corrected level of about –75 inches to –55 inches at 800 psig).
- Lowers RPV pressure band as needed to maintain below HCTL, as allowed by EOP-C5 P-4 Override step.

Console Operator Instruction:

WHEN ARI and RPS are directed to be defeated wait 2 minutes, then activate the following using F10 key:

RP14A, ARI Failure (Div I)	F10
RP14B, ARI Failure (Div II)	F10
RP02, RPS Failure to Scram	F10

Role Play: After ARI and RPS is defeated/bypassed, report ARI fuses are pulled and RPS jumpers are installed.

Console Operator Instruction:

When RPS is reset and ARI is defeated per EOP-6 Attachment 14, manually remove malfunction RD17Z. This will allow all control rods to fully

RO

CT-3.0, PO-6.0

- **Terminates and prevents injection (2nd time, when SPT exceeds 110°F)**
- Monitors and reports APRMs for downscale readings during level lowering evolution.
- Performs N2-EOP-6, Attachment 14, Alternate Control Rods Insertion, Sections 3.3 Additional Manual Scrams AND/OR 3.5 Manual Control Rod Insertion (by driving rods) concurrently.
- Additional Manual Scrams
 - Directs ARI interlocks defeated by pulling ARI fuses.
 - Directs RPS defeated by installing RPS jumpers.
 - After ARI fuses are pulled and RPS jumpers are installed resets RPS logic and verifies eight white RPS solenoid lights are lit
 - Verify SDV Vent and Drain valves are open.
 - Waits until SDV is drained before inserting a manual scram using pushbuttons.

insert when additional RPS trips are inserted.

Control Rods will insert when being manually driven in using Continuous Insert pushbutton.

Console Operator Instruction:

If directed by the Lead Evaluator, Annunciator Override 603409, RPS B DIS VOLUME HIGH LEVEL TRIP, Off. This will shorten the time required for the RO to insert another manual RPS trip.

After RPS is manually tripped, clear the override, so that the annunciator actuates again.

RO

PO-6.0

- Manual Control Rod Insertion:
 - Starts 2nd CRD Pump
 - Places CRD FCV in MAN and fully opens valve.
 - Fully closes Drive Pressure Control Valve to raise drive pressure.
 - Bypasses RWM using key.
 - Begins driving control rods.

RO

- After at least one SDV High Level Trip annunciator clears, inserts a manual scram using scram pushbuttons
- Reports all rods are full in

Termination Cue

- All Control Rods are fully inserted per N2-EOP-6 Attachment 14 and EOP-C5 has been exited.

SRO Candidate Evaluator:

After simulator is placed in FREEZE, ask the SRO Candidate to classify the event.

SRO

- Exits EOP-C5, then enters EOP-RPV.
- Directs water level restored to 159 inches to 202 inches
- Directs termination of Boron injection

SRO

PO-7.0

- Classify this event as a SITE AREA EMERGENCY EAL 2.2.2

V. POST SCENARIO CRITIQUE (Not required for Annual and Initial Operating Exams.)

VI. REFERENCE EVENTS AND COMMITMENTS

A. Reference Events

1. 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

5	Total Malfunctions
1	Malfunctions after EOP Entry
2	Abnormal Events
1	Major Transients
1	EOPs Used
1	EOP Contingency Procedures Used
75	Simulator Run Time
NA	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?

