Facility: **Nine Mile Point 2** Scenario No.: **NRC-01** Op-Test No.: **March 2008**
Examiners: _____ Operators: _____

Initial Conditions: Simulator IC-241

1. Reactor Power 90%

Turnover:

1. All equipment operable.
2. Swap Service Water Pumps from the 2SWP*P1B to the 2SWP*P1F for normal equipment rotation. Pre-start checks have been completed and an AO is standing by at the "F" pump

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	N (BOP) N (SRO)	Swap operating Service Water Pumps ***N2-OP-11 Service Water***
2	CW02B CW16C	C (BOP) C (SRO)	RBCLCW Pump trips. Standby Pump fails to auto-start and must be started manually. ***N2-SOP-13 Loss or Degraded CCP System***
3	PC10B Overrides	C (BOP) R (RO) C (SRO) TS (SRO)	ADS/SRV fails opens. Valve closes when fuses are pulled. Drywell Vacuum Breaker fails open. Power decrease to 85%. ***N2-SOP-34 Stuck Open SRV***
4	FW03A RR30,31	C (ALL) TS (SRO)	Feedwater Pump Trip, Partial Recirc Runback ***N2-SOP-6, Feedwater Failures*** ***N2-SOP-29, Sudden Reduction in Core Flow***
5	RD05- 18-31	R(RO) R (SRO)	One Control rod drifts out requiring a power decrease. ***N2-SOP-08 Unplanned Power Changes***
6	RD05- 42-39	C (RO) C (SRO)	Another control rod drifts out requiring a reactor scram
7	MS04	M	Steam Leak in Drywell. (**EOP-RPV, EOP-PC**)
8	RH01B RH14A	I (BOP) I (RO)	DIV1 EDG, LPCS and RHR A fail to initiate and RHR B trips when Drywell pressure exceeds 1.68 psig; Both LPCS and RHR A can be started manually.
9	N/A		PSP exceeded, RPV blowdown required (**CT**) **EOP-C2**

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

Facility: **Nine Mile Point 2**	Scenario No.: **NRC-01**	Op-Test No.: **March 2008**
TARGET QUANTITATIVE ATTRIBUTES **(PER SCENARIO; SEE SECTION D.5.d)**	ACTUAL ATTRIBUTES	
1. Total malfunctions (5-8) **Events 2,3,4,5,6,8**	6	
2. Malfunctions after EOP entry (1-2) **Events 8**	1	
3. Abnormal events (2-4) **Event 2 SOP-13 Event 3 SOP-34, Event 4 SOP-6,29 Event 5 SOP-8**	4	
4. Major transients (1-2) **Event 7**	1	
5. EOPs entered/requiring substantive actions (1-2) **Events 7, 8 EOP-RPV, EOP-PC**	2	
6. EOP contingencies requiring substantive actions (0-2) **Event 9 EOP-C2**	1	
7. Critical tasks (2-3)	2	
CRITICAL TASK DESCRIPTIONS: **CT-1.0 Initiate DW spray to control containment pressure** **CT-2.0 Initiate RPV Blowdown when PSP is exceeded and DW spray established**		

NMP SIMULATOR SCENARIO

NRC Scenario 1 **REV. 00** **No. of Pages: 22**

APRM UPSCALE/RBCLCW PUMP TRIP/ADS SRV OPENS/CONTROL ROD DRIFT/REACTOR SCRAM-MODE SWITCH FAILURE/STEAM LEAK IN DRYWELL

PREPARER	S. Dennis	DATE _____
VALIDATED	_____	DATE _____
GEN SUPERVISOR OPS TRAINING	R. Brown	DATE 1/23/08
OPERATIONS MANAGER	NA Exam Security	DATE _____
CONFIGURATION CONTROL	NA Exam Security	DATE _____

SCENARIO SUMMARY

Length: 1.5 hours

Initial Power Level: 90%

The scenario begins at 90% power. The BOP will be required to swap from the 2SWP*P1B to the 2SWP*P1F for normal equipment rotation. After completion of the pump swap, one of the running RBCLCW pumps will trip and the standby pump will fail to auto start. The standby pump can be manually started by the operators.

An ADS SRV will then go open but can be closed by pulling the SRV solenoid fuses. When this occurs, a Drywell vacuum breaker pair will fail open. The crew will enter the SOP for Stuck Open SRV and the SRO will review Technical Specifications (TS) in regard to the vacuum breakers.

Once TS are addressed a trip will occur on one Feedwater Pump and only a partial Recirc Runback will occur. SOPs must be entered to control feedwater level and address the reduction in power. Cram rods will need to be inserted and TS must be addressed due to loop flow mismatch.

When plant conditions stabilize, one control rod will drift out requiring an entry into the SOP for Unplanned Power Changes. The SOP will require that power be lowered and the RO will reduce recirculation flow IAW procedures. After power is lowered, another control rod will drift out requiring a reactor scram.

When the reactor scrams a steam leak will occur inside the drywell. LPCS and RHR A will fail to initiate and RHR B will trip when Drywell pressure exceeds 1.68 psig. However, both LPCS and RHR A can be started manually. RHR A must then be placed

in Suppression Chamber sprays per EOP-PC. When Suppression Chamber pressure exceeds 10 psig, the crew will attempt to spray the Drywell with RHR A, but RHS*MOV15A will not open. Spraying the Drywell must be accomplished with Service Water (**Critical Task**). Once DW sprays are in service and PSP is evaluated, it will be recognized that RPV Blowdown is required once above the PSP (**Critical Task**). The crew will blowdown the reactor and continue to control Containment pressure.

The scenario ends with the blowdown complete and containment pressure lowering.

Major Procedures Exercised: EOP-RPV, PC, C2. SOP-8, 34

EAL Classification: Alert 3.1.1 – Primary Containment cannot be maintained below 1.68 psig due to coolant leakage.

Termination Criteria: RPV Blowdown is complete and containment pressure lowering

I. SIMULATOR SET UP

A. IC Number: IC-17. (Operation Above 100% Rod Line)

B. Presets/Function Key Assignments

1. Malfunctions:

a.	RH14A	ECCS FAILS TO INITIATE (DIVI)	PRESET
b.	CW16C	CCP-P1C FAILS TO AUTOSTART	PRESET
c.	CW02B	RBCLCW PUMP TRIP P1B	TRG 1
d.	PC10B	DW/WW VACUUM BKR PAIR FAILED OPEN (2ISC*RV34 AB) –DELAY 20 SECONDS	TRG 2
f.	FW03A	Feedwater Pump Trip (P1A)	TRG 3
g.	RR30	HPU B PMP #1 FAILURE	TRG 3
h.	RR31	HPU B PMP #2 FAILURE	TRG 3
e.	RD05-18-31	CONTROL ROD FAILURE DRIFT OUT	TRG 4
f.	RD05-42-39	CONTROL ROD FAILURE DRIFT OUT	TRG 6
g.	MS04	STEAM LINE RUPTURE INSIDE PRIMARY CONTAINMENT (DELAY 3 MINUTES)	TRG 7
h.	RH01B	RHR PUMP TRIP (P1B)	TRG 8

2. Remotes:

a.	RD08-18-31 HCU ISOLATION FOR INSERTED ROD	TRG 5
b.	RH47 2RHS*MOV 15A EOP JMPR (RHS*MOV25A 33 CONTACT)	TRG 9
c.	RH47 2RHS*MOV 25A EOP JMPR (RHS*MOV15A 33 CONTACT)	TRG 9

3. Overrides:

a.	OVR-13S05DI2011 OPEN ADS VLV PSV 134	TRG 2
b.	OVR-03A2S14DI142815 ON MODE SWITCH (SD)	PRESET
c.	OVR-03A2S14DI14290 ON MODE SWITCH (REFUEL)	PRESET
b.	OVR-03A2S14DI14291 ON MODE SWITCH (SU)	PRESET
b.	OVR-03A2S14DI14292 ON MODE SWITCH (RUN)	PRESET

4. Annunciators:

a. None

C. Equipment Out of Service

1. None

D. Support Documentation

E. Miscellaneous

II. **SHIFT TURNOVER INFORMATION**

OFF GOING SHIFT: ☐ N ■ D DATE: _____

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

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

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

Shift Supervisor Log (SM, CRS, STA)
- CRO Log (CRO)

Lit Control Room Annunciators (SM, CRS, STA, CRO, CRE)

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

Evolutions/General Information/Equipment Status:

- Reactor Power = 90%
- Loadline = >100%
- None

PART III: Remarks/Planned Evolutions:

Swap Service Water Pumps from the 2SWP*P1B to the 2SWP*P1F for normal pump Rotation.

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 Spray the Drywell with Service Water when RHR is unavailable.

CT-2.0 Blowdown the RPV when PSP is exceeded.

B. Performance Objectives:

PO-1.0 Given the plant with direction to swap Service Water Pumps, the crew will remove the 2SWP*P1B pump from service and place the 2SWP*P1F pump in service for equipment rotation IAW N2-OP-11.

PO-2.0 Given the trip of a RBCLCW pump and the failure of the standby pump to auto start, the crew will manually start the standby pump IAW SOP-13.

PO-3.0 Given the plant or plant system in a condition requiring Technical Specification action, identify the deviation and any required actions/notifications in accordance with all applicable administrative, emergency, and technical procedures.

PO-4.0 Given a pair of failed open Drywell Vacuum Breakers the crew will diagnose the failure and enter Technical Specifications.

PO-5.0 Given a stuck open SRV the crew will diagnose the failure enter and execute N2-SOP-34 to close the by pulling the SRV solenoid fuses.

PO-6.0 Given a single Feedwater Pump trip, with only a partial Recirc Runback, the crew will enter and execute SOPs 6, 101D, and 29, to control feedwater level, reduce power and maintain NMP 2 in service.

PO-7.0 Given a control rod drift, the crew will execute N2-SOP-8 to fully insert and disarm the control rod.

PO-8.0 Given the plant operating and a steam leak inside the drywell the crew will diagnose the leak

PO-9.0 Given a second control rod drift the crew will recognize the requirement to scram the reactor and will perform a reactor scram.

PO-10.0 Given drywell pressure above 1.68, the crew will verify automatic ECCS initiations and recognize the failure of LPCS and RHR A to start.

PO-11.0 Given suppression chamber pressure above 10 psig, the crew will spray the drywell using Service Water through RHR B loop prior to exceeding the Primary Containment Pressure Limit.

PO-12.0 Given suppression chamber pressure above the Pressure Suppression Pressure with drywell sprays in operation, the crew will blowdown the reactor prior to exceeding the Primary Containment Pressure Limit

INSTRUCTOR ACTIONS/ PLANT RESPONSE	OPERATOR ACTIONS
	SRO/Crew • Crew conducts a pre-brief, walks down the panels, and tests annunciators.
EVENT 1 **Swap Service Water Pumps from the 2SWP*P1B to the 2SWP*P1F for normal equipment rotation IAW N2-OP-11.**	
EVENT 1 –SRO Actions	SRO • Directs the BOP to start Service Water Pump 1F and secure Service Water Pump 1B per N2-OP-11. • Conducts a pre-evolution brief.
EVENT 1 –BOP Actions	BOP PO-1.0 • Reviews N2-OP-11, Section E.2.0 and G.1.0
Role Play: As AO, wait two minutes and report that Service Water Pump P1F prestart checks are complete.	• Verifies Precautions and Limitations are met. • Dispatches AO to perform prestart check of P1D.
Cue: If asked report that SWP strainer and casing venting are complete.	• Starts Service Water Pump, P1F and secures Service Water Pump, P1B.

INSTRUCTOR ACTIONS/ PLANT RESPONSE	OPERATOR ACTIONS
EVENT 2 RBCLCW Pump P1B trips. Standby Pump fails to auto-start and must be started manually **SIM Booth**: Activate Trigger #1 when cued.	CREW PO-2.0 • Responds to RBCLCW Pump P1B trip. • Recognizes the P1A pump fails to start.
EVENT 2 –SRO Actions	SRO • Directs ROs to respond to annunciators and enter SOP-13 • May contact the Work Execution Center (WEC) for maintenance followup.
EVENT 2 –BOP Actions	BOP • Recognizes failure of standby RBCLCW pump to auto start. • References annunciator response for pump trip. • Refers to SOP-13 and starts the standby pump. • Place "B" Pump in Pull-To-Lock
EVENT 2 –RO Actions	RO • Monitors reactor power, pressure and level. • May announce on plant page entry to SOP-13

INSTRUCTOR ACTIONS/ PLANT RESPONSE	OPERATOR ACTIONS
EVENT 3 –ADS SRV Opens/ Drywell vacuum breaker fails open **SIM Booth:** Activate Trigger #2 when cued	CREW, SRO PO-4.0 and PO-5.0
EVENT 3 SRO Actions	SRO PO-3.0 • Enters into N2-SOP-34 • Directs Power Reduction to approx. 85% • Declares PSV134 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. • When informed Report that a pair of DW vacuum breakers are open determines that DW and SC pressures are equal, therefore the vacuum breakers should not be open. • Refers to Tech Spec 3.6.1.7.2.C for SP to DW vacuum breakers (2hours) and recognizes requirement to perform N2-OSP-ISC-M@002 within 12 hours.

EVENT 3 SRO Actions (Cont.)

- May direct one loop of RHS placed in Suppression Pool Cooling.
- IF RHS is placed in Suppression Pool Cooling, declares RHS inoperable for LPCI mode and enters Tech Spec 3.5.1 CONDITION A REQUIRED ACTION A.1 with 7 day COMPLETION TIME.
- IF Suppression Pool Temperature exceeds 90°F, enters EOP-PC.
- Notifies Operations and Plant Management.
- Contacts WEC SRO for assistance and work planning.
- Conducts post event brief.

EVENT 3 RO actions

RO

- Reports one or both of the following:
  - P601556 Drywell Vacuum Brkr Inboard Disc Open
  - P601557 Drywell Vacuum Brkr Outboard Disc Open.
- Informs the CRS that 34A and B vacuum breakers indicate open on Panel 2CEC*PNL628

INSTRUCTOR ACTIONS/ PLANT RESPONSE	OPERATOR ACTIONS
EVENT 3 RO actions (Cont.)	• Reduces power to approximately 85% per N2-SOP-101D. • **IF** Average Suppression Pool temperature is approaching 110°F..... **THEN** Scram the reactor per N2-SOP-101C and continue here. • Monitors parameters to assist in determining SRV position. • Monitors and control RPV water level in directed band in manual. • Make page announcement regarding plant status.
EVENT 3 BOP Actions	BOP • Reports annunciators • Enters and executes N2-SOP-34 • Identify which SRV is open. (PSV121) • Place the keylock switch for PSV21 to the OFF position. • Did the SRV close? **NO** (Detail 1) Use one or more of following indications to verify SRV status: -SPDS Computer -ERF Computer Points -MSSZC111; MSSZC128

EVENT 3 BOP actions (CONT)

PSV134 closes after pulling F81, F82 F13A, F14A. At P601 position indicating (red and green) lights for PSV134 are now deenergized.

Role Play: Acknowledge as Rad Protection in regard to placing SW rad monitor in service when RHR is placed service

-Reactor Power Change
-Generator Output Change
-Steam Flow/Feed Flow Mismatch
-Acoustic Monitor

- 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:
- C,A,B Solenoid fuse

  Did SRV close? **YES** for A solenoid

  Detail 1
- Use one or more of following indications to verify SRV status:
  - SPDS Computer
  - ERF Computer Points

    MSSZC111

    MSSZC128
  - Reactor Power Change
  - Generator Output Change
  - Steam Flow/Feed Flow Mismatch
  - Acoustic Monitor
- Exits SOP-34 and informs SRO SRV is closed.
- If directed starts RHS in

	Suppression Pool Cooling.
EVENT 4 – Feedwater Pump Trip, Partial Recirc Runback	Crew PO-6.0 • Recognizes and responds to trip of P1A feedwater pump trip.
Sim Booth: Activate Trigger #3 when cued	• Recognizes and responds to partial Recirc Runback
EVENT 4 SRO Actions	SRO • Directs crew response IAW the following: o SOP-6. Feedwater Failures o SOP-101D, Power Reduction o SOP-29, Sudden Reduction in Core Flow. • Refers to TS 3.4.1.B. for Recirc Loop Flow Mismatch (2 hours) • Direct inserting Cram Rods per SOP-6
EVENT 4 RO Actions	RO • Recognizes trip of P1A Feedwater Pump. • Refers to SOP-6, Feedwater Failures • Inserts 4 Cram Rods as required

	by SOP-6 • IAW SOP-6, Closes LV10 for tripped feedwater pump P1A. • Recognizes Partial Recirc Runback • Inserts Cram Rods as directed per SOP-6
EVENT 4 BOP Actions	BOP • Refers to SOP-29 Attachment 1 to address Recirc loop Flow Mismatch • Begins recovery actions to reset runback IAW Att.1.
SIM Booth Operator: Insert the next malfunction (TRG 4) for control rod drift PRIOR to resetting the runback.	
EVENT 5 – Control Rod Drift	Crew PO-7.0 • Identifies and reports control rod drift on 18-31
EVENT 5 SRO Actions	SRO • Recognizes entry and directs entry to SOP-8, Unplanned Power Changes • Declares control rod 18-31 inoperable per Tech. Spec. 3.1.3 condition C actions C.1 and C.2

INSTRUCTOR ACTIONS/ PLANT RESPONSE	OPERATOR ACTIONS
	(fully insert and disarm) (4 hours to disarm).
Sim Booth Operator: When requested to valve out the HCU, Insert TRG 5 after approximately 3 minutes.	
EVENT 5 RO Actions	RO • Recognizes and identifies Control Rod 18-31 drifting out. • Selects rod for display. • Refers to SOP-8 and inserts drifting control rod 18-31 • Releases insert pushbutton and observe rod position. • Recognizes rod continues to drift out • Drives the rod full-in and holds insert pushbutton until HCU is disarmed. • When rod 18-15 is full-in, directs field operator to close RDS*V103 & RDS*V105. • Dispatch Auxiliary Operator to isolate HCU by closing RDS*V103 and V105 in accordance with SOP-08.

INSTRUCTOR ACTIONS/ PLANT RESPONSE	OPERATOR ACTIONS
EVENT 6, Second Control Rod Drift **Sim Booth:** Activate Trigger #6 when cued	Crew PO-9.0 • Identifies and reports second control rod drift of control rod 42-39
EVENT 6 SRO Actions	SRO • Direct mode switch be placed in shutdown
EVENT 6 RO Actions	RO • Places mode switch to shutdown. • Provides scram report: o Mode Switch in Shutdown o APRMs downscale o RPV Water Level o RPV Pressure o All Rods In o FW and MSIV status • Maintains RPV level 160-200 inches • Monitors RPV pressure 800-1000 psig and lowering.

INSTRUCTOR ACTIONS/ PLANT RESPONSE	OPERATOR ACTIONS
EVENTS 7 & 8, Steam Leak Inside Drywell. LPCS and RHR A Fail to Automatically Initiate and RHR B Trips **Sim Booth: Activate Trigger #7 and Trigger #8 activated at 1.68 psig in drywell**	Crew PO-8.0 • Identifies steam leak and ECCS failures.