Nine Mile Point 2		Scenario No. RL3 (Alternate)		Operating Test No. 1	
Examiners:			Candidates: Lange		
Objectives: Evaluate SRO Instant candidates ability to respond to events, using normal, abnormal and emergency procedures. The candidates will respond to Service Water Pump trip, Loss of Feedwater Heating, Inadvertant SRV opening, Steam/Reactor Coolant leakage and loss of normal Containment Spray systems. This scenario will be classified as an Alert (EAL 3.1.1)					
Initial Conditions: 1. Plant is operating at 100% power and 100% rod line. (IC-20)					
Turnover: 1. Plant is at 100% reactor power and 100% rod line. 2. Transfer RPS A to alternate power supply and shutdown RPM-MG1A					
Event No.	Malf. No.	Type	Event Description		
1		N	(BOP/SRO) Shift RPS System A Power Supply to Alternate per N2-OP-97.		
2	CW01D	C	(BOP/SRO) Service Water Pump 2SWP*P1D trip. Requires starting standby pump and Tech Spec entry.		
3	MS10B	C/R	(RO/BOP/SRO) Loss of Extraction Steam to 6 th Point Feedwater Heater B. Requires entry into N2-SOP-8 and Rapid Power Reduction.		
4	AD05M	C	(BOP/SRO) Safety/Relief Valve PSV121 inadvertently opens. Requires Tech Spec entry and implementation of N2-SOP-34 to close valve. Valve closes when power supply fuses are pulled.		
5	MS18 MS13	M	(RO/BOP/SRO) Main Steam Rupture (leakage 20% ramp time 2 minutes) in Turbine Building with failure of MSIV to automatically isolate on high temperature. Manual scram and MSIV closure is required.		
6	RR20	C	(RO/BOP/SRO) Small Reactor Coolant System Leak (7% ramp time 5 minutes) develops in the Drywell.		
7	RH18B	C	(BOP/SRO) RHR Pump B Suction Strainer Clogging. Results in loss of normal method of Containment Spray. Requires lineup of external spray sources (Service Water) to spray containment.		

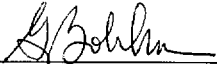

NMP SIMULATOR SCENARIO

SCENARIO RL 3

REV. 0

No. of Pages: 21

SWP PUMP TRIP/LOSS OF FW HEATING/INADVERTENT SRV OPENING/SMALL LOCA WITH CONTAINMENT SPRY USING SERVICE WATER

PREPARER	<u></u>	DATE	<u>9/20/02</u>
VALIDATED	<u>Dobiac, MacEwen, Nichols</u>	DATE	<u>10/10/02</u>
GEN SUPERVISOR OPS TRAINING	<u></u>	DATE	<u>10/11/02</u>
OPERATIONS MANAGER UNIT 2	<u>NA Exam Security</u>	DATE	<u> </u>
CONFIGURATION CONTROL	<u>NA Exam Security</u>	DATE	<u> </u>

SCENARIO SUMMARY

Length: 60 minutes

The scenario begins with the plant operating at rated power. RHR System "A" is out of service for maintenance. The crew will perform a planned transfer of RPS "A" electrical power supplies. When RPS 'A' is transferred to its alternate supply, SWP*PID trips. The crew will take the ARP actions and start SWP*PIF.

When the Technical Specification is completed, extraction steam to E6B will isolate. Feedwater temperature will lower and thermal power will rise. The crew will perform a rapid power reduction per N2-SOP-08.

While monitoring feedwater temperature, Relief Valve PSV121 fails open. The crew will shut the SRV per N2-SOP-34 by pulling the 'C' solenoid fuses.

After RHR 'B' is placed in Supp Pool cooling, a steam rupture occurs in the Turbine Building. The MSIV's fail to isolate, and the crew must take action to SCRAM the reactor and shut the MSIV's. The crew will enter N2-SOP-101C and execute N2-EOP-RPV to stabilize reactor pressure and level.

After reactor level and pressure are stabilized, a small leak from the Reactor Coolant System piping commences. As Drywell pressure slowly rises, the crew will execute N2-EOP-PC to control reactor vessel and primary containment parameters. After initiating containment sprays using RHR System "B", the ECCS suction strainer will gradually become clogged with debris in the Suppression Pool. Strainer plugging will require the crew to use an alternate source of containment spray, such as the Service Water System cross-tie to RHR System "B" in order to prevent exceeding Pressure Suppression Pressure Limit (PSP). The use of Service Water for containment spray will be successful in mitigating further degradation of the primary containment.

Major Procedures: N2-SOP-08, N2-SOP-34, N2-SOP-101C, N2-EOP-RPV, N2-EOP-PC, N2-EOP-6 Att 5.
EAL Classification: ALERT 3.1.1

Termination Criteria: Reactor is shutdown with Drywell pressure lowering as a result of Containment Spray using Service Water.