EVENTS 7 & 8 SRO Actions	SRO PO-12.0
	
	• Directs RO to start LPCS and RHR A pumps.
	• Directs RHR A placed in Suppression Chamber sprays.
	
	• Declares an Alert based on EAL 3.1.1 and EPMP-EPP-0102 review.
	
	• Directs the crew to monitor and report when Suppression Chamber pressure exceeds 10 psig.
	• When told that Suppression Chamber pressure exceeds 10 psig Directs the following:
	  o Drywell Unit Coolers tripped.
	  o Recirc. Pumps tripped
	• Verifies within Drywell Spray Initiation Limit Curve
	• Directs spraying the Drywell using RHR A and defeating the DW

Spray interlocks per EOP-6, Att. 22

- Determines Suppression Chamber pressure above the Pressure Suppression Pressure curve limit.

EVENT 9

Note to Evaluator: It is important that the evaluation to blowdown when above PSP be made only after Drywell sprays are initiated or it is determined that the Drywell cannot be sprayed. It is incorrect EOP implementation to continue to RPV Blowdown with having attempted to spray the Drywell.

- **Directs spraying the Drywell using Service Water via RHR B using EOP-6 Att. 5.**

CT-1.0

- Verifies that Containment pressure is above PSP with Drywell Sprays in service.
- **Directs RPV Blowdown per EOP-C2, based on being above PSP with Drywell Sprays in service.**

CT-2.0

- Directs placing RHR A in Suppression Pool Cooling.

EVENT 7 & 8 RO Actions

RO PO-10.0

- Reports DW pressure above 1.68 psig.
- Recognizes and reports failure of LPCS and RHR A pumps to start.
- Recognizes and reports failure of DIV I EDG.

SIM Booth: Insert Trigger #9 for RHS* MOV15A failure

- Recognizes and reports trip of RHR B pump.
- Starts LPCS and RHR A pump.
- Places RHR A in Suppression

	Chamber sprays and does not establish Suppression Pool cooling. • Defeats the DW Spray interlocks per EOP-6, Att. 22 • Recognizes and reports that RHS*MOV15A has lost power on overload and is not open. • **Sprays the Drywell using Service Water via RHR B using EOP-6 Att. 5.** **CT-1.0** • Places RHR A in Suppression Pool Cooling.
EVENT 7 ,8 & 9 BOP Actions **EVENT 9 – RPV Blowdown**	BOP PO-11.0 • Reports Suppression Chamber pressure above 10 psig. • Verifies DW unit coolers tripped. • Trips Recirc pumps. • **Initiates ADS Division 1 using the pushbuttons on P601** **CT-2.0** • Verifies that 7 ADS valves open. • Verifies that RPV pressure is lowering

V. POST SCENARIO CRITIQUE

A. NA, NRC Exam

VI. REFERENCE EVENTS AND COMMITMENTS

A. Reference Events

1.0 During performance of Surveillance (N2-OSP-ADS-R001), when the 8th SRV was opened Suppression Chamber pressure became great enough to open a pair of vacuum breakers. The vacuum breakers stayed open for almost 30 minutes until DW and SC pressure equalized.

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
1	Malfunctions after EOP Entry
4	Abnormal Events
1	Major Transients
2	EOPs Used
1	EOP Contingency Procedures Used
	Simulator Run Time
	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?

N2-SOP-13 - LOSS OR DEGRADED CCP SYSTEM

EVENT DESCRIPTION

See Section 1.0.

NOTE: Trip of WCS pumps may NOT be immediately required if the station is in Mode 4/5.

IF	THEN
All CCP pumps have tripped AND none can be re-started,	• **SCRAM** the Reactor per N2-SOP-101C. • Trip BOTH Recirc pumps AND enter N2-SOP-29. • Trip WCS pumps if required.
SWP supply to the Reactor Bldg. is isolated AND can NOT be promptly restored,	
CCP system conditions have degraded to the point that systems loads will NOT have adequate cooling,	

IF	THEN
A standby CCP pump failed to auto start,	Attempt to manually start the pump.
An RHS pump is operating,	Shift seal cooling to SWP per N2-OP-13, H.7.0.
The CCP expansion tank is found empty,	Recover per N2-OP-13, E.1.0.

At least 1 main AND booster pump operating?

- Yes → (skip)
- No → **WAIT** until 1 main AND 1 booster pump are AVAILABLE. → Perform Attachment 2 to restart pumps.

Is cooling capacity degraded?

- No → (skip)
- Yes →
  - Monitor system loads (**Detail A**).
  - Secure loads as required.

IF	THEN
WCS must be removed from service,	1. Throttle WCS*MOV200 until the filters are in hold. 2. Trip WCS pump(s).

Perform any of the following as required to stabilize the CCP system:

- Place standby main/booster pump in service per N2-OP-13, F.2.0/F.4.0.
- Place standby heat exchanger in service per N2-OP-13, F.7.0.
- Place CCP-TIK108, RBCLC HEAT EXCHANGER TEMP CONTROLLER in MANUAL AND maintain CCP temperature 80 - 85°F.
- Take local control of CCP-TV108 per N2-OP-13, H.3.0.

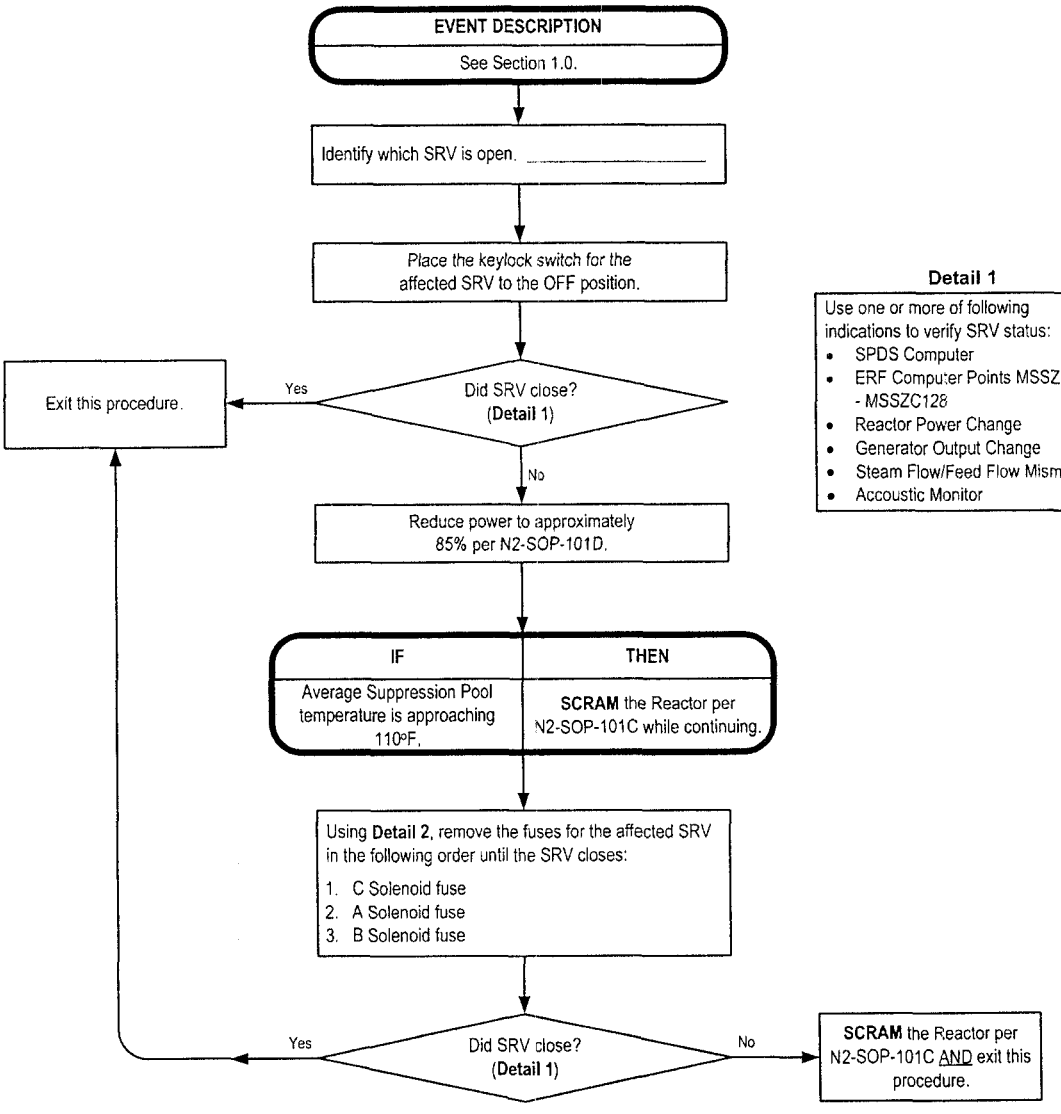
WAIT until CCP cooling is restored/ stabilized.

- Verify system operating per N2-OP-13, F.1.0.
- Verify CCP-TIK108, RBCLC HEAT EXCHANGER TEMP CONTROLLER to AUTO.
- Verify CCP-TV108 local control restored to Auto per N2-OP-13, H.3.0.

Detail A - Major System Loads

- WCS System
- Recirc Pump Cooling
- Drywell Cooling
- SFC HXs
- IAS Mini Loop HXs
- Equipment Drain Cooling
- RDS Pump Cooling
- Sample System Cooling

N2-SOP-34 - STUCK OPEN SRV



Detail 1

Use one or more of following indications to verify SRV status:

- SPDS Computer
- ERF Computer Points MSSZC111 - MSSZC128
- Reactor Power Change
- Generator Output Change
- Steam Flow/Feed Flow Mismatch
- Accoustic Monitor

Detail 2

SAFETY RELIEF VALVE	SOLENOID	FUSE LOCATION	FUSES
2MSS*PSV120	C	P628 Strip K	F83,F84
2MSS*PSV121	C	P628 Strip K	F79,F80
	A	P628 Strip A	F9A,F10A
	B	P631 Strip C	F9B,F10B
2MSS*PSV122	C	P628 Strip A	F41,F42
2MSS*PSV123	C	P628 Strip K	F39,F40
2MSS*PSV124	C	P628 Strip K	F122,F123
2MSS*PSV125	C	P628 Strip A	F87,F88
2MSS*PSV126	C	P628 Strip A	F17,F18
	A	P628 Strip A	F7A,F8A
	B	P631 Strip C	F7B,F8B
2MSS*PSV127	C	P628 Strip A	F49,F50
	A	P628 Strip K	F5A,F6A
	B	P631 Strip C	F5B,F6B
2MSS*PSV128	C	P628 Strip A	F21,F22
2MSS*PSV129	C	P628 Strip K	F120,F121
	A	P628 Strip A	F113A,F114A
	B	P631 Strip C	F113B,F114B
2MSS*PSV130	C	P628 Strip K	F85,F86
	A	P628 Strip A	F15A,F16A
	B	P631 Strip C	F15B,F16B
2MSS*PSV131	C	P628 Strip A	F51,F52
2MSS*PSV132	C	P628 Strip K	F43,F44
2MSS*PSV133	C	P628 Strip K	F23,F24
2MSS*PSV134	C	P628 Strip A	F81,F82
	A	P628 Strip K	F13A,F14A
	B	P631 Strip C	F13B,F14B
2MSS*PSV135	C	P628 Strip A	F45,F46
2MSS*PSV136	C	P628 Strip A	F47,F48
2MSS*PSV137	C	P628 Strip K	F19,F20
	A	P628 Strip K	F3A,F4A
	B	P631 Strip C	F3B,F4B

NOTES:

- Average Suppression Pool temperature will continue to rise after SRV
(C2) closure due to convective mixing of localized heated water.
- With Suppression Pool average temperature >90°F and <110°F AND RTP is > 1%, Suppression Pool average temperature must be verified to be <110°F once per hour (Tech Spec 3.6.2.1, Condition A).
- With Suppression Pool average temperature >110°F and <120°F, Suppression Pool average temperature must be verified to be <120°F once every 30 minutes (Tech Spec 3.6.2.1, Condition D).
- N2-OSP-ISC-M@002 must be performed within 12 hours after an SRV has cycled (Tech Spec 3.6.1.7.2).

N2-SOP-06 - FEEDWATER FAILURES

Immediate Actions Shadowed

EVENT DESCRIPTION

See Section 1.0.

IF	THEN
FWLC is NOT responding correctly,	Take manual control of FWLC.

IF	THEN
Feedwater failure requires a power reduction,	Reduce power per N2-SOP-101D.
Level 3 (159.3") is anticipated,	**SCRAM** the Reactor per N2-SOP-101C AND exit this procedure.
Level 8 (202.3") is anticipated,	
A feed flow OR steam flow instrument is malfunctioning,	Change to single Element Control per N2-OP-3, F.8.0 AND return FWLC to auto.
The narrow range A(B) instrument is malfunctioning,	Change to narrow range B(A) instrument per N2-OP-3, F.8.0 AND return FWLC to auto.
FWS-LV10 is NOT responding,	Enter LV10 Failure Flowchart WHILE continuing this flowchart. A

Is emergency Feedpump shutdown required?

- Yes → Perform Concurrently
- No

Reduce Power to approximately 65% per N2-SOP-101D.

Shutdown affected pump.

Verify level stable between 178.3" AND 187.3".

- ❑ Verify 2FWL-P2A(B,C) auto starts.
- ❑ Close 2FWS-LV10A(B,C).
- ❑ IF required, close 2FWS-MOV47A(B,C).
- ❑ Locally place 2FWL-P2A(B,C) control switch in Start.

Feedpump being placed in standby?

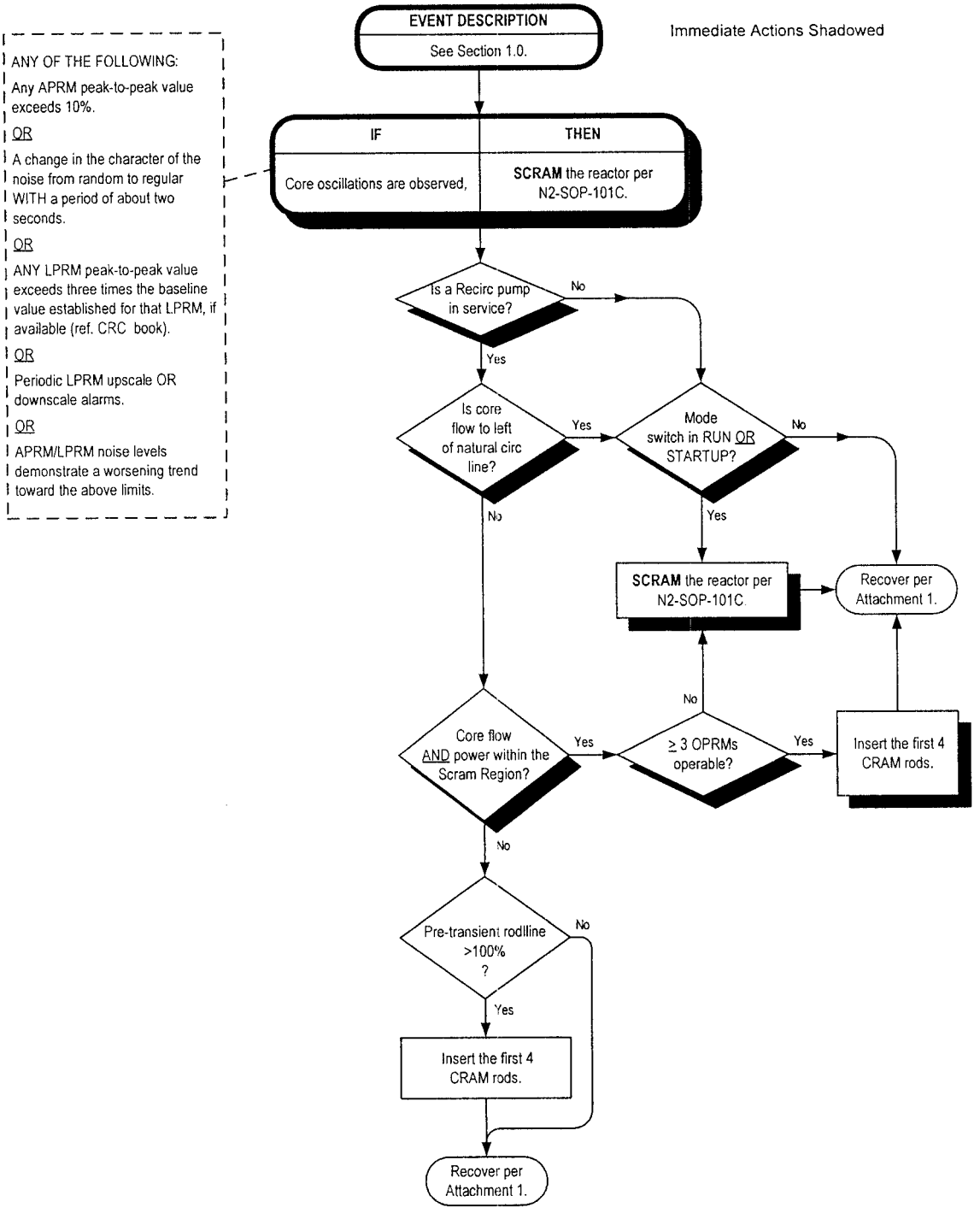
- No
- Yes → Open 2FWS-V25A(B,C).

Remove Condensate Demineralizers from service as required per N2-OP-5.

RPV level high OR low?

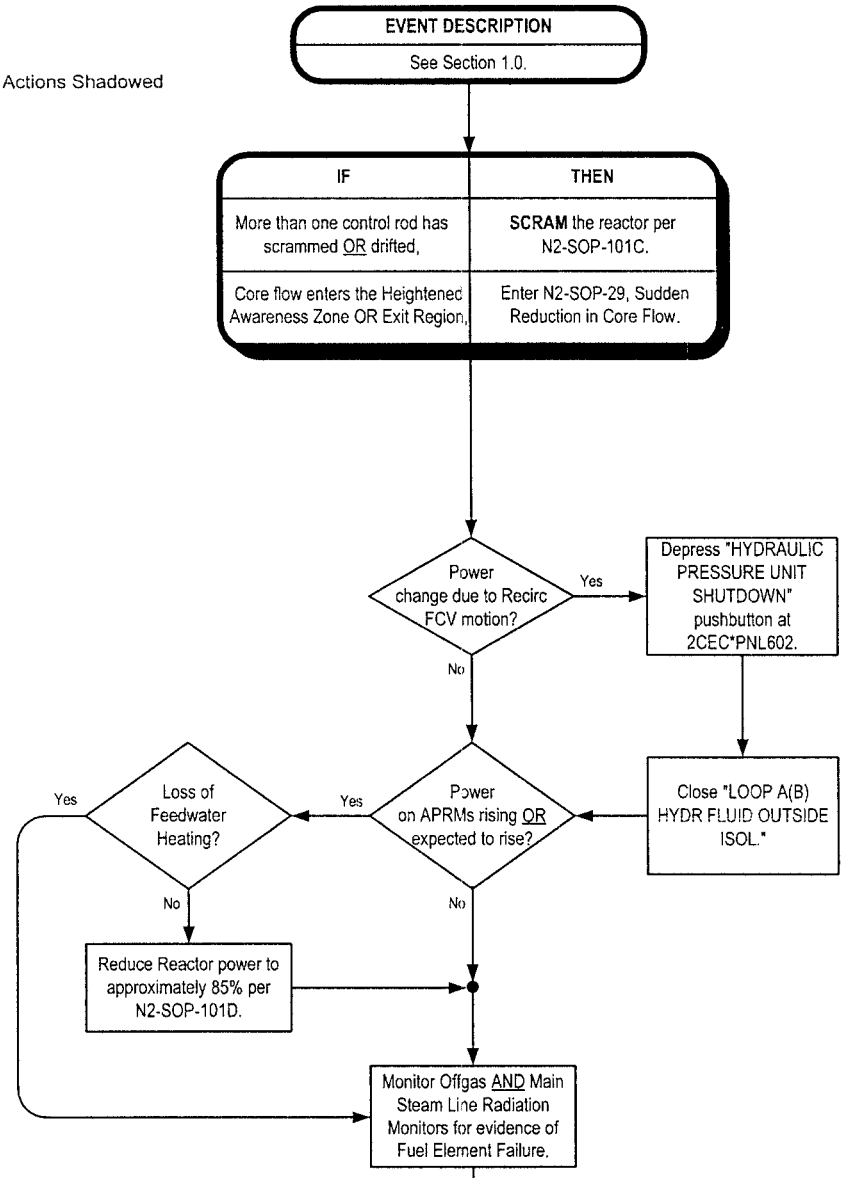
- Rising → IF required, throttle feedwater flow with 2FWS*MOV21A/B. → Determine cause for rising level. → As directed by SM/CRS, exit this procedure.
- Lowering → FW pump trip?
  - Yes → Fast close LV10 until valve indicates 0%. → Place 2FWS-LV55 in manual AND close. → IF required, close 2FWS-MOV47A(B,C). → Determine cause for lowering level. → As directed by SM/CRS, exit this procedure.
  - No → Determine cause for lowering level. → As directed by SM/CRS, exit this procedure.

N2-SOP-29 - SUDDEN REDUCTION IN CORE FLOW



N2-SOP-08 - UNPLANNED POWER CHANGES

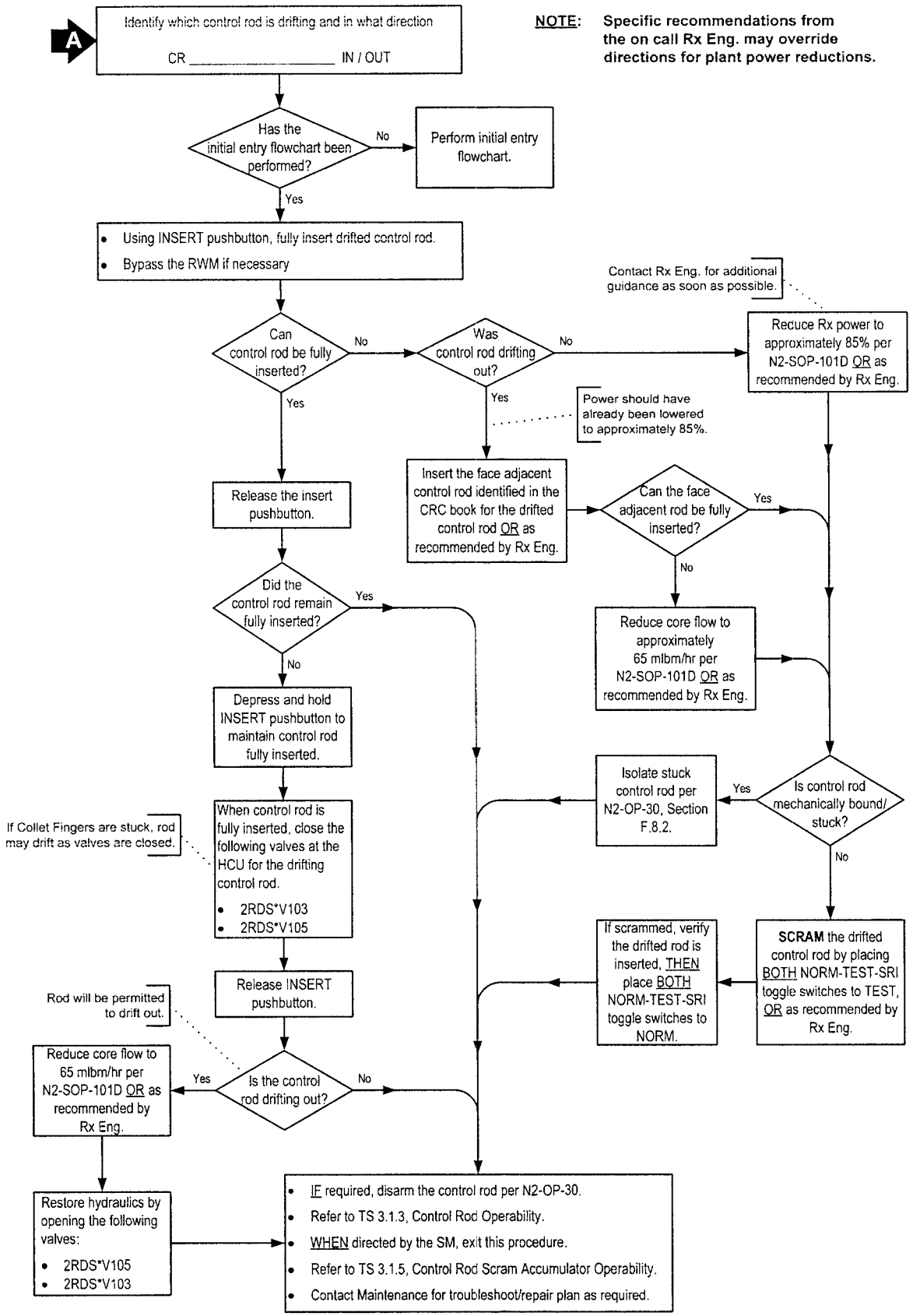
Immediate Actions Shadowed



IF	THEN
More than one control rod has scrammed OR drifted,	**SCRAM** the reactor per N2-SOP-101C.
Core flow enters the Heightened Awareness Zone OR Exit Region,	Enter N2-SOP-29, Sudden Reduction in Core Flow.

IF	THEN
Cause due to Control Rod Drift,	Continue at A
Cause due to Loss of Feedwater Heating,	Continue at B
Cause due to Recirc FCV Failure,	Perform Attachment 2.
Cause due to Control Rod Drop,	Perform Attachment 3.
Cause due to Single Control Rod Scram,	Perform Attachment 4.
Cause is Unknown,	Perform Attachment 5.

N2-SOP-08 - CONTROL ROD DRIFT



N2-SOP-101D - RAPID POWER REDUCTION

Immediate Actions Shadowed

EVENT DESCRIPTION
See Section 1.0.

IF	THEN
MFLCPR is greater than 0.95,	BEFORE power is lowered to < 75%, begin inserting the first four CRAM rods PRIOR to further Recirc flow reduction.

IF	THEN
Further power reductions are required WHILE executing this procedure,	Re-enter at this point
Core flow is <54 mlbm/hr,	Enter N2-SOP-29, Sudden Reduction in Core Flow, and perform concurrently

Lower Reactor power by using Recirc flow AND/OR CRAM rods.

Determine Reactor Rodline AND monitor core thermal limits.

Reactor power ≤ 65%.

Yes

- Verify clean steam reboiler auto transfer to Aux Steam.
- Verify HVH steam supply auto transfer to Aux Steam.
- Verify sufficient Cond Demins in service per N2-OP-5.
- Place HDL pumps in recirc per N2-OP-8, G.1.0.

No

As required, continue with N2-OP-101C(101D,101A).

NOTE: If cram rods cannot be inserted due to equipment failures but power reduction below 75% is required, then attempt to maintain 1/2% (17 MWth) per minute power reduction, if possible, and immediately notify Rx Eng.

NOTE:

The following actions are typically performed for down power evolutions:

- ❑ Update rodline notice at panel 2CEC*PNL603.
- ❑ Notify Central Regional Control (315-460-2421).
- ❑ Notify Constellation dispatcher (410) 468-3750.

(EOP)

N2-SOP-101C - IMMEDIATE AND GENERAL ACTIONS

EVENT DESCRIPTION
See Section 1.0.

Immediate Actions Shadowed

IF	THEN
Automatic Scram is anticipated AND time permits,	Reduce Recirc Flow to 55 mlbm/hr per N2-SOP-101D.
Mode switch is NOT in REFUEL position,	Place MODE Switch to SHUTDOWN position.
RPS is NOT tripped,	Arm AND depress BOTH Manual Scram pushbuttons on either side of 2CEC*PNL603.

Verify automatic responses.

(C1)
- ❑ 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	THEN
All feedwater pumps have tripped,	Place ALL 2FWS-LV10 and LV55 controllers to "manual" and verify the valves are full closed.

IF	THEN
The Reactor scram can be promptly reset (and remain reset),	Reset the scram.
The Reactor scram CANNOT be reset,	Close 2RDS-V28 if directed by the SSS/CRS.

Reset the scram as follows:
1. Notify radwaste to operate all pumps for 2DER-TK2A.
2. Place all four SDV high level bypass switches to BYPASS.
3. IF intiated, reset ARI per N2-OP-36B, H.3.0.
4. Using scram reset switches, reset the scram; verify all 8 pilot solenoid lights lit.
5. Reseat rods if necessary by applying insert signal.
6. Verify SDV vent and drain valves open.

Notify the Shift Manager/Emergency Director to review EPIP-EPP-02 for classification of an emergency.

Perform Concurrently

A — Continue with "Level Control" flowchart.

WHILE continuing, 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.

B — Continue with "Pressure Control" flowchart.

IF	THEN
WCS is in one pump three filter lineup,	Throttle close 2WCS*MOV200 (AND if required, throttle open 2WCS-M0V110) to obtain approximately 225 gpm WCS flow.
Outside temperature is <50 degrees,	1. If required, isolate the Reactor Building by placing 2HVR*AOD1A (OR *AOD1B) to close AND verify the following: • Reactor Building ventilation isolates • GTS starts 2. Perform N2-OP-52 actions for Reactor Building isolation (Sections H.1.0, H.5.0).

N2-SOP-101C - LEVEL CONTROL

A

Objective
Stabilize and control level at 178 - 183" (or as directed by EOPs) with feedwater in auto (preferred) or manual.

IF	THEN
Feed pump restart is required,	Restart feed pump per **Detail 1**.
Level CANNOT be maintained <250",	Close ALL MSIVs AND open the following to maintain level <255": ❑ MSS*MOV207 ❑ MSS*MOV111 ❑ MSS*MOV112 (2EHS*MCC102-7A, 240' NAB)
Level control is lost,	Re-enter at A

Stabilize RPV level using ANY of the following:
- ❑ Feed and Condensate
- ❑ RCIC
- ❑ CRD
- ❑ HPCS

Master FWS Controller thumbwheel tape setting has no effect until setpoint setdown is reset

As required, perform the following to establish ordered level band:
- ❑ Close 2FWS-LV10A/B/C.
- ❑ IF 2 feedpumps are running, trip one feedpump ("C" preferred).
- ❑ As required, close the following valves:
  - 2FWS-MOV47A/B/C
  - 2FWS-LV55A/B
  - 2CNM-LV137
  - 2FWS-MOV21A/B
  - 2FWS-V103A/B
  - 2ZIP-V10/11
- ❑ Establish WCS reject per N2-OP-37.
- ❑ Reset Reactor scram per General Actions flowchart.

WHEN RPV level is stable, THEN continue.

As required, perform the following:
- ❑ Reset setpoint setdown per **Detail 2**.
- ❑ Reset PAM recorders.
- ❑ Continue with N2-OP-101C, Section G.3.0.

IF required, place FWLC in single element.
1. Place FWLC in manual.
2. Place 1 Element/3 Element control switch in 1 Element.
3. If required, restore FWLC to auto.

Detail 2

Reset Setpoint Setdown
1. Verify Rx level stable above Level 3 (159.3").
2. Null FWS Master Controller by rotating the thumbwheel until the red process pointer is in the green band.
3. Depress the SETPOINT SETDOWN RESET pushbutton AND confirm amber light is extinguished.
4. Verify proper automatic control in the desired band.

Detail 1

FWS Pump Restart

Is at least 1 condensate pump running?
- No → Condensate and Feedwater injection is unavailable.
- 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 .

Start feedwater pump as follows:
1. Confirm suction pressure > 500 psi.
2. Verify aux oil pump running.
3. Place pump switch to red flag.
4. WHEN 2FWS-FV2A/B/C ~ 15% open, confirm pump start.
5. Confirm flow ~ 8000 gpm.
6. Inject with 2FWS-LV55A/B (open 2FWS-V103A/B if required) OR verify open 2FWS-MOV47A/B/C AND inject with 2FWS-LV10A/B/C as required.
7. IF required, reset setpoint setdown per N2-OP-3, H.1.0.
8. For automatic control, refer to N2-OP-3, H.9.12 OR H.9.13.
9. Verify aux oil pump stops.

N2-SOP-101C - PRESSURE CONTROL

B

Objective
- Pressure controlled within prescribed band.
- Cooldown rate <100 degrees per hour (RPV pressure >420 psig for first hour).

IF	THEN
Pressure control is lost,	Re-enter at B
MSIVs are closed AND the Main Condenser is available,	WHEN desired, re-open the MSIVs per N2-OP-1, Section H.4.0 AND use the Main Condenser to control pressure.

Perform Concurrently

Control pressure (cooldown rate) within the ordered band using any of the following:
- Main Condenser using TBVs
  - Use EHC pressure set OR bypass valve opening jack.
  - Initiate condenser neck spray by opening 2CNM-MOV126.
- SRVs
- RCIC
- Steam Condensing

As required to control cooldown rate, perform the following:
- Close 2MSS-AOV87A/B/C/D and AOV88A/B.
- IF time permits, swap gland seal to main steam per N2-OP-25, Section F.2.0 OR H.3.0.
- Close 2ASS-MOV152.
- Start 2ARC-P1A(B) as follows:
  1. Confirm no fuel damage.
  2. Close 2ARC-AOV104.
  3. Place in AUTO 2ARC-AOV105.
  4. Open 2SWP-HV98A(B).
  5. Start 2ARC-P1A(B).
  6. Verify proper operation per N2-OP-9, Section F.1.1.
- Close 2ASS-AOV148.
- Fast close outboard MSIVs. (C3,4,5,6,9)

WHEN pressure control is stable OR appropriate cooldown rate has been established, THEN continue.

Continue with pressure control actions per N2-OP-101C, G.3.0.

Facility: **Nine Mile Point 2** Scenario No.: **NRC-02** Op-Test No.: **March 2008**
Examiners: _____ Operators: _____
Initial Conditions: Simulator IC-17 or equivalent
1. Reactor Power 100%

Turnover:
1. All equipment operable.
2. Perform RHR Pump Operability Test IAW N2-OSP-RHS-Q006

Event No.	Malf. No.	Event Type*	Event Description
1	RHS*P2	N (BOP) N (SRO) TS (SRO)	Perform RHR Pump Operability Test IAW N2-OSP-RHS-Q006 RHS B/C Water Leg Pump breaker trip (TS)
2	IA02A,B IA04A,B	C (BOP) C (SRO)	Instrument Air Compressor "A" Trips, "B" will not start, "C" must be placed in service manually. **N2-SOP-19, Loss of Instrument Air**
3	TC03A	R (RO) R (SRO)	Power decrease to 85% due to EHC oscillation problem **N2-SOP-23, EHC Press Reg Failure** **N2-SOP-101D, Rapid Power Reduction.**
4	CS01B	C(BOP) C (SRO) TS (SRO)	HPCS spurious start. (TS)
5	FW15	I (RO) I (SRO)	Feedwater master controller fails as-is requiring manual control. **N2-SOP-6, Feedwater Failures**
6	RR10A,B	C (RO) C (SRO)	Recirculation FCV failure causes FCV to open. **N2-SOP-8, Unplanned Power Changes**
7	TC02 FW03A,B RP02 RP14A,B	M (ALL)	EHC Regulator failure cause Reactor High Pressure, ATWS, Loss of Feedwater **EOP-RPV, EOP-Failure to Scram** **EOP-6, Att.14**
8	RC07	C (BOP) C (SRO)	RCIC controller failure. Requires manual actions to inject.
9	RP08A,B	C (BOP) C (SRO)	SLC pump fails to Auto-Start

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

Facility: **Nine Mile Point 2**	Scenario No.: **NRC-02**	Op-Test No.: **March 2008**
TARGET QUANTITATIVE ATTRIBUTES **(PER SCENARIO; SEE SECTION D.5.d)**	ACTUAL ATTRIBUTES	
1. Total malfunctions (5-8) **Events 2,3,4,5,6,8,9**	7	
2. Malfunctions after EOP entry (1-2) **Events 8,9**	2	
3. Abnormal events (2-4) **Event 2 –SOP-19, Event 3SOP-101D, SOP-23** **Event 5 – SOP-6, Event 6 SOP-8**	4	
4. Major transients (1-2) **Event 7**	1	
5. EOPs entered/requiring substantive actions (1-2) **Events 7,8,9 EOP-RPV, EOP-PC**	2	
6. EOP contingencies requiring substantive actions (0-2) **Event 7,8,9 EOP-C5,**	1	
7. Critical tasks (2-3)	4	
CRITICAL TASK DESCRIPTIONS: **CT-1.0 Place ADS inhibit switches to ON to prevent injection under ATWS conditions** **CT-2.0 restore & maintain RPV level above the MSCWL precluding the need to perform a RPV Blowdown.** **CT-3.0 Inject SLC before exceeding HCTL** **CT-4.0 RO inserts all control rods**		

NMP SIMULATOR SCENARIO

NRC Scenario 2 **REV. 00** **No. of Pages: 19**

RHS WATER LEG PUMP TRIP/IA COMPRESSOR TRIP/EHC PRESSURE REGULATOR OSCILLATIONS/HPCS SPURIOUS START/FEEDWATER MASTER CTRLR FAILURE/RECIRC FCV VALVE OPENS/ATWS/LOSS OF HIGH PRESSURE FEED

PREPARER	S.Dennis	DATE _____
VALIDATED	_____	DATE _____
GEN SUPERVISOR OPS TRAINING	R.Brown	DATE 1/23/08
OPERATIONS MANAGER	NA Exam Security	DATE _____
CONFIGURATION CONTROL	NA Exam Security	DATE _____

SCENARIO SUMMARY

Length: 1.5 hours

Initial Power Level: 100%

The scenario begins at 100% power. The RO will perform the surveillance test for the "C" RHR Pump, N2-OSP-RHS Q006. While the pump is running, the breaker will trip for the RHS B/C Water Leg Pump RHS*P2 requiring a TS entry by the SRO (TS 3.5.1.C – 72 hours). Once TS are addressed, the in service Instrument Air Compressor will trip requiring operator action to manually start the "C" standby compressor. The "B" compressor will not start.