I. SIMULATOR SET UP

A. IC Number: IC 20, 100% Reactor Power

B. Presets/Function Key Assignments

1. Malfunctions:

- | | |
|---|---------------|
| a. CW01D, Service Water pump 'D' Trip | F5 |
| b. MS10B, Loss of Extraction Steam to FWHTR E6B | F6 |
| c. AD05M, ADS Relief Valve PSV-121 fails open | F7 |
| d. MS18, Steam Line rupture in the Turb Bldg, @20% over 2 minutes | F8 |
| e. RR20, RR Loop Rupture, @ 7% over 5 minutes | F9 |
| f. RH18B, RHR "B" Suction Strainer clogged, @ 90% over 3 minutes | ET01 |
| g. RH01B, RHR Pump Trip, (P1B), | ET02 |
| h. MS13, MSIV Isolation Failure | Queued |

2. Remotes:

- | | |
|---------------------------------|---------------|
| a. RP01, RPS MG "A", Reset | F3 |
| b. RP04, RPS MG "A" Stop | F4 |
| c. RHS*MOV 4A, 103C fuse pulled | Queued |

3. Overrides:

- | | |
|---|---------------|
| a. P601-E12A-S07A-A, RHS*MOV 8A Green light "OFF" | Queued |
| b. P601-E12A-S34A-B, RHS*MOV 9A Green light "OFF" | Queued |
| c. P601-E12A-S4A-B, RHS*MOV 1A Green light "OFF" | Queued |
| d. P601-E12A-S6A-B, RHS*MOV 2A Green light "OFF" | Queued |
| e. P601-E12A-DS35-B, RHS*MOV 1A Amber light "ON" | Queued |
| f. P601-E12A-DS38-B, RHS*MOV 2A Amber light "ON" | Queued |
| g. P601-E12A-DS39-B, RHS*MOV 9A Amber light "ON" | Queued |
| h. P601-E12A-DS42-B, RHS*MOV 8A Amber light "ON" | Queued |

4. Annunciators:

- | | |
|--|---------------|
| a. AN601448 RHR "A" System Valve motor overload "ON" | Queued |
| b. AN601459 RHR "A" High Point Vent Level Low "ON" | Queued |

C. Equipment Out of Service

1. Remove RHR "A" Loop from service as follows;
 - a) Depress RHR "A" manually out of service pushbutton
 - b) Place RHR "A" Pump Switch in the pull-to-lock position.
 - c) Close RHS*MOV-2A, 1A, 9A and 8A.

D. Support Documentation

None

E. Miscellaneous

1. ET01 = Suppression Chamber Spray Flow "A" or "B" > 600 gpm.
2. ET02 = "B" Drywell Spray (both) "OPEN"

II.

SHIFT TURNOVER INFORMATION

SHIFT: ~ N ~ D DATE: _____

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

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

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

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

Evolutions/General

Information/Equipment Status:

- Reactor Power = 100% • Loadline = > 100%

“A” RHR Loop out of service for work on the minimum flow valve since last shift. Expected to be returned to service for testing in two (2) days. Seven day Completion Time from T.S. 3.5.1 Required Action A.1, 3.6.1.6 Required Action A.1, 3.6.2.3 Required Action A.1, and 3.6.2.4.

PART III: Remarks/Planned Evolutions:

Required evolution to be performed after shift turnover - Transfer RPS “A” to alternate and shutdown RPM-MG1A, per N2-OP-97, Section G.2.0. This is being done to facilitate maintenance on the motor.

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

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

TITLE	NAME	TITLE	NAME
SSS		CRE	
ASSS		E	
STA		E	
CSO		Other	

PERFORMANCE OBJECTIVES

A. Critical Tasks:

- CT-1.0 Given an steam rupture in the Turbine Building and a failure of the Main Steam Lines to isolate, the crew will initiate a manual scram and close the MSIVs per N2-SOP-101C and N2-SOP-83.
- CT-2.0 Given a failure of normal Containment Spray systems, the crew will initiate Containment Spray to maintain Suppression Chamber Pressure below Pressure Suppression Pressure Limit using external spray sources such as Service Water System Cross-tie to RHR "B" per N2-EOP-6, Attachment 5 or Fire Water per N2-EOP-6, Attachment 6.

B. Performance Objectives:

- PO-1.0 Given information contained in the Shift Turnover Sheet, the crew will transfer RPS 'A' Scram Solenoid power from normal to alternate and shutdown the RPM 'A' motor generator set per N2-OP-97.
- PO-2.0 Given an electrical fault and trip of Service Water pump SWP*P1D, the crew will implement the ARP for annunciators (601217, 601219), start Service Water pump SWP*P1F and comply with Technical Specifications.
- PO-3.0 Given a loss of extraction steam to high pressure feedwater heater E6B, the crew will rapidly lower reactor power per N2-SOP-08 and N2-SOP-101C.
- PO-4.0 Given the plant experiencing a failed-open SRV, the crew will take N2-SOP-34 actions to close the failed SRV prior to exceeding 110°F in the suppression pool.
- PO-5.0 Given a steam rupture in the Turbine Building and a failure of automatic MSIV isolations, the crew will take actions to SCRAM the reactor and shut the MSIV's per N2-SOP-101C and N2-SOP-83.
- PO-6.0 Given a small reactor coolant leak inside the drywell, the crew will maintain containment parameters by implementing N2-EOP-PC.

- PO-7.0 Given a failure of normal Containment Spray systems, the crew will initiate Containment Spray to maintain Suppression Chamber Pressure below Pressure Suppression Pressure Limit using external spray sources such as Service Water System Cross-tie to RHR "B" per N2-EOP-6, Attachment 5 or Fire Water per N2-EOP-6, Attachment 6.
- PO-8.0 Given the plant in a condition requiring emergency classification, the SRO shall properly classify the event per EPP-EPIP-02.

INSTRUCTOR ACTIONS/
PLANT RESPONSE

OPERATOR ACTIONS

Instructor – check all queued malfunctions, overrides and annunciators have remained active.

Once given shift turnover information, allow no more than five (5) minutes for the crew to perform a walk down of panels.

Begin Scenario.

Event 1 BOP/SRO Normal Evolution

The RPS “A” white lights on Panel 603 will extinguish.

CREW

- Complete panel walk down and tests annunciators.
- SRO conducts pre-shift brief.
- Crew assumes the shift.

SRO

PO-1.0

- Directs BOP to shift RPS “A” to its alternate and shutdown RPM-MG1A per N2-OP-97.
- Conducts pre-evolution brief.

BOP:

PO-1.0

- Review N2-OP-97, Section G.2.0.
 - Verifies that the alternate power supply transformer is available
 - Verifies **NO** SCRAM signals are present in the opposite channel (RPS “B”)
- At Panel 610, places the “Power Source Selector Switch” to “Alt. A”.

INSTRUCTOR ACTIONS/
PLANT RESPONSE

OPERATOR ACTIONS

Role Play:

As the In-Plant Operator acknowledge direction to reset the RPS EPA. Wait two (2) minutes and insert remote:

RP01, RPS 'A' EPA Breaker Reset F3

Report RPS 'A' EPA is reset

Role Play:

As the In-Plant Operator acknowledge direction to open the MG generator output breaker and stop the MG set, then insert remote:

RP04, RPS MG1, Stop F4

Report RPS 'A' MG set is shutdown

Event 2 BOP/SRO Component Failure

When the MG set is stopped, insert the following malfunction:

CW01D, SWP*P1D Trip F5

*601217, SER WTR PUMP 1B/1D/1F MOT/
FEEDER ELECT FAULT alarms*

*601216, SER WTR PUMP 1B/1D/1F AUTO
TRIP/FAIL TO START alarms*

RO:

- Identifies and reports the four RPS "A" white lights have extinguished.

BOP:

- Requests an In-Plant Operator reset the RPS EPA locally

RO:

- Verifies four (4) RPS "A" white lights on P603 are lit.

BOP:

- Directs an In-Plant Operator to open RPS 'A' MG generator output breaker
- Directs an In-Plant Operator to depress the MG set 'motor stop pushbutton' until the motor off status light is lit

BOP:

- Identifies and reports the trip of SWP*P1D

INSTRUCTOR ACTIONS/
PLANT RESPONSE

OPERATOR ACTIONS

*When SWP*P1D is place in pull-to-lock,
annunciator 601216 clears*

Event 3 Component Failure Event, RO Reactivity
Manipulation

When the ARP actions for the Service Water pump
trip are complete, insert the following Malfunction:

MS10B, Loss of Extraction Steam to E6B F6

*2ESS-MOV3B Extraction Steam Supply shuts
2DSR-AOV81B shuts
Feedwater temperature lowers
Thermal power rises*

SRO: PO-2.0

- Acknowledges the BOP report
- Directs the ARP actions
- Directs the BOP to start SWP*P1F

BOP: PO-2.0

- Throttles the discharge valves for the running Service Water pumps to limit pump flow <10,000 gpm
- Starts SWP*P1F
- Places SWP*P1D in pull-to-lock
- Directs the SRO to Technical Specifications
- Fully opens the previously throttled pump discharge valves.