Oscillations of the in service EHC pressure regulator will occur and require actions to swap to the alternate regulator and lower reactor pressure. Additionally, the RO will be required to lower reactor power to 85% IAW the SOP-23.

Once conditions stabilize, a HPCS spurious start will occur requiring operator action to terminate the initiation. The SRO will address TS for HPCS inoperability and 2 other ECCS pumps inoperable (3.0.3). After addressing TS, the Feedwater Master Controller will then fail "as-is". The crew will enter SOP-6 and control feedwater in manual. Additionally, a failure of the Recirculation FCV will cause the FCV to open. Operator action will be required to control the FCV and reactor level. Cram rods may be inserted or Recirc flow lowered to lower reactor power to pre-transient levels.

The backup EHC pressure regulator will fail and result in a rapid RPV pressure rise. The reactor will automatically scrams, however, all control rods will not fully insert and

"A" and "B" reactor feed pumps will trip. EOPs RPV, EOP-Failure-To-Scram will be entered. The RO must inhibit ADS to prevent injection during the ATWS (**CT**).

The RCIC turbine can be manually controlled after a controller malfunction. SLC pumps will fail to auto-start and must be manually started prior to exceeding the HCTL (**CT**). RPV level must be restored with "C" FW pump, RCIC (or Condensate Booster Pumps with RPV pressure lowered) precluding the need to perform a RPV Blowdown (**CT**). The RO will implement actions to insert control rods until all rods are inserted (**CT**).

Major Procedures Exercised: EOP-RPV, PC, C2. SOP-8, 34

EAL Classification: SAE 2.2.2 – Reactor/Reactivity Control-ATWS

Termination Criteria: RPV level is being controlled in the required band and control rod insertion is in progress.

I. SIMULATOR SET UP

A. IC Number: IC-17 or equivalent. (Operation Above 100% Rod Line)

B. Presets/Function Key Assignments

1. Malfunctions:

a.	RH20	RHS*P2 TRIP	TRG 10
b.	IA02A	2IAS-C3A THERMAL OVERLOAD TRIP	TRG 1
c.	IA02B	2IAS-C3B THERMAL OVERLOAD TRIP	PRESET
d.	IA04A	IAS COMPRESSOR LAG AUTO-START FAILURE	PRESET
e.	IA04B	IAS COMPRESSOR B/U AUTO-START FAILURE	PRESET
f.	TC03A	EHC SYS PRESS REG FAILURE-OSCILLATION	TRG 2
g.	CS01B	HPCS INADVERTENT INITIATION	TRG 4
h.	FW15	FW MASTER CTRLR FAILURE-AS IS (DLY 2 SECS)	TRG 5
i.	TC02B	EHC SYS PRESS REG FAILURE-LOW (B)	TRG 6
j.	TC02A	EHC SYS PRESS REG FAILURE-LOW (A)	TRG 6
k.	FW03A	FW PUMP TRIP (P1A) – DELAY 45 SECS	TRG 7
l.	FW03B	FW PUMP TRIP (P1B) – DELAY 45 SECS	TRG 8
m.	RC07	RCIC FLOW TRANSMITTER FAILURE-HI	TRG 9
n.	RP02	RPS-FAILURE TO SCRAM-AUTOMATIC	TRG 22
o.	RP14A	RRCS ARI FAILURE/DEFEATED (DIV I)	TRG 23
p.	RP14B	RRCS ARI FAILURE/DEFEATED (DIV II)	TRG 23
q.	RH08	GRP 5 ISOLATION FAILURE- RHS*MOV122/113	TRG 25
r.	an603109	RPS A DIS VOL HI LVL TRIP	TRG 26
s.	an603409	RPS B DIS VOL HI LVL TRIP	TRG 26
t.	RP08A	RRCS 98 SEC TIMER FAILURE (DIV 1)	PRESET
u.	RP08B	RRCS 98 SEC TIMER FAILURE (DIV II)	PRESET
	RD17A	PARTIAL INSERTION OF RODS UDER SCRAM(L1)	PRESET
	RD17B	PARTIAL INSERTION OF RODS UDER SCRAM(L2)	PRESET
	RD17C	PARTIAL INSERTION OF RODS UDER SCRAM(L3)	PRESET
	RD17E	PARTIAL INSERTION OF RODS UDER SCRAM(L5)	PRESET
	RD17F	PARTIAL INSERTION OF RODS UDER SCRAM(L6)	PRESET
	RD17G	PARTIAL INSERTION OF RODS UDER SCRAM(L7)	PRESET
	RD17H	PARTIAL INSERTION OF RODS UDER SCRAM(L8)	PRESET
	RD17I	PARTIAL INSERTION OF RODS UDER SCRAM(L9)	PRESET

RD17J PARTIAL INSERTION OF RODS UDER SCRAM(L10) PRESET

RD17K PARTIAL INSERTION OF RODS UDER SCRAM(L11) PRESET

RD17L PARTIAL INSERTION OF RODS UDER SCRAM(L12) PRESET

RD17M PARTIAL INSERTION OF RODS UDER SCRAM(L13) PRESET

RD17N PARTIAL INSERTION OF RODS UDER SCRAM(L14) PRESET

Remotes:

a. RH52 RHR'B' FILL AND VENT TRG 24

b. TC02 PRESSURE REG BIAS 'A' -10_0_+10 'B' (PSIG) TRG 3

c. RR10A FCV A DRIFT (DELAY 3 SECONDS) TRG 5

d. RR12A FCV A DRIFT POSITION (0-100%) TRG5

e. DEFEAT RCIC/MT TRIP INTLK (EOP-6 ATT 2) TRG 20

f. MS06A DEFEAT LVL 1 ISOL OF MSIVS (JMPR K148A) TRG 21

g. MS06B DEFEAT LVL 1 ISOL OF MSIVS (JMPR K148B) TRG 21

h. MS06C DEFEAT LVL 1 ISOL OF MSIVS (JMPR K148C) TRG 21

i. MS06D DEFEAT LVL 1 ISOL OF MSIVS (JMPR K148D) TRG 21

3. Overrides:

   a. ADS RELIEF VALVE FAILURE-OPEN PSV 134 TRG 3

4. Annunciators:

   a. None

C. Equipment Out of Service

   1. None

D. Support Documentation

E. Miscellaneous

II. **SHIFT TURNOVER INFORMATION**

OFF GOING SHIFT: ☐ N ■ D DATE: _____

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

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

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

Shift Supervisor Log (SM, CRS, STA)
- CRO Log (CRO)

Lit Control Room Annunciators (SM, CRS, STA, CRO, CRE)

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

Evolutions/General Information/Equipment Status:

- Reactor Power = 100%
- Loadline = >100%
- None

PART III: Remarks/Planned Evolutions:
Perform N2-OSP-RHS-Q@006 RHR System Loop C Pump and Valve Operability Test and System Integrity Test

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 Inhibit ADS to prevent injection during the ATWS.

CT-2.0 Manually start SLC prior to exceeding the HCTL.

CT-3.0 RPV level must be restored to preclude the need to perform a RPV Blowdown

CT-4.0 Following the ATWS implement actions to insert control rods

B. Performance Objectives:

PO-1.0 Given the plant or plant system in a condition requiring Technical Specification action, identify the deviation and any required actions/notifications.

PO-2.0 Given RHS B/C Water Leg Pump breaker tripping, the crew will secure from the surveillance, declare the pump inoperable and restore the valve lineup.

PO-3.0 Given the plant operating at power with an instrument air compressor failure, the operating crew will restore IA header pressure to normal prior to 60 psig IA header pressure.

PO-4.0 Given the plant operating with a malfunction of the EHC pressure regulator the crew will take action in accordance with N2-SOP-23 to reduce power below 85% and place the "B" pressure regulator in service.

PO-5.0 Given the plant with a spurious HPCS initiation, the crew will take actions to terminate the injection.

PO-6.0 Given an operating reactor with a Recirc flow control valve failed open and a FWLC failure the crew will tale the appropriate actions to restore and maintain RPV water level.

PO-7.0 Given the plant operating at power with RPV pressure lowering due to an EHC failure, the crew will verify the MSIVs close and the Reactor SCRAMs in accordance with SOP-101C.

PO-8.0 Given a loss of Normal Feedwater the crew will stabilize RPV level using RCIC in manual.

PO-9.0 Given entry conditions to EOPs RPV, PC and C-5, the crew will execute the following actions to mitigate the event:

- Preventing HPCS Injection
- Inhibiting ADS initiation.
- Terminating and preventing RPV injection in accordance with EOP Basis and as directed by EOP-C5.
- Verifying SLS injection prior to Suppression Pool temperature $\geq$ 110°F.
- Operating Suppression Pool Cooling to minimize suppression pool heatup.
- Insert Control Rods per EOP-6, Att. 14.

INSTRUCTOR ACTIONS/ PLANT RESPONSE	OPERATOR ACTIONS
	Crew • Crew conducts a pre-brief, walks down the panels, and tests annunciators.
EVENT 1 **RHR Pump Operability Test with RHS B/C Water Leg Pump breaker trip**	
EVENT 1 –SRO Actions	SRO PO-1.0 • Perform pre-job brief with RO assigned to performance of surveillance • Authorizes/directs performance of surveillance N2-OSP-RHS-W@006 for RHS 'C' loop
EVENT 1 –BOP Actions	BOP • Reviews surveillance, and commences. • Makes plant announcement starting RHS*P1C • Positions RHS*P1C control switch to start. • Notes and reports to CRS, annunciator 601540 did not alarm
Role Play: When directed to open test connections, report that the test connections are open.	• Directs test connection for suction opened. • Throttle open RHS*FV38C to 7450 gpm

INSTRUCTOR ACTIONS/ PLANT RESPONSE	OPERATOR ACTIONS
Sim Booth OPERATOR After pump flow is established at 7450 gpm, activate malfunction by depressing F10 key:	• Observe RHS*MOV4C closed • Directs test connection for discharge opened. PO-2.0
RHS*P2 TRIP TRG 10 Annunciator 601648: RHR B SYS VALVES/WATER LEG PMP MOT OVERLOAD	
EVENT 1 –BOP Actions	BOP • Diagnoses RHS B/C Water Leg Reference Pump breaker trip • Notifies SRO
SIM BOOTH NOTE: After 5 minutes, Call Control room and report that the BKR for the RHS Water Leg Pump was bumped accidentally by Electrical Maintenance. Electrical Maintenance has seen no breaker problems and advises retarting the pump.	
EVENT 1 – SRO Actions	SRO • Determines the Loss of RHS*P2, RHS B/C WTR LEG PMP, will render RHS B AND C inoperable. • Refers to Technical Specification 3.5.1.
EVENT 2 Instrument Air Compressor "A" Trips, "B" will not start, "C" must be placed in service manually.	

INSTRUCTOR ACTIONS/ PLANT RESPONSE	OPERATOR ACTIONS
SIM Booth: Insert Trigger #2 when cued	
EVENT 2 –BOP Actions	BOP PO-3.0
When single loop conditions are stabilized and when directed by lead instructor insert malfunction:	• Reports Annunciator • Enters SOP-19
IA02A Inst. Air Compressor 'A' Trip - *Instrument Air header pressure lowers* - *AN 851228 INSTR AIR CPSR 3A/3B/3C AUTO TRIP/FAIL TO START*	• Reports Instrument air header pressure lowering • Recognizes 'Lag' IAS Compressor B fails to start • Manually starts IAS Compressor C.
	SRO • Acknowledges reports • Directs SOP 19 entered • Directs manual starting of standby IAS compressors
EVENT 3 – Power decrease to 85% due to EHC oscillation problem **Sim Booth:** Activate trigger #2 when directed	
RPV Pressure starts to oscillate *Annunciator for "B Regulator in Control "* *Alarms* *Fuel failure starts ramping*	Crew PO-4.0 • Reports alarms • Reports pressure / power oscillations
EVENT 3 –SRO Actions	SRO • Direct entry into SOP-23 • Direct power reduced below 85% IAW SOP-101D

INSTRUCTOR ACTIONS/ PLANT RESPONSE	OPERATOR ACTIONS
	• Verify thermal limits are acceptable per OP-23 section for operation with 1 pressure regulator out of service
EVENT 3 –RO Actions	RO • Enter SOP-23 • Perform power reduction below 85%
EVENT 3 –BOP Actions When requested to adjust EHC Controls to place EHC "B" pressure regulator in activate Trigger #3, this dials remote function TC02 to 10 PSIG to place the "B" EHC pressure regulator in control.	BOP • Direct personnel to relay room to place "B" EHC regulator in control per SOP-23
EVENTS 4 HPCS spurious start **Sim Booth:** Insert CS01B, HPCS Inadvertent Initiation, Trigger #4 when cued *HPCS auto starts Div III D/G starts.* *HPCS injects into the vessel.* *Reactor level increases as HPCS injects.*	

INSTRUCTOR ACTIONS/ PLANT RESPONSE	OPERATOR ACTIONS
EVENTS 4 – SRO Actions	SRO PO-5.0 • Determines HPCS initiation not required. • May direct HPCS pump be placed in pull-to-lock if still running. • Directs SOP-06 entry. • Review Tech Spec 3.5.1 required actions B.1 and B.2, declares HPCS INOP and enters 14 day LCO. • Review Tech Spec 3.3.5.1, required actions A.1 and B.3.1. • Review Tech Spec 3.6.1.3 for HPCS injection valve. • Contacts Work Week Manager.
EVENTS 4 SRO Actions (Cont.)	• Identifies need for notifications per 10CFR50.72 (b) (3) (v) and 10CFR50.73 (a) (2) (v). • May direct HPCS injection valve to be closed. • Conducts transient brief.
EVENTS 4 RO Actions	RO • As time permits, verifies HPCS injection not required. • If directed, places HPCS in pull-to-lock. • If directed, closes HPCS injection valve. • Dispatches operator to verify proper operation of Div III D/G.

INSTRUCTOR ACTIONS/ PLANT RESPONSE	OPERATOR ACTIONS
Role Play: If called to check the Div III Switchgear or HPCS pump, report overcurrent flags on breaker and HPCS pump appears normal. Role Play: IF called for a report on HPCS report you are still investigating	
EVENTS 5 & 6 – Feedwater master controller fails as-is requiring manual control., Recirculation FCV failure causes FCV to open. **Sim Booth:** Insert Trigger #5 when cued	CREW PO-6.0 • Identifies/Reports power rise. • Responds to Annunciator for RX Water Level Hi/Lo.
EVENTS 5 & 6 –SRO Actions	SRO • Directs entry to SOP-6, Feedwater Failures • Directs Manual Control of Feedwater • Directs entry to SOP -8, Unplanned power changes • Directs lowering power by insertion of Cram Rods or Lowering Recirc on Loop "A"
EVENTS 5 & 6 –RO & BOP Actions	• Enters SOP 6 & 8 as directed • Lowers power with Cram Rods or using "B" Recirc FCV • Reports Recirc flow mismatch • Monitors FW system response and

	takes manual control as required to maintain normal level band • Reviews power to flow map.
EVENT 7 - EHC Regulator failure cause Reactor High Pressure, ATWS, Loss of Feedwater **Sim Booth:** Initiate Triggers 6,7,8,9,22,23,25,26 when cued	
• *RPV Press rises rapidly.* • *Rx may Scram on High Pressure or Neutron Flux.* • *RPV level lowers.* • *All control rods fail to fully insert.* • *A loss of Feedwater occurs*	Crew PO-7.0, PO-8.0 & PO-9.0 • Recognize and report EHC failure, loss of feedwater, Reactor SCRAM and failure of SCRAM.
EVENT 7 SRO Actions	SRO • Directs mode switch placed in shutdown. • Acknowledges scram report. • Enters EOP-RPV Control. • Exits RPV Control and enters • EOP-C5 "Failure to Scram."

- Directs ADS logic inhibit to on and verification that HPCS is in pull-to-lock.
- Directs RRCS initiated.
- Directs a RPV water level band.
- Directs a RPV pressure band with a target of 500 – 600 psig to establish injection with Booster pumps.
- Directs a loop of RHR be placed in Suppression Pool Cooling.
- Directs control rods inserted using EOP-6, Attachment 14.
- Directs RO to prevent MSIV closure per EOP-6, Attachment 10.
- Acknowledges trip of RCIC turbine.
- May direct LPCS and LPCI injection prevented. (Not preferred source of injection.)
- Enter EOP-PC, executes all legs simultaneously.
- May direct drywell cooling restored in accordance with EOP-6,
- Attachment 24.

EVENT 7 RO Actions

RO

- Place reactor mode switch in shutdown.
- Provides scram report.

INSTRUCTOR ACTIONS/ PLANT RESPONSE	OPERATOR ACTIONS
	• **Inserts Control Rods in accordance with EOP-6 Attachment 14** **CT-4.0**
SIM Booth: At the examiner cue, once scram is reset, clear all RD17 malfunctions and SDV Hi LVL annunciator malfunctions (an603109, an603409 RPS A,B DIS VOL HI LVL TRIP) on Trigger 26. This will allow rod insertion when an additional scram is initiated.	• Restores Drywell Cooling (EOP-6 Att 24): • Lowers RPV pressure using SRVs and establishes injection with condensate booster pumps. • **Using condensate system, restore and maintain RPV level above the MSCWL.** **CT-3.0**
EVENT 7 BOP Actions	BOP • Takes appropriate action to maintain RPV water level within the directed band. • Verifies HPCS in pull to lock. • Takes appropriate action using SRVs or bypass valves to maintain RPV pressure within the directed band. • **Places ADS inhibit switches to ON.** **CT-1.0**
Sim Booth: If requested by control room activate TRG 21 for the following MSIV	• Installs jumpers to defeat MSIV closure isolation per EOP-6,

INSTRUCTOR ACTIONS/ PLANT RESPONSE	OPERATOR ACTIONS
Defeats: MS06A DEFEAT LVL 1 ISOL OF MSIVS (JMPR K148A) MS06B DEFEAT LVL 1 ISOL OF MSIVS (JMPR K148B) MS06C DEFEAT LVL 1 ISOL OF MSIVS (JMPR K148C) MS06D DEFEAT LVL 1 ISOL OF MSIVS (JMPR K148D)	Attachment 10. • Places RHR A(B) in suppression pool cooling. • Notifies the SM to declare RHR A(B) LPCI mode inoperable.
EVENT 8 RCIC Controller Failure **EVENT 8 BOP Actions**	BOP • Identify and report to CRS, RCIC failure in automatic. • Take manual control of RCIC speed controller and raise turbine speed to inject with RCIC, if directed.
EVENT 9 – SLC FAILURE TO AUTO START	BOP • Identifies Failure of SLC to auto start on initiation signal. • **Manually places SLC in service prior to exceeding the HCTL CT -2.0**
Termination Criteria: RPV water level being controlled in directed band and control rod insertion in progress.	