SRO: PO-2.0

- Refers to Technical Specification 3.7.1 Condition E.1 applied while only 3 SWP pumps were running. The LCO is met after SWP*P1F is started.

CREW:

- Recognizes thermal power rise
- Recognizes loss of feedwater heating to 'B' high pressure feedwater heater.

SRO: PO-3.0

- Directs entry into N2-SOP-08 ,
Unexplained Power Changes
- Directs a rapid power reduction to
below 90% per N2-SOP-101D

RO: PO-3.0

- Enters/executes N2-SOP-08 actions
- Performs rapid power reduction to
directed power level with Recirc flow.

BOP:

- Notifies Reactor Engineer
- Monitors Offgas and Main Steam Line
Rad Monitors for evidence of a fuel
failure
- Monitors feedwater temperature to
assure compliance with Figure 1 of
N2-SOP-08
- Verify closed CNM-AOV101
- Verify closed FWS-MOV102
- Verify closed ESS-MOV3B
- Dispatch operator to adjust LIC26B
setpoint until LV26B opens
- Exits N2-SOP-8 and enters N2-OP-8
H.2.0, to complete removal of heater
from service.

INSTRUCTOR ACTIONS/
PLANT RESPONSE

OPERATOR ACTIONS

Event 4 BOP/SRO Component Failure

After the rapid power reduction is completed and the crew transitions to N2-OP-8, insert the following malfunction:

AD05M, PSV-121 Fails Open

F7

SRV PSV 121 opens

Steam flow/feed flow mismatch occurs

Supp Pool temperature begins to rise

Expected Annunciator:

601548, Safety Relief Valve Open

SRO:

- Notifies Plant Management of the event and power reduction
- Requests Maintenance/I&C support for troubleshooting.

BOP:

- Reports alarm
- Reports PSV121 indicates open
- Places keylock switch for PSV121 on P601 to 'OFF'
- Reports SRV is still open

RO:

Verifies the SRV is open by any of the following :

- Steam flow/feed flow mismatch
- Tailpipe temperature rise
- SPDS ERF indication
- Generator output drop

SRO:

- Acknowledges the report that PSV-121 is open
- Directs entry/execution of N2-SOP-34
- Briefs the crew on the 110°F Supp Pool temperature limit

INSTRUCTOR ACTIONS/
PLANT RESPONSE

OPERATOR ACTIONS

When fuses F79 and F80 are removed, position indication for PSV121 is lost at P601. The SRV will shut, but the crew will need to make that determination by one or more of the alternate means such as ERF computer display.

*Expected Annunciator:
601538, Safety Relief Valves Power Failure*

Note:

Depending upon how long the SRV is open, Annunciator 601560, Supp Pool Water Temp High will alarm after approximately two (2) minutes.

BOP:

PO-4.0

- Acquires safety glasses and fuse pullers
- Enters the rear of panel P628
- Locate fuse strip 'K' (right-hand side of panel).
- Removes fuses F79 and F80 for the 'C' solenoid of PSV121

RO:

- Verifies and reports PSV121 is shut by alternate methods.

SRO:

- Acknowledges reports that fuses are pulled and SRV is shut.
- Directs RHR 'B' place in Supp Pool cooling.
- Reviews Technical Specifications and determines that SR 3.6.1.7.2 is required within 12 hours.
- If RHR B is placed in Suppression Pool Cooling, enters Tech Spec 3.5.1 Condition C. Required Action C.1 applies and one RHR loop must be restored with 72 hour Completion Time.
- Notifies Plant Management

INSTRUCTOR ACTIONS/
PLANT RESPONSE

OPERATOR ACTIONS

Console Operator Instruction:

When requested to place Service water Rad Monitor SWP*RE23B in service, manually activate remote

RM45, SWP23B, 1E-6

Then report RE23B is in service.

Event 5 RO/BOP/SRO Major

When RHR 'B' is lined-up for Supp Pool cooling, insert the following malfunction:

MS18, MSL Rupture in Turb Bldg

@20% over 2 minutes

F8

Expected Annunciators:

602227, Turb Bldg MN Steam Line Temp Hi-Hi

602233, Mn Stm Line Pipe Tnl/TB Encl/RB Gen Area Temp High

Turbine Building temperatures will begin to rise.

BOP:

- Places RHR 'B' in Supp Pool cooling.
 - Notifies SRO that LPCI B is required to be declared inoperable when placed in Suppression Pool Cooling per N2-OP-31
 - Contacts RP to place RE23B in service.
 - Opens SWP*MOV90 and 33B
 - Starts RHR Pump B
 - Throttles open RHS*FV38B to establish about 7400 gpm.

RO:

PO-5.0

- Acknowledges/announces Turbine Building Temperature alarms.
- May realize the failure of the half MSIV Isolation.
- Takes ARP actions

SRO:

PO-5.0

- Acknowledges BOP report.
- Directs ARP actions.
- Directs monitoring Turbine/Reactor Building temps to locate steam leak.
- Directs Turbine Building evacuation.

INSTRUCTOR ACTIONS/
PLANT RESPONSE

OPERATOR ACTIONS

After two (2) minutes, the following annunciator alarms:

*602228, Mn Steam Line Pipe Tunnel Temp
Hi-Hi – Diff Temp Hi*

With both annunciators 602227 and 602228 in alarm, the following malfunction becomes effective:

MS13, MSIV Isolation Failure Queued

BOP:

- Monitors area temps on panel P632 and P642
- Reports rising temperatures on MSL Tunnel detectors (N604A,B 616A,B 617A,B and 619A,B)

RO:

- Reports alarms
- Recognizes and reports failure of MSIV Isolation

SRO: **CT-1.0, PO-5.0**

- Acknowledges failure of MSIV's to isolate
- **Directs the Mode Switch to shutdown**
- **Directs shutting the MSIV's**
- Directs the actions of N2-SOP-101C
- Enters N2-EOP-RPV
- Acknowledges the SCRAM report

RO: **CT-1.0, PO-5.0**

- **Places the Mode switch to shutdown**
- Makes SCRAM report
- Takes actions of N2-SOP-101C
- **Manually shuts the MSIV's**

INSTRUCTOR ACTIONS/
PLANT RESPONSE

OPERATOR ACTIONS

If RPV water level drops to 108", HPCS will automatically start.

BOP:

- May report that area temps are dropping after the MSIV's are shut
- When directed, maintains pressure using SRV's.

SRO:

- Enters EOP-RPV
- Directs level be maintained 160 inches to 200 inches with Feedwater System, RCIC and/or HPCS.
- Directs pressure maintained/stabilized with SRV's between 800 psig and 1000 psig.

RO:

- Maintains level as directed using Feedwater, RCIC and/or HPCS.
- If Reactor Feedwater Pumps trip on level 8, restart Feedwater Pumps if directed.
 - Verify 2 Condensate AND 2 Booster Pumps are in service.
 - Verify LV10 controllers in MAN and full closed.
 - Reset Level 8 trips using pushbuttons
 - Start a Reactor Feedwater Pump
 - Injects through LV10

INSTRUCTOR ACTIONS/
PLANT RESPONSE

OPERATOR ACTIONS

Event 6 RO/BOP/SRO Component Failure

When post SCRAM level and pressure have been stabilized insert the following malfunctions:

RR20, RR Loop Rupture, @ 7% over 5 minutes.

F9

Drywell and Suppression Chamber pressure begin to rise.

Expected Major Annunciator:

603140 DRYWELL PRESSURE HIGH/LOW

Drywell and then Suppression Chamber pressure will rise.

Drywell pressure will exceed 1.68 psig. CSH, RHR,

CSL and all EDGs start

Reactor Pressure will continue to lower.

RO:

- Reports Reactor water level and pressure are lowering.