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?

N2-SOP-19 - LOSS OF INSTRUMENT AIR

EVENT DESCRIPTION

See Section 1.0.

IF	THEN
2IAS-PI101 (P851), Instrument air pressure, lowers to < 85 psig,	Verify 2IAS-AOV171 auto closes AND dispatch an Operator to monitor 2RDS-PI133 & 2IAS-PI194 (RB el. 261') .
2IAS-PI194 (RB el. 261'), Inst air rcvr 2IAS-TK3 pressure, lowers to < 74 psig,	**SCRAM** the Reactor per N2-SOP-101C AND declare the OUTBOARD MSIV's inoperable.
2RDS-PI133 (RB el. 261'), scram air header pressure, lowers to < 60 psig,	**SCRAM** the Reactor per N2-SOP-101C.
2IAS-PI101 (P851), Instrument air pressure, lowers to < 70 psig,	

Reactor Scram required ONLY if control rod(s) are withdrawn.

IF	THEN
Annunciator 851218 (Inst Air Rcvr Tk3 Press Low) alarms,	Dispatch an Operator to monitor 2IAS-PI194 (RB el. 261').
Annunciator 603306 (CRD Scram Air Hdr Press Low) alarms,	Perform Attach. 3.
Air compressor is tripped AND isolation of compressor/receiver is required	Close 2IAS-V102(V202, V302), 2IAS-TK1A(TK1B, TK1C) outlet isolation

Air compressor tripped/degraded?

- No → Determine cause of lowering air pressure.
- Yes → Loss of all air compressors due to slow transfer or loss of control power?
  - Yes → Perform Attach. 2.
  - No → If required, Start / Verify auto started Instrument air compressors:

    Manual start;
    1. Select 2IAS-C3A(C3B,C3C) as LEAD on the Instrument Air Compressor Selector Switch for the compressor to be started.
    2. Place 2IAS-C3A(C3B,C3C) control switch to NORMAL-AFTER-START.

    Auto start;
    - 100 psig - Lag air compressor
    - 85 psig - Backup air compressor

Determine cause of lowering air pressure.

- Loss of air due to a line break?
  - No → Correct cause of lowering air pressure.
  - Yes → Verify break is isolated. → If required, perform N2-OP-19, Section H.3.0. → Correct cause of lowering air pressure.

Pressure restored?

- Yes → Perform Attach. 1.
- No → Have compressors lost cooling?
  - Yes → Loss of mini-loop pumps?
    - Yes → Perform Attach. 4.
    - No → Verify cooling is restored to air compressors.
  - No → Correct cause of compressor failure. → If required, reset compressor local fault(s) N2-OP-19, section H.9.0. → Verify cooling is restored to air compressors.

Perform Attach. 1. → Exit this procedure AND enter N2-OP-19, Section F.1.0.

N2-SOP-23 - EHC PRESS REGULATOR FAILURE

EVENT DESCRIPTION

See Section 1.0.

IF	THEN
Reactor pressure is lowering rapidly,	**SCRAM** the Reactor per N2-SOP-101C.
Reactor Pressure can NOT be maintained greater than 500 psig due to the malfunction,	Verify outboard MSIVs closed.
Reactor pressure is oscillating due to pressure regulators shifting control,	Lower power to approx. 85% per N2-SOP-101D.

Are press regulators shifting control?

- Yes → Adjust Pressure Regulator Bias to place the backup pressure regulator in control per **Detail A**.
- No → Is backup press regulator in control?
  - Yes →
    - Verify Backup Pressure Regulator in control.
    - Verify Reactor pressure ≤ 1020 psig.
    - Verify throttle pressure ≤ 988 psig (MSSPA16).
  - No →

If one pressure regulator is out of service, refer to N2-OP-23, Section H.5.0.

WHEN pressure is stable or as directed, exit this procedure.

NOTES: The following guidance should be reviewed after the plant has been stabilized:

- N2-OP-101D Precaution D.10.2 for Equipment Out of Service Analysis
- Tech Spec Section 3.2.2, MCPR and Core Operating Limits Report
- Tech Spec 3.2.3, LHGR and Core Operating Limits Report

Detail A

1. Dispatch an operator with key (tag# 16) to panel P843 in Relay Room.
2. At P843, Bay A, disengage potentiometer locking mechanism AND slowly rotate the PRESSURE SETPOINT BIAS potentiometer to achieve the desired setting:
   - 4.46 to place the B Regulator in control.
   - 2.80 to place the A Regulator in control.
3. Engage potentiometer locking mechanism.
4. At P843 AND P851, check "A" IN CONTROL OR "B" IN CONTROL.
5. Check annunciator 851148 AND comp pt TMBBC09 alarm (B Reg in control) OR clear (A Reg in control).
6. Use the INCREASE OR DECREASE pushbuttons at PRESSURE SETPOINT SELECTOR at P851 to establish <1020 psig Reactor Steam Dome pressure. Do NOT exceed 988 psig Turbine Throttle pressure.

NOTES:

- A setting of approx. 3.63 on the PRESSURE SETPOINT BIAS potentiometer is the control crossover point between the A and B Regulator.
- Adjustment of bias settings greater than 4.46 or less than 2.80 may be required depending on the severity of oscillation.

N2-SOP-101D - RAPID POWER REDUCTION

Immediate Actions Shadowed

EVENT DESCRIPTION
See Section 1.0.

IF	THEN
MFLCPR is greater than 0.95,	BEFORE power is lowered to < 75%, begin inserting the first four CRAM rods PRIOR to further Recirc flow reduction.

IF	THEN
Further power reductions are required WHILE executing this procedure,	Re-enter at this point
Core flow is <54 mlbm/hr,	Enter N2-SOP-29, Sudden Reduction in Core Flow, and perform concurrently

Lower Reactor power by using Recirc flow AND/OR CRAM rods.

Determine Reactor Rodline AND monitor core thermal limits.

Reactor power ≤ 65%.

Yes

- Verify clean steam reboiler auto transfer to Aux Steam.
- Verify HVH steam supply auto transfer to Aux Steam.
- Verify sufficient Cond Demins in service per N2-OP-5.
- Place HDL pumps in recirc per N2-OP-8, G.1.0.

No

As required, continue with N2-OP-101C(101D,101A).

NOTE: If cram rods cannot be inserted due to equipment failures but power reduction below 75% is required, then attempt to maintain 1/2% (17 MWth) per minute power reduction, if possible, and immediately notify Rx Eng.

NOTE:

The following actions are typically performed for down power evolutions:

- ❑ Update rodline notice at panel 2CEC*PNL603.
- ❑ Notify Central Regional Control (315-460-2421).
- ❑ Notify Constellation dispatcher (410) 468-3750.

N2-SOP-06 - FEEDWATER FAILURES

Immediate Actions Shadowed

EVENT DESCRIPTION

See Section 1.0.

IF	THEN
FWLC is NOT responding correctly,	Take manual control of FWLC.

IF	THEN
Feedwater failure requires a power reduction,	Reduce power per N2-SOP-101D.
Level 3 (159.3") is anticipated,	**SCRAM** the Reactor per N2-SOP-101C AND exit this procedure.
Level 8 (202.3") is anticipated,	
A feed flow OR steam flow instrument is malfunctioning,	Change to single Element Control per N2-OP-3, F.8.0 AND return FWLC to auto.
The narrow range A(B) instrument is malfunctioning,	Change to narrow range B(A) instrument per N2-OP-3, F.8.0 AND return FWLC to auto.
FWS-LV10 is NOT responding,	Enter LV10 Failure Flowchart WHILE continuing this flowchart. A

Is emergency Feedpump shutdown required?

- Yes → Perform Concurrently
- No

Reduce Power to approximately 65% per N2-SOP-101D.

Shutdown affected pump.

Verify level stable between 178.3" AND 187.3".

- ❑ Verify 2FWL-P2A(B,C) auto starts.
- ❑ Close 2FWS-LV10A(B,C).
- ❑ IF required, close 2FWS-MOV47A(B,C).
- ❑ Locally place 2FWL-P2A(B,C) control switch in Start.

Feedpump being placed in standby?

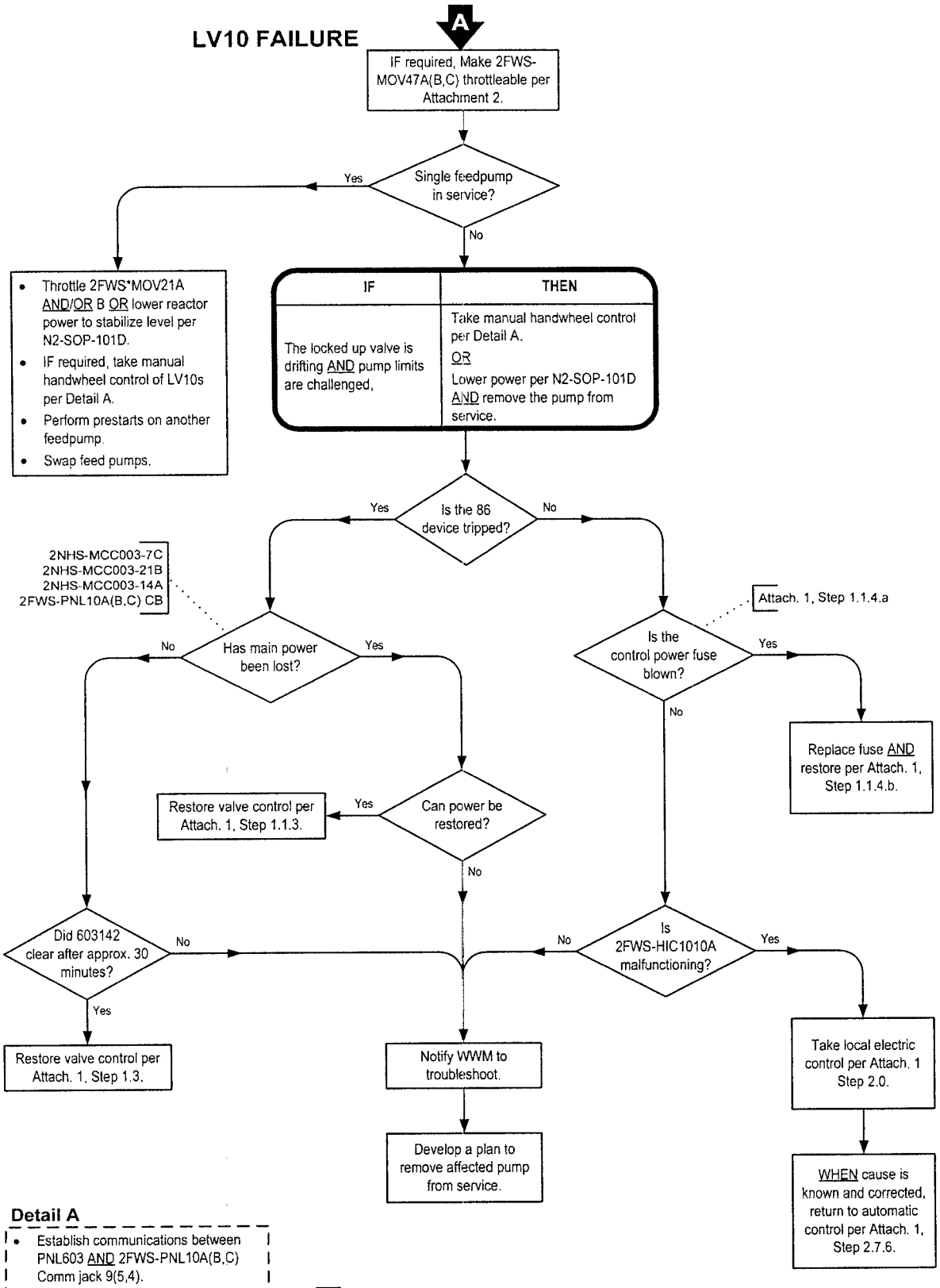
- No → Remove Condensate Demineralizers from service as required per N2-OP-5.
- Yes → Open 2FWS-V25A(B,C). → Remove Condensate Demineralizers from service as required per N2-OP-5.

RPV level high OR low?

- Rising → IF required, throttle feedwater flow with 2FWS*MOV21A/B. → Determine cause for rising level. → As directed by SM/CRS, exit this procedure.
- Lowering → FW pump trip?
  - Yes → Fast close LV10 until valve indicates 0%. → Place 2FWS-LV55 in manual AND close. → IF required, close 2FWS-MOV47A(B,C). → Determine cause for lowering level. → As directed by SM/CRS, exit this procedure.
  - No → Determine cause for lowering level. → As directed by SM/CRS, exit this procedure.

N2-SOP-06 - FEEDWATER FAILURES

LV10 FAILURE



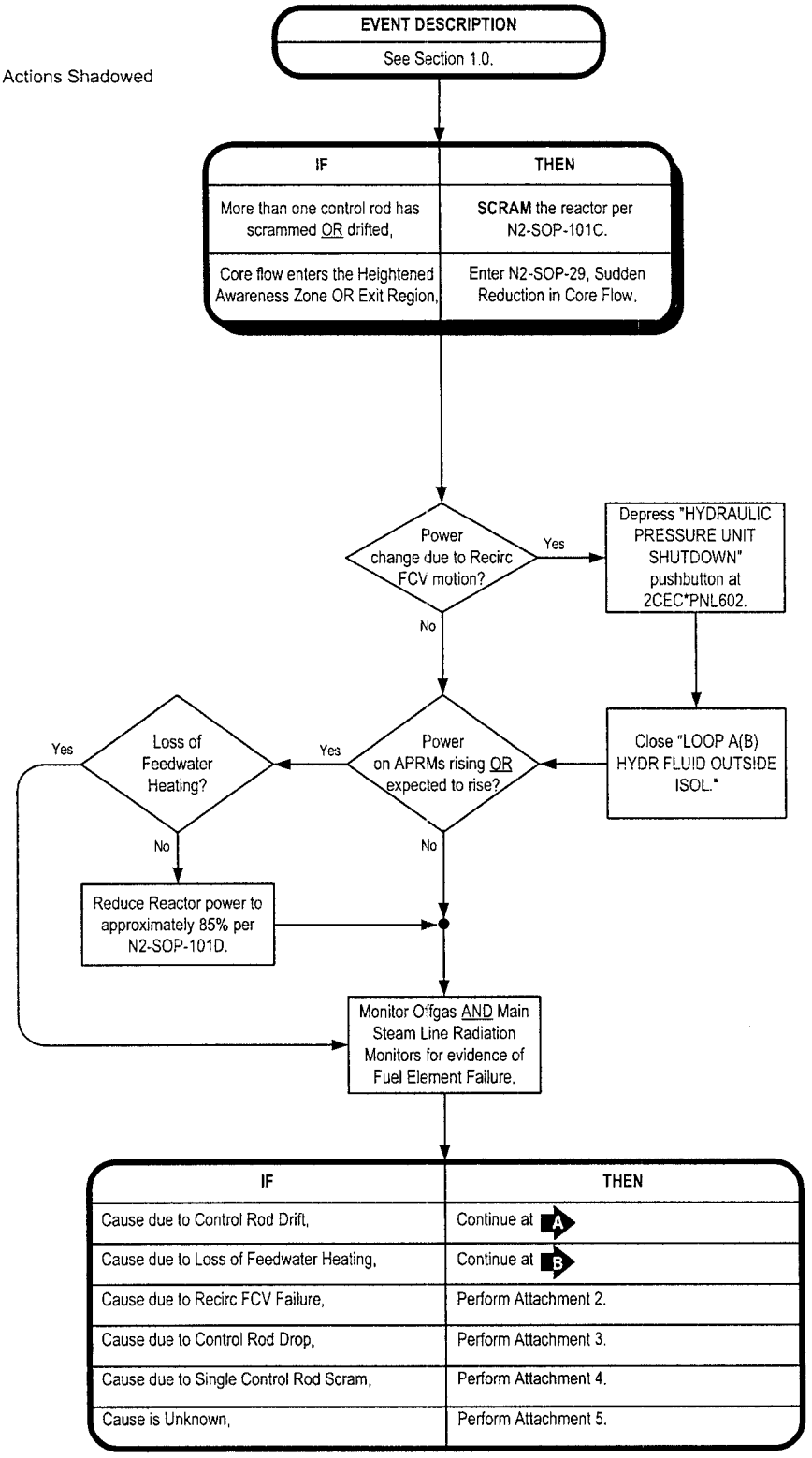
Detail A

- Establish communications between PNL603 AND 2FWS-PNL10A(B,C) Comm jack 9(5,4).
- Open the applicable breaker(s):
  - 2NHS-MCC003-7C (LV10A)
  - 2NHS-MCC003-21B (LV10B)
  - 2NHS-MCC003-14A (LV10C)
- Open OR close 2FWS-LV10A (B,C) using the local handwheel.

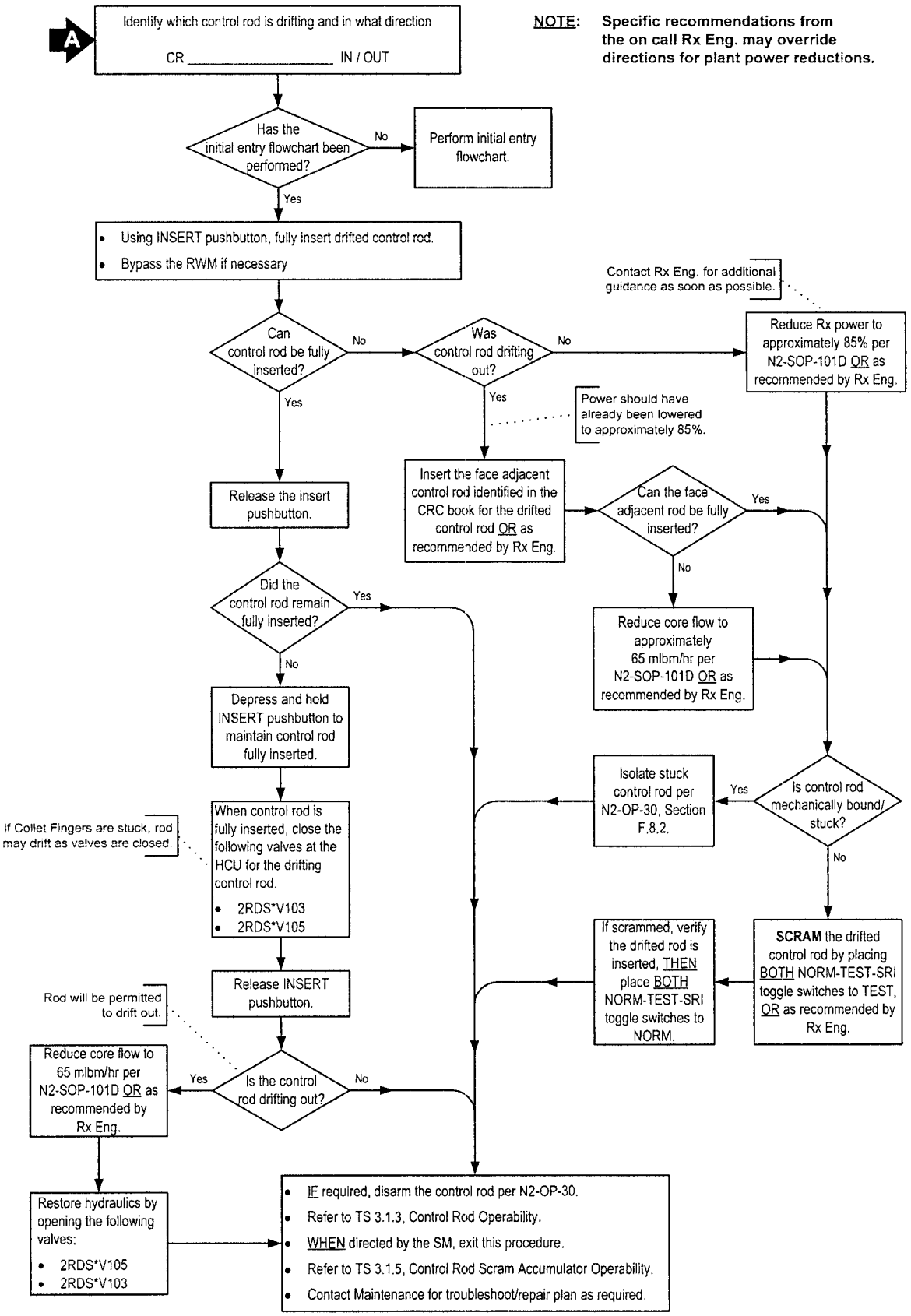
LV10s are reverse acting, CW to open, CCW to close.

N2-SOP-08 - UNPLANNED POWER CHANGES

Immediate Actions Shadowed



N2-SOP-08 - CONTROL ROD DRIFT



N2-SOP-08 – LOSS OF FEEDWATER HEATING

B

Adjust Reactor power per N2-SOP-101D to maintain the following:
- Reactor power ≤ 3467 MWt (Use OD-3 or manual Heat Balance)
- FW temperature (NSSTA101, 102, 103, 104, OR FWS-TI64A, TI64B) in the 'GOOD' area of Figure 1
- HDL-P1A (B,C) flows < 3800 gpm AND current < 190 amps

Perform the following:
- Verify 2CNM-AOV101, LOW PRESS HTR STRING BYPASS VLV, is closed
- Verify 2FWS-MOV102, 6th POINT HEATERS BYPASS VLV, is closed

Loss of FW Heating caused by 2CNM-AOV101 OR 2FWS-MOV102 being open AND the valve is now closed.

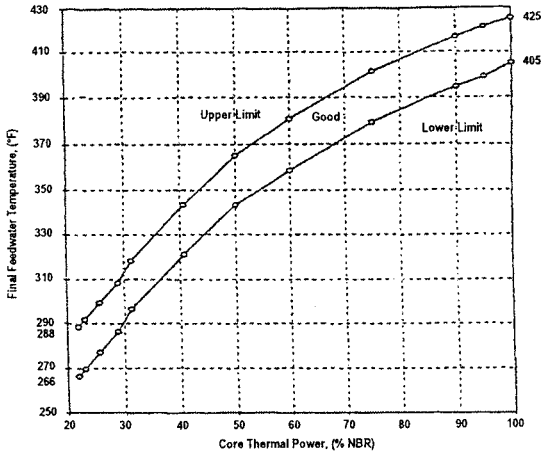
Yes → Exit this procedure

No

IF	THEN
More then one High Pressure Heater lost	Commence a Plant Shutdown per N2-OP-101D AND N2-OP-101C
2FWS-MOV102 is stuck open	
More than one Low Pressure Heater String lost	
2CNM AOV101 is stuck open	
One High Pressure Heater AND one Low Pressure Heater String lost (can be different HTR Strings)	

Perform Attachment 1

Figure 1: FEEDWATER TEMPERATURE/THERMAL POWER LIMIT



NOTE: Allow feedwater heater system sufficient time to stabilize before initiating further power reductions

Facility: **Nine Mile Point 2** Scenario No.: **NRC-03** Op-Test No.: **March 2008**
Examiners: _____ Operators: _____

Initial Conditions: Simulator IC-244

1. Plant startup is in progress IAW N2-OP101A @ Step 2.45.
2. RWM @ Step 16. Rod 34-11
3. Reactor Pressure is at approximately 900 psig.
4. One Bypass Valve is approximately 15%
5. Other operators will be performing SJAE startup later today.

Turnover:

1. Continue Power Increase to get one bypass valve open approximately 25%
2. Transfer Reboiler Steam Supply to Main Steam IAW N2-OP-25, Section 5.0, then continue startup

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	R (RO) R (SRO)	Continue startup **N2-OP-101A**
2	N/A	N (BOP) N (SRO)	Transfer Reboiler Steam Supply to Main Steam **N2-OP-25**
3	NM09A	I (RO) I (SRO)	IRM "A" Inop Trip **N2-OP-92 Neutron Monitoring, N2-OP-97 RPS**
4	ED04F	C (BOP) TS (SRO)	Loss of power to Div I switchgear. (TS) Restore non-essential Service Water, Drywell Cooling. **N2-SOP-3 Loss of AC Power**
5	NM06G	TS (SRO)	IRM "G" Fails Upscale (TS)
6	MT01 FW01B CW01F	C (ALL) TS (SRO)	Small Seismic Event, Condensate pump trip, Service Water Pump trip (TS) **N2-SOP-90 Seismic Event, N2-SOP-3 Loss of AC Power**
7	MT01 RR20	M (ALL)	Large Seismic Event, Recirc Loop suction line break **N2-SOP-90 Seismic Event, EOP-RPV, EOP-PC**
8	RH14B	C (BOP) C (SRO)	Division II fails to auto initiate
9	D08E AD08G	C (BOP) C (SRO)	Level indication lost, RPV Blowdown Required, only 5 ADS valves open. **EOP-C4**
10	N/A		RPV Flooding, level restoration **EOP-C4**

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

Facility: **Nine Mile Point 2** Scenario No.: **NRC-01** Op-Test No.: **March 2008**		
TARGET QUANTITATIVE ATTRIBUTES **(PER SCENARIO; SEE SECTION D.5.d)**	ACTUAL ATTRIBUTES	
1. Total malfunctions (5-8) **Events 3,4,5,6,8,9**	6	
2. *Malfunctions after EOP entry* (1-2) **Events 8,9**	2	
3. Abnormal events (2-4) **Event 3 –SOP-97, Event 4 SOP-3, Event 4-SOP-90**	3	
4. Major transients (1-2) **Event 7**	1	
5. EOPs entered/requiring substantive actions (1-2) **Events 7,9 *EOP-RPV, EOP-PC,***	2	
6. EOP contingencies requiring substantive actions (0-2) **Event 10 EOP-C4**	1	
7. Critical tasks (2-3)	2	
CRITICAL TASK DESCRIPTIONS: **CT-1.0 initiate an RPV blowdown when level indication is lost or if the PSP is exceeded.** **CT-2.0 flood the RPV to the elevation of the main steam lines IAW RPV flooding.**		

NMP SIMULATOR SCENARIO

NRC Scenario 3 **REV. 00** **No. of Pages: 19**

PREPARER	S. Dennis	DATE _____
VALIDATED	_____	DATE _____
GEN SUPERVISOR OPS TRAINING	R. Brown	DATE 1/23/08
OPERATIONS MANAGER	NA Exam Security	DATE _____
CONFIGURATION CONTROL	NA Exam Security	DATE _____

SCENARIO SUMMARY

Length: 1.5 hours

Initial Power Level: 1% Startup with RPV Pressure at 900 psig

The scenario begins with a plant startup in progress and reactor pressure at 900 psig. Control rods will be withdrawn until one bypass valve is open 25%. When that occurs, the operators will transfer the Reboiler Steam Supply to Main Steam. After that occurs, the plant startup will continue with control rod withdrawal.

While increasing power an inop trip will occur on IRM channel "A". The operators will bypass the affected IRM and reset the half scram. TS (TS 3.3.1.1) will be referred to by the SRO.

Next, a loss of offsite power to Div I Switchgear occurs when breaker 16-2 fails open, the crew will take action per N2-SOP-03 to stabilize plant parameters and adjust Service Water flow. The SRO will be required to address TS (TS 3.8.1.A – 1 Hr for surveillance – 72 hour SD LCO). When plant conditions are stabilized IRM "G" will have an upscale trip requiring a TS entry by the SRO.

A seismic event will then occur causing a Condensate pump to trip and the standby pump must be started. A service water pump will also trip requiring entry to TS 3.7.1.E. -72 hours). N2-SOP-90 will be entered to address the seismic event.

Once conditions are stabilized, a seismic aftershock will occur causing a rupture of the recirculation loop suction line. Initially drywell pressure rise slowly and the operators will manually scram the plant. The leak will get larger and entry into EOP-RPV and EOP-PC will be required. The event is complicated by a failure of Division 2 ECCS to initiate automatically. Operator action will be required to manually initiate Division 2 ECCS.

The crew must initiate an RPV blowdown when level indication is lost or if the PSP is exceeded (**CT**). Only 5 SRVs will initially open requiring operator action to open additional SRVs. The crew must flood the RPV to the elevation of the main steam lines in accordance with RPV flooding EOP-C4 (**CT**). Once RPV is flooded, containment parameters can be addressed.

Major Procedures Exercised: EOP-RPV, PC, C4

EAL Classification: Alert 8.4.4 – Seismic Event,
SAE – 2.1.2 –RPV Flooding Required

Termination Criteria: Level recovered to the main steam lines as indicated by acoustic monitors, RPV pressure rising, or tailpipe temperatures lowering.

I. SIMULATOR SET UP

A. IC Number: IC-244, Ensure RWM is functional when IC is snapped.

B. Presets/Function Key Assignments

1. Malfunctions:

a.	RH14B	ECCS FAILS TO INITIATE (DIV II)	PRESET
b.	D08E	ADS VLV N2 SUPPLY SEVERED (MSS*PSV134)	PRESET
c.	AD08G	ADS VLV N2 SUPPLY SEVERED (MSS*PSV129)	PRESET
d.	NM09A	IRM CHANNEL FAILURE – INOP (A)	TRG 1
e.	ED04F	4.16 KV NORMAL BUS FAULT (SWG16)	TRG 2
f.	NM06G	IRM CHANNEL FAILURE- UPSCALE (G)	TRG 3
g.	MT01	SEISMIC ACCELERATION	TRG 4
h.	FW01B	CONDENSATE PUMP TRIP (P1B)	TRG 4
i.	CW01F	SERVICE WATER PUMP TRIP (P1F)	TRG 4
j.	RR20	RR LOOP RUPTURE –DBA LOCA (5 minute Ramp)	TRG 5
K.	RPV LEVEL INSTRUMENTS ALL FAIL UPSCALE (3 Minute Delay)		TRG 6

Remotes:

a.	CS14	OPS-CSH01 PNL625 TST SW CSH*MOV107	TRG 7

3. Overrides:

a. None

4. Annunciators:

a. None

C. Equipment Out of Service

1. None

D. Support Documentation

E. Miscellaneous - **ENSURE THE FOLLOWING PROCEDURES ARE OUT IN THE CONTROL ROOM SIGNED OFF AS INDICATED BELOW**

N2-OP- 3 – signed off thru step 3.3.32

N2-OP-101A – step 2.46.3 completed

N2-OP-101A - step 2.45 in progress

II. **SHIFT TURNOVER INFORMATION**

OFF GOING SHIFT: ☐ N ■ D DATE: _____

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

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

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

Shift Supervisor Log (SM, CRS, STA)
- CRO Log (CRO)

Lit Control Room Annunciators (SM, CRS, STA, CRO, CRE)

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

Evolutions/General Information/Equipment Status:

- Reactor Power = Startup @ 900 psig
- Currently at step 2.45 of N2-OP-101A
- RWM @ step 16, Rod 34-11
- BPV #1 is approximately 15% open
- Other operators will be performing SJAE startup later today.

PART III: Remarks/Planned Evolutions:

Applicable Procedures In Progress

N2-OP- 3 – signed off thru step 3.3.32

N2-OP-101A – step 2.46.3 completed

N2-OP-101A - step 2.45 in progress

**** Additional Applicable Startup procedures are being monitored and performed by other operators. No actions from any applicable procedure will taken without notifying the control room.**

Continue to raise power to get BPV #1 25% open

Transfer the Reboiler Steam Supply to Main Steam IAW N2-OP-25, Section 5.0.

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 The crew must initiate an RPV blowdown when level indication is lost or if the PSP is exceeded

CT-2.0 The crew must flood the RPV to the elevation of the main steam lines IAW RPV flooding EOP-C4

B. Performance Objectives:

PO-1.0 Given the plant or plant system in a condition requiring Technical Specification action, identify the deviation and any required actions/notifications.

PO-2.0 Given the plant with a reactor startup in progress, the crew will identify and take actions for a failed IRM detector in accordance with N2-OP-92.

PO-3.0 Given the reactor plant operating at full power when service water pump trips, the crew will take action to stabilize service water in accordance with the ARP and N2-OP-11.

PO-4.0 Given a large LOCA inside the primary containment, the operating crew will operate the containment sprays to stabilize containment pressure <1.68 psig.

PO-5.0 Given EOP-RPV, monitor and control Reactor Water Level and Reactor Pressure.

PO-6.0 Given the plant shutdown following a large break LOCA and RPV level indication not usable, the crew will perform RPV flooding in accordance with EOP-C4.

PO-7.0 With RPV level instrumentation unavailable for use the crew will open 7 ADS valves in accordance with EOP-C4.

PO-8.0 With RPV level instrumentation unavailable, 7 ADS valves open and control rods not inserted, the crew will inject with all systems necessary to achieve and maintain greater than 165 psig RPV pressure in accordance with EOP-C4.

INSTRUCTOR ACTIONS/ PLANT RESPONSE	OPERATOR ACTIONS
	CREW Crew conducts a pre-brief, walks down the panels, and tests annunciators.
EVENT 1 ***Continue Startup***	SRO • Direct the RO to continue withdrawing control rods until RPV pressure is 925 psig and BPV #1 is 20% open.
EVENT 1 –RO Actions	RO • Withdraws control rods IAW sequence. • Monitors RPV, CRD and Nuclear Instruments • Establish a stable positive period greater than 60 seconds using • control rods as required. • Maintain IRM indications between 25 AND 75 on 125% scale by ranging IRM range switches as required.
EVENT 1 –BOP Actions	BOP • Maintain Reactor Water Level between 178.3" AND 187.3"

INSTRUCTOR ACTIONS/ PLANT RESPONSE	OPERATOR ACTIONS
EVENT 2 Transfer Reboiler Steam Supply to Main Steam	
EVENT 2 –SRO Actions	SRO • Directs the BOP to change the Reboiler Steam supply to the Main Steam supply provided that Reactor pressure control is established with a Turbine Bypass Valve open 20% or greater.
EVENT 2 –BOP Actions	BOP • Verifies an operator is stationed at the Auxiliary Boilers. • Manually open 2ASS-MOV148, MAIN STM TO AUX STM ISOL VLV • Close 2ASS-AOV145, AUX BLR STM INLET VLV, • Place the Reboiler 2ASS-STV112 and 2ESS-STV104 control switches in the AUTO • Direct the local operator to depress the RESET PUSHBUTTONS on the 2CES-IPNL204 • Open 2CNA-HV34A(B) • Monitor for proper reboiler operation

INSTRUCTOR ACTIONS/ PLANT RESPONSE	OPERATOR ACTIONS
EVENT 3 IRM "A" Inop Trip	
SIM BOOTH: Activate Trigger 1	
EVENT 3 SRO Actions	SRO PO-1.0 • Direct actions for IRM failure consult ITS 3.3.1.1.

EVENT 3 RO Actions	RO
	• Recognize IRM "A" failure.
	• Reports to SRO.
	• Bypass IRM "A" per N2-OP-92, H.3.0.
	• Resets half scam per N2-OP-97, Sect H.2.0
	• At 2CEC*PNL603, reset SCRAM signals by momentarily placing applicable switches to RESET as follows:
	  o REACTOR SCRAM RESET LOGIC A
	  o REACTOR SCRAM RESET LOGIC C
	  o Verify PILOT SCRAM VALVE SOLENOID white lights A, C, E AND G are lit.

EVENT 4 Loss of power to Div I switchgear. (TS) Restore non-essential Service Water, Drywell Cooling.

SIM BOOTH: Activate Trigger 2

- *Loss of power to Div I/III Switchgear.*
- *Div I and III EDGs start and pick up their respective buses.*
- *SWP non-essential headers isolate.*

Crew PO-3.0

- Recognize loss of power from SWG016.
- Enter SOP-3 and perform immediate actions to stabilize SWP and restore pneumatics.

SRO PO-1.0

- Monitor crew actions and implementation of SOP-3.
- Evaluate Tech Specs for the loss of power to SWG016. T.S. 3.8.1 AC Sources Operating.
- Enters T. S. 3.8.1 Condition A, restore in 24 hrs.
- Enters T.S. 3.7.1 Condition C, restore in 72 hrs.

BOP

- Perform supplemental actions of SOP-3 for a loss of power with EDGs on the bus.
- Verify Div I/III EDGs start.
- Verify SWP non-essential headers isolate.

INSTRUCTOR ACTIONS/ PLANT RESPONSE	OPERATOR ACTIONS
	• Verify Div I SWP pump restarts. • Restore flow to SWP non-essential headers. • Start 3rd SWP pump in Div II. • Restore pneumatics.
EVENT 5 IRM G Fails Upscale **SIM BOOTH: Activate Trigger 3 for IRM "G" Upscale**	
EVENT 5 SRO Actions	SRO PO-2.0 • Direct actions for IRM failure consult ITS 3.3.1.1.
EVENT 5 RO Actions **NOTE: This will result in a half scram which cannot be reset. IRM "G" can not be bypassed due to the previous IRM 'A" inop condition**	RO • Recognize IRM "G" failure. • Reports to SRO.
EVENT 6 Small Seismic Event, Condensate pump trip, Service Water Pump trip **Activate Malfunctions on Trigger 4** MT01 SEISMIC ACCELERATION FW01B CONDENSATE PUMP TRIP (P1B) CW01F SERVICE WTR PP TRIP (P1F) *Annunciator:* *842121 Seismic Acceleration Exceeded*	Crew PO-3.0 • Report alarms • Monitor plant conditions • Recognize trip of SWP*P1F. • Recognizes trip of "B" Condensate PP

INSTRUCTOR ACTIONS/ PLANT RESPONSE	OPERATOR ACTIONS
	• Responds to Seismic alarm
EVENT 6 SRO ACTIONS	SRO • Monitor crew response • Directs SOP-90 entry for seismic event • Directs a SWP pump in DIV II started. • Direct the standby Condensate Pump started. • Recognizes entry into T.S. 3.7.1, Cond. E, required Act. E.1, restore required pump within 72 hours. • Reviews OP-78, Attachment 11 and enters action #2. • Exits T.S. 3.7.1 action E.1 after SWP*P1F is started.
EVENT 6 BOP Actions **Role Play**: If directed, as Auxiliary Operator to perform pre-start checks on the SWP pump wait 2-3 minutes then report they are complete. **Role Play**: If directed to inspect the "F" SWP, wait 4 minutes, then report that there is an acrid odor in the vicinity of that pump. **Role Play**: If directed to inspect the "F" SWP breaker, wait 2 minutes, then report that the	BOP • Refers to ARPs. • Places SWP*P1F in pull-to-lock. • Throttles flows on remaining running • SWP Pumps to maintain flows ≤ 10,000 gpm. • Starts SWP.

breaker indicates instantaneous overcurrent trip. (50/51 relays, 86 device is tripped).