BOP:

- Reports Drywell and Suppression Chamber pressures are rising.
- Reports Drywell temperature is rising

SRO:

PO-6.0

- Re-enter N2-EOP-RPV when Drywell Pressure exceeds 1.68 psig
- LPCI/LPCS injection overridden prior to injection.
- Enter N2-EOP-PC
 - Directs Suppression Chamber Spray using RHR Loop "B".
 - Directs DW unit coolers restored.

BOP:

PO-6.0

- Reports rising containment pressure and temperature. (w/values)
- Lines up Service Water to the RHR heat exchanger.
- Initiates Suppression Chamber Spray by opening RHS*MOV33B.

INSTRUCTOR ACTIONS/
PLANT RESPONSE

OPERATOR ACTIONS

Event 7 BOP/SRO Component Failure

When Suppression Chamber Spray is initiated, the following malfunction will occur:

RH18B, RHR B Suction Strainer Clogged @ 90% over 3 minutes. ET05

RHR Pump B amps and flow will start oscillating as the suction strainer clogs.

Evaluator Note: Crew will either secure RHR Pump "B" from Suppression Chamber Spray now and align Service Water to RHR Loop "B" OR align Service Water to RHR Loop "B" after the RHR pump auto trips. Either path is acceptable as long as Drywell Spray is initiated with Service Water before exceeding PSP.

Suppression Chamber pressure continues to rise and exceeds 10 psig.

- Verifies and reports CSH automatically started as required.

BOP:

- Recognize and report Suction Strainer clogging problem.
- Monitor RHR Pump "B" parameters.
- If directed, secures Suppression Chamber Spray by closing RHS*MOV33B and tripping RHS*P1B.

SRO:

- May direct use of alternate sources for Containment Spray.

SRO:

CT-2.0

- **When Suppression Chamber pressure is greater than or equal to 10 psig, directs Drywell sprays initiated either using RHR "B" OR Service Water lined up to RHR "B".**
 - Directs RCS Pumps and Drywell Unit Coolers tripped
 - Verifies parameters within DW Spray Initiation Curve.

INSTRUCTOR ACTIONS/
PLANT RESPONSE

OPERATOR ACTIONS

NOTE: If SRO elects to keep using the “B” RHR Pump, it will automatically trip when the Drywell Spray MOVs are full open by the following malfunction:

RH01B, RHR Pump Trip

ET02

RO:

- When directed for Drywell Spray
 - Trips Recirc Pumps.
 - Verify Drywell Unit Coolers tripped.

BOP:

- Reports containment pressure and temperature. (w/values)
- Initiates Drywell Sprays by opening RHS*MOV15B and MOV25B.
- Starts fifth Service Water Pump.
- Restores nitrogen to the Drywell when directed.

BOP:

CT-2.0

- Secures Drywell and Suppression Chamber Sprays using “B” RHR.
- **Aligns RHR Service Water to spray using N2-EOP-06, Attachment 5.**
 - Places RHS*P1B in PTL
 - Close RHS*MOV12B
 - **Open RHS*MOV116**
 - **Open RHS*MOV115**

INSTRUCTOR ACTIONS/
PLANT RESPONSE

OPERATOR ACTIONS

After Drywell Sprays are initiated, Drywell and Suppression Chamber Pressure begin to lower.

Termination Cue:

- Reactor is shutdown with RPV Level and Pressure controlled in the directed band.
- Drywell and Suppression Chamber Pressure is lowering as a result of Containment Spray using external spray sources.

SRO Candidate Evaluator:

After simulator is placed in FREEZE, ask the SRO Candidate to classify the event.

- **Sprays Drywell using Service Water.**
 - **Verify RHS*MOV24B closed**
 - **Verify RHS*FV38B closed**
 - **Open RHS*MOV15B and 25B to spray Drywell.**

SRO:

PO-7.0

- Classify this event as a ALERT 3.1.1

V. POST SCENARIO CRITIQUE (Not required for Annual and Initial Operating Exams.)

VI. REFERENCE EVENTS AND COMMITMENTS

A. Reference Events

1. 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

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

4. Developmental Checks:

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

Is Criteria given for sequencing to subsequent events?

Is termination criteria clear and unambiguous?

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