EVENT 6 RO Actions

Role Play: If directed, as Auxiliary Operator to perform pre-start checks on the condensate pump wait 2-3 minutes then report they are complete.

Role Play: If directed to inspect the "B" Condensate Pump, wait 4 minutes, then report that there is an acrid odor in the vicinity of that pump.

Role Play: If directed to inspect the "B" Condensate Pump breaker, wait 2 minutes, then report that the breaker indicates instantaneous overcurrent trip. (50/51 relays, 86 device is tripped).

RO

- Refers to ARPs.
- Places Condensate Pump B in pull-to-lock.
- Starts Standby Condensate Pump

EVENT 7 Large Seismic Event, Recirc Loop suction line break

When directed by lead instructor:

Re-activate MT01 – Seismic Acceleration AND Trigger 5 for RR20, Recirc loop rupture

- *Reactor scrams due to large break LOCA*
- *Drywell pressure rises rapidly*
- *RPV water level lowers rapidly*

Crew PO-4.0

- Recognize / report reactor scram and LOCA

EVENT 7 SRO Actions

SRO

- Monitor plant response
- Acknowledge scram report
- Announces entry into EOP-RPV and executes all legs simultaneously.
- Directs operators to control water level between the Post Scram low level and 200 inches and to restore RPV level to between 160 and 200 inches.
- Enters EOP-PC
- Directs operator to establish SC sprays before pressure reaches 10 psig
  EOP-6, Att. 22 Enters EOP-C4 for RPV flooding
- Directs 7 ADS valves open
- Directs RPV injection with available systems
- Directs slowly raising injection using feedwater/condensate, RCIC, CRD, and/or RHS through shutdown cooling to achieve 2 or more SRVs open AND RPV pressure above 165 psig but as low as possible.
- Directs MSIVs shut.

	• RCIC/Steam Condensing Isolations shut. • Main Steam line drains isolated. • Monitor crew actions response • Acknowledge only 5 ADS SRVs open. • Directs additional SRVs opened • Verify ECCS injecting • Monitor containment response • Directs crew to monitor for indications of core damage IAW EOP-C4 • Directs RHR cooling maximized • Directs pneumatics restored • Directs Div I/II H2/O2 monitors placed in service per EOP-PC
EVENT 7 RO Actions	• Mode switch to shutdown and scram report • Restores level (as directed). • When directed to start RPV Flooding Slowly commences injection to the RPV to achieve 165 psig or greater using feedwater/condensate, RCIC, CRD, and/or RHS through shutdown cooling. • Shuts all MSIVs.

INSTRUCTOR ACTIONS/ PLANT RESPONSE	OPERATOR ACTIONS
	• Verifies shut RCIC/Steam Condensing Isolation valves, 2ICS*MOV121 & 2ICS*MOV128. • Shuts Main Steam Lines drain valves.
EVENT BOP Actions **EVENT 8** - Failure of Div II ECCS to initiate	• Takes action to manually initiate Div II ECCS • As directed Injects with LP ECCS As Directed Injects with available FWS/Cond

EVENT 9 & 10 – Loss of RPV level indication, RPV Flooding
RPV water level goes below the fuel zone indication and crew recognizes that RPV level is unknown.
 	
SIM BOOTH: As Directed, activate Trigger 6 for RPV Level Instrument Flashing
 	
After ECCS has had time to re-flood the RPV to the jet pumps, water level will be indicated on the fuel zone but due to the reference leg flashing malfunction will begin to be erratic on all available instruments.
	PO-5.0, PO-6.0, PO-7.0, PO-8.0
	CREW
	• Report RPV level indication is unknown
	
	SRO
	• Enters EOP-C4 – RPV Flooding
	• Monitors for Core damage
	• **Directs blowdown by opening 7 ADS valves**
	CT-1.0
	• **Directs Continued Injection until the main steam lines are flooded as indicated by:**
	  ○ **Increasing Reactor pressure.**
	  ○ **SRV Red Light Indication on P601 –acoustic monitor**

	noise. o **Decreasing SRV tailpipe temperature.** **CT-2.0**
	BOP • Initiates blowdown by opening 7 ADS valves • Report only 5 ADS SRVs open. • Open additional SRVs • **Establishes 7 SRVs open** **CT- 1.0**
Event 9 & 10: BOP Actions (cont)	• Continues feeding vessel with available systems as directed. • Monitors for indications of main steam lines flooded.
Event 9 & 10: RO Actions	• Continues feeding vessel with available systems as directed. • Monitors for indications of main steam lines flooded.
Termination Criteria: Indication of Mean Steam Lines Flooded is determined by crew	

V. POST SCENARIO CRITIQUE

A. NA, NRC Exam

VI. REFERENCE EVENTS AND COMMITMENTS

A. Reference Events

None

B. Commitments

1. None

2.

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-04** Op-Test No.: **March 2008**
Examiners: _____ Operators: _____

Initial Conditions: Simulator IC-17

1. Reactor Power 100%

Turnover:

1. Reduce power to 90% per LD for a rod line adjustment which will take place on the next shift.
2. Perform N2-OSP-RMC-S@001 Control Rod Movement and Position Verification Surveillance Test

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	R (RO) R (SRO)	Reduce power to 90% at approximately 2% per minute.
2	N/A	N (RO) N (SRO)	Perform N2-OSP-RMC-W@001 Control Rod Movement and Position Verification Surveillance Test
3	RD18	C (RO) C (SRO)	CRD P1A suction filter clog causes pump trip. **N2-SOP-30, CRD Failures**
4	RD11	TS (SRO)	Rod Position Indication Lost
5	overrides	C (BOP) TS (SRO)	Control room AC unit trips (TS 3.7.2.A – 7 days, TS 3.7.3.A – 30 days.
6	EG06A	C (BOP) C (SRO)	Stator water pump trip, failure of standby to auto start, Generator RB. Power reduction may be required. **N2-SOP-68, Loss of Stator Cooling**
7	overrides	C (BOP) C (SRO)	Loss of Switchgear 15, loss of one division of RPS solenoids **N2-SOP-3, Loss of AC Power, N2-SOP-97 RPS Failures** **N2-SOP-13, Degraded CCP System, N2-SOP-60, Loss of DW Cooling**
8	RP03 MS03	C (RO) C SRO)	Small containment leak, Mode Switch and RPS Manual PB fail, ARI successful. **EOP-RPV, EOP-C5 Failure-To-Scram**
9	ED02A,B DG04A,B	M (ALL)	Loss of Offsite Power with EDG auto-start failures **N2-SOP-3, N2-SOP-11, EOP-RPV, EOP-PC**
10	RH01A	C (BOP) C (SRO)	EDGs available, RHR Pump "A" trip, spray must be swapped to "B" loop.

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

Facility: **Nine Mile Point 2**	Scenario No.: **NRC-04**	Op-Test No.: **March 2008**
TARGET QUANTITATIVE ATTRIBUTES **(PER SCENARIO; SEE SECTION D.5.d)**	ACTUAL ATTRIBUTES	
1. Total malfunctions (5-8) **Events 3,5,6,7,8,10**	6	
2. Malfunctions after EOP entry (1-2) **Events 10**	1	
3. Abnormal events (2-4) **Event 3- SOP-30, Event 6-SOP-68, Event 7-3,13,60,97,**	3	
4. Major transients (1-2) **Event 9**	1	
5. EOPs entered/requiring substantive actions (1-2) **EOP-RPV, EOP-PC**	2	
6. EOP contingencies requiring substantive actions (0-2) **EOP-Failure to Scram,**	1	
7. Critical tasks (2-3)	3	
CRITICAL TASK DESCRIPTIONS: CT 1.0 – Upon Mode Switch and RPS PB Failure, Scram is accomplished with RRCS . CT 2.0 – On EDG Auto-start failure, start the EDGs from the control room IAW SOP-03. CT 3.0 – drywell spray is initiated prior to exceeding the PSP.		

NMP SIMULATOR SCENARIO

NRC Scenario 4 **REV. 00** **No. of Pages: 26**

PREPARER	S. Dennis	DATE ____
VALIDATED		DATE ____
GEN SUPERVISOR OPS TRAINING	R. Brown	DATE 1/23/08
OPERATIONS MANAGER	NA Exam Security	DATE ____
CONFIGURATION CONTROL	NA Exam Security	DATE ____

SCENARIO SUMMARY

Length: 1.5 hours

Initial Power Level: 100%

The scenario begins with the crew performing a power maneuver power will be lowered to 90% for a rod line adjustment which will take place on the next shift. The crew will perform surveillance N2-OSP-RMC-W@001 Control Rod Movement and Position Verification. Following the third rod tested, a trip of the running CRD pump will occur due to a clogged suction strainer. Actions must be taken to start the standby pump. Once the standby pump is started, position indication for a control rod will be lost requiring the SRO to address Technical Specifications (TS 3.1.3.C.1 and 2).

One of the Control Room AC units will trip and the standby unit will fail to auto-start. The SRO will enter TS 3.7.3.A. The running Stator Water Cooling pump then trips and the standby pump fails to start but can be manually started. If a bypass valve opens due to the pump trip and generator runback a power reduction will be required. When conditions stabilize, a loss of Switchgear 15 will occur which affects RPS and requires operator action to transfer RPS to its alternate supply. Additionally, Switchgear 15 may be re-powered.

Once conditions are stabilized, a small leak will develop in the drywell requiring a manual scram of the reactor. A failure of the mode switch and RPS manual scram pushbuttons will occur requiring the use of RRCS to insert control rods (**CT**). The SRO will enter EOPs and EOP contingencies.

Once the rods are inserted, a Loss of Offsite Power will occur. Additionally, the EDGs will fail to auto start. The operators will take actions to start the EDGs in the control room IAW SOP-03(**CT**). The containment leak will get worse. RHR pump P1A will trip when placed in service and Suppression Chamber Spray must continue with RHR

pump P1B. The operators will be expected to control containment pressure with Drywell Spray prior to exceeding the Pressure Suppression Pressure (**CT**).

Major Procedures Exercised: EOP-RPV, PC, C6. SOP-1,3,11,30,68

EAL Classification: Alert – 6.1.3 – AC Power loss for >15 minutes on one bus
Alert – 3.1.1 – Primary Containment Pressure cannot be maintained <1.68 psig
Alert - 2.1.1 – auto scram failed

Termination Criteria: Containment pressure is decreasing and RPV level and pressure are being controlled.

I. SIMULATOR SET UP

A. IC Number: IC-17

B. Presets/Function Key Assignments

1. Malfunctions:

a.	RD18	ONLINE CRD SUCTION FLTR CLOG	TRG 1
b.	RD11	30-59 CONTROL ROD FAILURE RPIS (ANY) (DELAY 2 SECONDS)	TRG 2
c.	EG06A	MAIN GEN STATOR CLG PMP TRIP	TRG 4
d.	MS03	STM LEAK INSIDE PRI CONT	TRG 7
e.	RP03	RPS FAILURE TO SCRAM	PRESET
f.	ED02A	LOSS OF OFFSITE 115KV LINE 5 (DLY 5 SECS)	TRG 8
g.	ED02B	LOSS OF OFFSITE 115KV LINE 6 (DLY 5 SECS)	TRG 8
h.	DG01A	DG #1 FAILURE TO START	TRG 8
i.	DG01C	DG #3 FAILURE TO START	TRG 8
j.	ED14	UPS FAULT 2VBB-UPS1G	TRG 9
k.	RH01A	RHR PUMP TRIP (P1A) (DLY 10 SECS)	TRG 15
l.	MS04	STM LINE RUPTURE IN PRI CONT (RAMP 8 MINS)	TRG 13
m.	AN603443	Control Rod Drift	TRG 2

2. Remotes:

a.	RP02	RPS MG2 EPA	TRG 6
b.	RC02	RCIC LVL 8 TRIP DEFEAT	TRG 14
c.	DG01	LOCKOUT RELAY DG1 (DELAY 8 MINS)	TRG 11
d.	DG03	LOCKOUT RELAY DG3 (DELAY 4 MINS)	TRG 12
e.	SB05	2VBS-PNLA102 BKRS 1,2	TRG 20
f.	SB06	2VBS-PNLB102 BKR 3 (DLY 10 SECS)	TRG 20
g.	SB07	2VBS-PNLA104 BKR 3 (DLY 20 SECS)	TRG 20
h.	SB08	2VBS-PNLB103 BKR 7 (DLY 30 SECS)	TRG 20
i.	SB01	2VBS-PNLA101 BKRS 6,7,9,11,12,13,19,20,36,37 (DLY 1 MIN)	TRG 20
j.	SB02	2VBS-PNLB101 BKR 5,6,7,8,9,12,13,14,15 (DLY 1MIN 10 SECS)	TRG 20
k.	SB03	2VBS-PNLB104 BKR 3 (DLY 1 MIN 20 SECS)	TRG 20
l.	SB04	2VBS-PNLA103 BKR 3 (DLY 1 MIN 45 SECS)	TRG 20
m.	SB11	2VBS-PNLA101 BKR 35	TRG 21

n. SB12 2VBS-PNLB101 BKR 23 (DLY 10 SECS) TRG 21

o. SB09 2VBS-PNL101A BKRS 3,11,13,20 (DLY 20 SECS) TRG 21

p. SB13 2BYS-PNL201A BKRS 11,18,19,20 (DLY 30 SECS) TRG 21

q. SB15 2BYS-PNL202A BKRS 1,2,3,4,5,6 (DLY 1 MIN TRG 21

r. SB14 2BYS-PNL201B BKRS 18,21 (DLY 1 MIN 10 SECS) TRG 21

s. SB10 2VBS*PNL301B BKRS 12,13,17,20 TRG 21
(DLY 1 MIN 20 SECS)

t. SB16 2BYS*PNL202B BKRS 1,2,3,4 (DLY 1 MIN 45 SECS) TRG 21

3. Overrides:

a. OVR-20A2S065DI2438 PTL CNTL RM A/C FAN ACU 1A SW TRG 3

b. OVR-04A2S022DI6126 GEN STR COOL PMP 2GMC P1B PRESET

c. OVR-05A2S101DI7235 STP NORM INCOMING TRG 5
13.8KV NORM BUS FD

d. OVR-18A3S095DI1357 STP CONTROL ROOM A/C FAN*ACU1B
PRESET
OFF (GRN)

e. OVR-18A3S095DI1358 NAP CONTROL ROOM A/C FAN*ACU1B
PRESET
OFF (GRN)

4. Annunciators:

a. None

C. Equipment Out of Service

1. None

D. Support Documentation

E. Miscellaneous

1. Provide RMR for Power reduction

II. **SHIFT TURNOVER INFORMATION**

OFF GOING SHIFT: ☐ N ☐ D DATE: _____

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

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

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

Shift Supervisor Log (SM, CRS, STA)
- CRO Log (CRO)

Lit Control Room Annunciators (SM, CRS, STA, CRO, CRE)

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

Evolutions/General Information/Equipment Status:

- Reactor Power = 100%
- Loadline = >100%
- None

PART III: Remarks/Planned Evolutions:

Lower Reactor power per RMR to 90% to support rod line adjustment next shift.
Perform N2-OSP-RMC-S@001 Control Rod Movement and Position Verification.

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 a failure of RPS the crew will use of RRCS to insert control rods.

CT-2.0 Given a Loss of Off-Site Power with a failure of the EDGs the operators will take actions to start the EDGs in the control room IAW SOP-03

CT-3.0 Given a small leak in the drywell the crew will initiate Drywell Spray prior to exceeding the Pressure Suppression Pressure

B. Performance Objectives:

PO-1.0 Given the plant at rated power, the crew will lower power to 90% using recirc flow control following the guidance of the provided RMR and N2-OP-101D.

PO-2.0 Given the plant at 90% power, the crew will perform surveillance N2-OSP-RMC-W@001

PO-3.0 Given a loss of the a running CRD pump, the crew will start the Standby CRD pump before receiving any accumulator alarms, IAW N2-SOP-30.

PO-4.0 Given the failure of control rod position indication for a control rod Refer to N2-OP-96, Section H and restore RPIS.

PO-5.0 Given the plant or plant system in a condition requiring Technical Specification action, identify the deviation and any required actions/notifications.

PO-6.0 Given a loss of the operating stator water cooling pump and the failure of the standby pump to auto start the operating crew will take action to manually start the standby pump IAW N2-SOP-21, N2-SOP-68 and N2-SOP-101C.

PO-7.0 Given a loss of the Control Room AC Unit and the failure of the standby AC unit to auto start the operating crew will take action to manually start the standby AC unit IAW N2-OP-53A.

PO-8.0 With an electrical fault on NNS-SWG015, the crew will electrically isolate NNS-SWG015 and investigate the cause per N2-SOP-03.

PO-9.0 With "B" RPS de-energized due to loss of NNS-SWG015, the crew will re-energize "B" RPS from its alternate supply per N2-SOP-97.

PO-10.0 With DW Cooling fans de-energized due to loss of NNS-SWG015, the crew will start DRS-UC3A per N2-OP-60.

PO-11.0 With the plant operating at power the crew will respond to LOCA in the drywell

PO-12.0 Given the plant operating at full power when a station blackout occurs, the crew will respond to the station blackout in accordance with N2-SOP-1 and N2-SOP-03.

INSTRUCTOR ACTIONS/ PLANT RESPONSE	OPERATOR ACTIONS
	CREW • Crew conducts a pre-brief, walks down the panels, and tests annunciators.
EVENT 1 – Power reduction to 90%	
EVENT 1 –SRO Actions	SRO PO-1.0 • If not previously performed, conducts Shift and Reactivity Briefs. • Directs power lowered to 90% per RMR and OP-101D
EVENT 1 –RO Actions *Core Flow lowers, Power lowers*	RO • Lowers power to 90 % by reducing core flow • Moves RCS*HYV17A&B individually in the close direction, maintaining loop flow differential at a minimal value by alternating between the two valves. • Monitors NIs and rate of power change.
EVENT 1 –BOP Actions	BOP • Monitors plant parameters to verify proper operations.

INSTRUCTOR ACTIONS/ PLANT RESPONSE	OPERATOR ACTIONS
EVENT 2 - Perform N2-OSP-RMC-W@001 Control Rod Movement and Position Verification Surveillance Test	
EVENT 2 –SRO Actions	SRO PO-2.0 • Authorizes/directs performance of surveillance N2-OSP-RMC-W@001
EVENT 2 –RO Actions	RO • Commences surveillance • Exercises first control rod • Exercises the second rod
EVENT 3 CRD P1A suction filter clog causes pump trip.	
Sim Booth: Activate Trigger 1 as directed *RDS-P1A trips on low suction pressure.* *AN 603318 CRD Pmp Suct Fltr Diff Press High* *AN 603315 CRD Pmp 1B Suct Press Low* *AN 603309 CRD Pmp 1A Suct Press Low* *AN 603308 CRD Pmp 1A/1B Auto Trip RDS-P1A trips* *AN 603341 Rod Drive Accum Trbl*	CREW PO-3.0 • Recognize/Report the loss of RDS-P1A
EVENT 3 SRO Actions	SRO • Directs RO to halt surveillance test.

NOTE: If Required, prompt SRO to continue with surveillance test when CRD suction Filters are swapped

- Directs RO to enter and execute SOP-30
- When suction filter has been swapped directs the resumption of Control Rod Movement surveillance test.

EVENT 3 –RO Actions

Role Play: As an Operator dispatched to Swap CRD Suction Filters, wait 5 min. or as directed by lead instructor, clear Malfunction **RD18** and report Suction Filters swapped.

RO

- Enters and executes SOP-30
  - Places RDS Flow Controller to "MAN"
  - Closes RDS Flow Control Valve
  - Directs AO to shift RDS Suction Filters
  - Throttles closed WCS*MOV200 until F/Ds are in "HOLD"
  - Trips WCS Pumps
  - Acknowledge CRD Suction Filter Swap.
  - Restart a CRD pump per N2-SOP-30.
  - Report CRD Flow restored.

Examiner Note: The following annunciator may alarm during the CRD suction Filter swap.

AN 603316, "CONTROL ROD HIGH TEMPERATURE" alarms.

CREW

- Recognizes/Reports control rod high temperature alarm and takes the actions of ARP.
- Dispatches Aux Operator to monitor CRD temperatures.

Role Play: As the Aux Operator dispatched to monitor CRD temperatures, report that highest temperature is on rod 18-43 (report 265°F if alarm is in, report 240°F if alarm is clear).

EVENT 4 - Rod Position Indication Lost

Booth Operator: Insert malfunction RD11 (Trigger 2) after rod 30-59 is returned to position 48.

AN603443 Control Rod Drift
AN603303, Rod Drive Control System Inoperable
AN603304, Rod Position Indicating Sys Inoperable
AN 603305, Control Rod Display noperable

CREW PO-4.0 & 5.0

- Resumes N2-OSP-RMC-W@001 Control Rod Movement and Position Verification.
- Recognize Rod Out Block
- Diagnose loss of RPIS for 30-59

EVENT 4 SRO Actions

Role Play: As the Reactor Engineer direct a halt to all further rod movement and direct the SRO to determine the control rod movement and notify Reactor Engineering if any control rod movement occurs.

Role Play: As the I & C Supervisor ask for

SRO

- Suspend all attempts to move control rods.
- Direct entry into N2-OP-96, Section H.
- Refer to Technical Specification 3.1.3
- Determines a control rod whose

all the current control room annunciators and state you will send an I & C Tech to determine the cause of the problem.	position cannot be determined be declared inoperable and fully inserted within 3 hours and disarmed within 4 hours. • Notify the Reactor Engineer AND Contact the I&C Department to troubleshoot AND repair.
EVENT 4 RO Actions	RO • Respond to Rod Out Block • Suspend all attempts to move control rods. • Enter ARP for 603304 RPIS INOP • Push AND hold the RDCS STATUS Inoperative Reset pushbutton for five seconds • Refer to N2-OP-96, Section H. • Verify the Rod Display fans are operating in P603 panel, depress "Test High Temp" and "Test Low Temp" orange push button to verify fan operation. • Record the lit LEDs in 2CEC-PNL615. • Attempt to determine the position of 30-59 by checking: The Full-In (or Full-out) indication on the R&DD. Demand an OD-7 printout from

	the process computer. • When I & C reports the RPIS is repaired and the RPIS system is verified operable reset the control rod drift and block.
EVENT 5 - Control Room AC unit trips **Sim Booth: Activate Trigger 3 as directed**	CREW PO-7.0 • Recognizes and diagnoses the loss of Control Room AC and the standby unit failure to auto-start.
EVENT 5 SRO Actions	SRO • Directs manual start of CNTL RM A/C FAN ACU 1B • Enters procedure N2-OP-53A • Enters TS 3.7.2.A – 7 days, TS 3.7.3.A – 30 days.
EVENT 5 RO Actions	• Monitors Reactor Power, Pressure & Level

INSTRUCTOR ACTIONS/ PLANT RESPONSE	OPERATOR ACTIONS
EVENT 5 BOP Actions	BOP • Manually starts CNTL RM A/C FAN ACU 1A. • Verifies system conditions IAW Enters procedure N2-OP-53A • Verifies CR HVAC operates correctly
EVENT 6 Stator water pump trip, failure of standby to auto start, Generator RB. Power reduction may be required.	
Sim Booth: Activate Trigger 4 as directed *GMC-P1A trips on motor electric fault.* *AN851135, STTR CLG WTR Pump 1A/1B Auto Trip/Fail to Start* *GMC-P1B fails to start automatically or manually.* *Loadset begins to runback* *Turbine bypass valves begin to open.*	Crew PO-8.0 • Recognizes/reports loss of GMC-P1A. • Recognizes failure of standby GMC pump to start automatically.
EVENT 6 SRO Actions	SRO • Enter SOP-68 • Enters ITS 3.7.2.A – 7 days, TS 3.7.3.A – 30 days

INSTRUCTOR ACTIONS/ PLANT RESPONSE	OPERATOR ACTIONS
EVENT 6 RO Actions	RO • Enters SOP-68 • If a runback occurs, initiate a power reduction IAW N2-SOP-101D as necessary to maintain the BPV closed
EVENT 6 BOP Actions Role Play: As the AO sent to Stator Water skid that all conditions are normal. If sent to the breaker for GMC-P1A report that the breaker front is warm. Report that the breaker for GMC-P1B appears normal.	BOP • Enters SOP-68 • manually starts GMC-P1B • Reports start of standby GMC pump • Dispatched personnel to the local GMC skid to check for probable causes.
EVENT 7 **Loss of Switchgear 15** *Plant response will include loss of:* *CCS-P1B* *RDS-P1B* *WCS-P1B* *1/2 of DW Cool Fans* *RPM - MG1B* **Sim Booth: Activate Trigger** **CUE:** After being dispatched by control room,	CREW PO-8.0, 9.0, 10.0 • Recognize trip of RPS and loss of SWG015. • Enter SOP-3 for loss of SWG015. • Enter SOP-97 to re-energize "B" RPS.

report as Electrical Maintenance that Switchgear 15 has no problems and it appears a problem occurred with BKR 15-3.

EVENT 7 SRO Actions

Sim Booth: When asked to reset the EPAs for RPS, INSERT **TRG 6.**

Role Play: After being dispatched by control room, report as Electrical Maintenance that Switchgear 15 has no problems and it appears a problem occurred with BKR 15-3.

Sim Booth: Activate Trigger 5 as requested

Role Play: As AO dispatched for SOP-97, report:

- RPM*ACB1B tripped
- RPM*ACB2B tripped
- RPM-MG1B not running
- RPM-MG1B Generator Output switch closed
- NHS-MCC009-4EL breaker closed

SRO

- Enter SOP-3 and isolate SWG015.
- Enter SOP-97 and to re-energize "B" RPS.
- Direct an operator to place RPS Alternate power switch to ALT and reset the EPAs
- Enters ITS 3.4.7
- Directs a plant shutdown per N2-OP-101C due to the significantly reduced CCP capacity.

INSTRUCTOR ACTIONS/ PLANT RESPONSE	OPERATOR ACTIONS
EVENT 7 RO Actions	RO • Check control rod positions for drifting control rods • Enter ARPs for AN602218 and 602224. • When the EPA breakers are reset, reset half scram and isolations.
EVENT 7 BOP Actions **Role Play:** As AO dispatched for SOP-97 to reset the EPAs report: • EPA relay trip flags reset • EPA breaker reset	BOP • Start DRS-UC3A per N2-OP-60. • Start CCP-P1C • Dispatch operators to EHS*MCC103 (CB261') and RB 261'to override and open MOVs to RCS Pumps. • Direct throttling open WCS*MOV110 • When directed place RPS Alternate power switch to ALT. • Direct an operator to reset the EPAs.
When "B" RPS has been re-energized per SOP-97 and as directed by the Lead Instructor, **insert malfunction Trigger 7 (MS03) for Steam Leak**	

EVENT 8

Steam Leak in containment, Failure to Scram

603140 Drywell Pressure HIGH/LOW

CREW PO-11.0

- Recognizes and responds to annunciator.
- Identifies and reports changing containment parameters.

EVENT 8 SRO Actions

SRO

- Directs mode switch to shutdown.
- Enters RPV Control.
- Directs EOP-RPV, enters C-5 Failure to SCRAM.
- Directs ADS logic inhibited.
- Directs CSH placed in pull-to-lock. inches
- Directs a RPV water level band 159-200 inches.
- Directs a RPV pressure band with a target of 800-1000 psig.
- **Directs RRCS initiated.**

  CT-1.0
- Directs EOP-6, Attachment 13.
- May direct EOP-6 Attachment 10.

INSTRUCTOR ACTIONS/ PLANT RESPONSE	OPERATOR ACTIONS
EVENT 8 RO Actions	RO PO-4.0 • Place reactor mode switch in shutdown and provides scram reports. • Recognizes and Reports all control rods did not insert • Inhibits ADS. • **Initiates RRCS IAW EOP-6, Attachment 13** **CT-1.0** • Takes appropriate action to maintain RPV water level within the directed band of 159 -200 inches.
EVENT 8 BOP Actions	BOP • Takes appropriate action to maintain RPV pressure within the directed band. • As directed places HPCS in PTL • Restores drywell Cooling (EOP-6 att 24): o Determines drywell temperature <250°F o Overrides drywell unit cooler water LOCA isolation interlocks with keylock switches. o Verifies closed drywell unit cooler inlet valves

INSTRUCTOR ACTIONS/ PLANT RESPONSE	OPERATOR ACTIONS
	• Restores CCP to drywell by opening containment isolation valves. o Restores CCP to drywell unit coolers by opening drywell unit cooler inlet valves. o Overrides drywell unit cooler fan interlocks with keylock switches. o Restarts drywell Unit cooler Fans (all).
Sim Booth Operator: After exiting EOP-Failure to Scram and re-entering EOP-RPV control AND a level and pressure band has been established – Initiate **TRG 8** for the next event Station Blackout.	
EVENT 9 & 10 – Loss of Offsite Power with EDG Auto start failures, increasing drywell leak, Trip of 'B' RHR pump	
Loss of NPS-SWG001 and 003. *Loss of all Feed* *Recirc pumps trip* *CRD pump trips* *Circ Water pumps trip* *Loss of all AC except Div III Diesel*	CREW PO-12.0 • Recognizes and reports Loss of Power. • Recognizes SOP and EOP- entry Conditions.

INSTRUCTOR ACTIONS/ PLANT RESPONSE	OPERATOR ACTIONS
EVENT 9 & 10 SRO Actions	SRO • Directs Entry to SOP-3 for Loss of AC • **Directs start attempt of the EDGs from the control room CT-2.0**
EVENT 9 & 10 SRO Actions (cont)	• Updates crew on EOP-RPV entry. • Directs level control using RCIC. • Directs pressure control using SRV's • Directs entry into EOP-PC as appropriate. • Directs suppression chamber spray be initiated before exceeding 10 psig suppression chamber pressure.
EVENT 9 BOP Actions	BOP • **Attempts to start the EDGs 1 and III as per SOP-3 Detail "A" instructions:** o **Checks listed annunciators** o **Places EDG control switch to Start** o Verifies voltage and frequency o Places Synch Switch to ON o Closes output breaker o Verifies bus voltage of 4160V o Places Synch Switch to Off
EVENT 9 & 10 BOP Actions (cont) **Sim Booth: Once the EDGs are started and**	

the safety buses powered up, activate Trigger 13. This will increase the severity of the drywell leak

- Informs SRO of successful start and load of EDGs

CT-2.0

- Once EDGs are started, Controls RPV pressure with SRVs – 800 - 1000 psig
- Places RHR A(B) in suppression chamber sprays as follows.
  - Opens SWP*MOV90A(B) – may be delayed until after spray are in service as follows:
  - Verifies RHR pump A(B) running.
  - Verifies RHS*MOV24A(B) overridden closed.
  - Opens RHS*MOV33B to establish SC spray flow.
  - Opens RHS*FV38A(B) and establish approximately 7450 gpm-if suppression pool cooling is required.
  - Throttles open SWP*MOV33A(B) to establish flow not to exceed 7400 gpm. May be required to start 5th Service Water pump (post-LOCA).
  - Closes RHS*MOV8A(B) – after 10 minute time delay from ECCS initiation signal.

	○ Directs RP to place SWP*RE23A(B) in service.
EVENT 10 – Drywell Spray required, RHR pump "A" trip	SRO • Directs DW spray when SP Pressure is >10 psig • Verifies DW spray conditions are met. • Directs RCS Pumps tripped. • Direct DRS Unit Coolers tripped. • **Directs DW Spray IAW EOP-6, Attachment 22 prior to exceeding the PSP limit.** **CT-3.0**
EVENT 10 – RO/ BOP actions **Sim Booth: When operator places "A" RHR in Drywell Spray, initiate Trigger 15 to trip RHR pump "A"** **NOTE: The "A" RHR pump will trip requiring "B" RHR pump and loop to be placed in Drywell Spray**	RO/BOP • When directed to place DW spray in service ○ Trips/verifies tripped RCS Pumps. ○ Trips DRS Unit Coolers. • **Places RHR in Drywell Spray prior to exceeding the Pressure Suppression pressure limit as follows:** **CT-3.0** ○ Verifies an initiation signal present. ○ Opens SWP*MOV90A(B) – May be delayed until after sprays are in service.

INSTRUCTOR ACTIONS/ PLANT RESPONSE	OPERATOR ACTIONS
	o Verifies RHR pump running. o Determines the "A" RHR pump tripped requiring "B" RHR pump and loop to be placed in Drywell Spray o Verifies closed RHS*FV38 (B). o Verifies open RHS*MOV4 (B). o **Opens RHS*MOV25 (B).** o **Opens RHS*MOV15 (B).** o Verifies RHS*MOV4 (B) closes. o Verifies approximately 7450 gpm on drywell spray header. o Closes RHS*MOV8 (B) after 10 minute time delay from receipt of initiation signal. o Contacts RP to start SWP*RE23A(B). o Throttles open SWP*MOV33 (B) to establish flow not to exceed 7400 gpm – may be required to start 5th service water pump (post LOCA). • Monitors for improving containment parameters
Termination Cue: Containment pressure is decreasing and RPV level and pressure are being controlled.	

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

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

N2-SOP-30 - CONTROL ROD DRIVE FAILURES

EVENT DESCRIPTION

See Section 1.0.

IF	THEN
• 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,	**SCRAM** the reactor per N2-SOP-101C.
• RPV pressure is <900 psig AND • Any withdrawn control rod has an inoperable accumulator AND • Charging Water Header Pressure < 940 psig,	

Is RDS pump operating?

- Yes → Perform any or all of the following as required to restore charging water pressure:
  - Place standby pump in service per N2-OP-30, Section F.2.0.
  - Place standby discharge filter in service per N2-OP-30, Section F.3.0.
  - Place standby suction filter in service per N2-OP-30, Section F.1.0.
  - Verify charging header integrity.
  - Verify open 2RDS*V28.

  → WHEN charging water header pressure has been restored above 940 psig, exit this procedure.
- No →

IF	THEN
Annunciator 602324, RWCU PUMP CLG WTR TEMP HIGH, is received.	Remove WCS from service as follows: 1. Throttle WCS*MOV200 until in service filters on hold. 2. Trip WCS pumps.
An RDS pump can NOT be restored to service within 15 minutes OR indications of system breech exist.	Isolate RDS backfill by closing 2RDS-V20 (preferred) OR 2RDS-V2058.

- Shift 2RDS-FC107 (RDS flow controller) to Manual.
- Close FCV to minimum position.

NOTE: RDS backfill isolation valves are located on RB El. 215' in the RDS pump area. 2RDS-V20 is in the overhead between the RDS pumps. 2RDS-V2058 is above the center of 2CES-RAK103.

Was trip caused by low suction pressure?

- Yes → IF required, swap RDS suction filters per N2-OP-30, Section F.1.0.
- No →

Start a RDS pump.

WHEN a RDS pump is running, perform the following:

1. Adjust RDS flow using 2RDS-FC107 to approximately 63 gpm.
2. Place 2RDS-FC107 in Auto.
3. IF WCS OR RPV backfill was removed from service, THEN restore per SSS/CRS.
4. Verify WCS/RCS seal flows and backfill flows per N2-OP-30, Sections F.2.5 through F.2.9.

N2-SOP-68 - LOSS OF STATOR WATER COOLING

NOTE: Runback may be indicated by the following:

- Load set motor lowering
- TBVs open
- Generator Auxiliaries Trouble (851112)
- Comp Pt GMCBC07, GEN PROT CKT ENERGIZED

EVENT DESCRIPTION
See Section 1.0.

IF	THEN
A Generator Runback is in progress,	• Reduce power per N2-SOP-101D to maintain Turbine Bypass Valves closed. • Start the standby GMC pump. • Lower Generator VARS to approx. 0.
Reactor power has been reduced to minimum (Recirc flow approx. 55 mlbm) AND the runback has NOT cleared,	Trip the Turbine per N2-SOP-21.
A complete loss of GMC system has occurred,	
Turbine has tripped,	Exit this SOP AND recover GMC per N2-OP-26.

NOTE: Turbine Trip occurs:

- 2 minutes after the runback is initiated and Generator load is greater than approx. 1007 MWe.
- 3.5 minutes after the runback is initiated and Generator load is greater than approx. 283 MWe.

Dispatch personnel to GMC skid to check local indications for possible cause.

Did the Generator Runback stop?

- No → Return to IF
- Yes ↓

Continue power reduction per N2-SOP-101D UNTIL ALL Turbine Bypass Valves are closed.

- Verify proper operation of GMC system per N2-OP-26, Section F.1.0.
- Determine cause of the runback.

WHEN the cause of the Generator Runback has been corrected:

- Press the INCREASE pushbutton on the LOAD SELECTOR UNTIL approx. 1350 MWe is indicated on the LOAD SET METER.
- Exit this procedure.

N2-SOP-03 - LOSS OF AC POWER

LOSS OF 2NPS-SWG001(003) AND/OR NNS-SWG014(015)

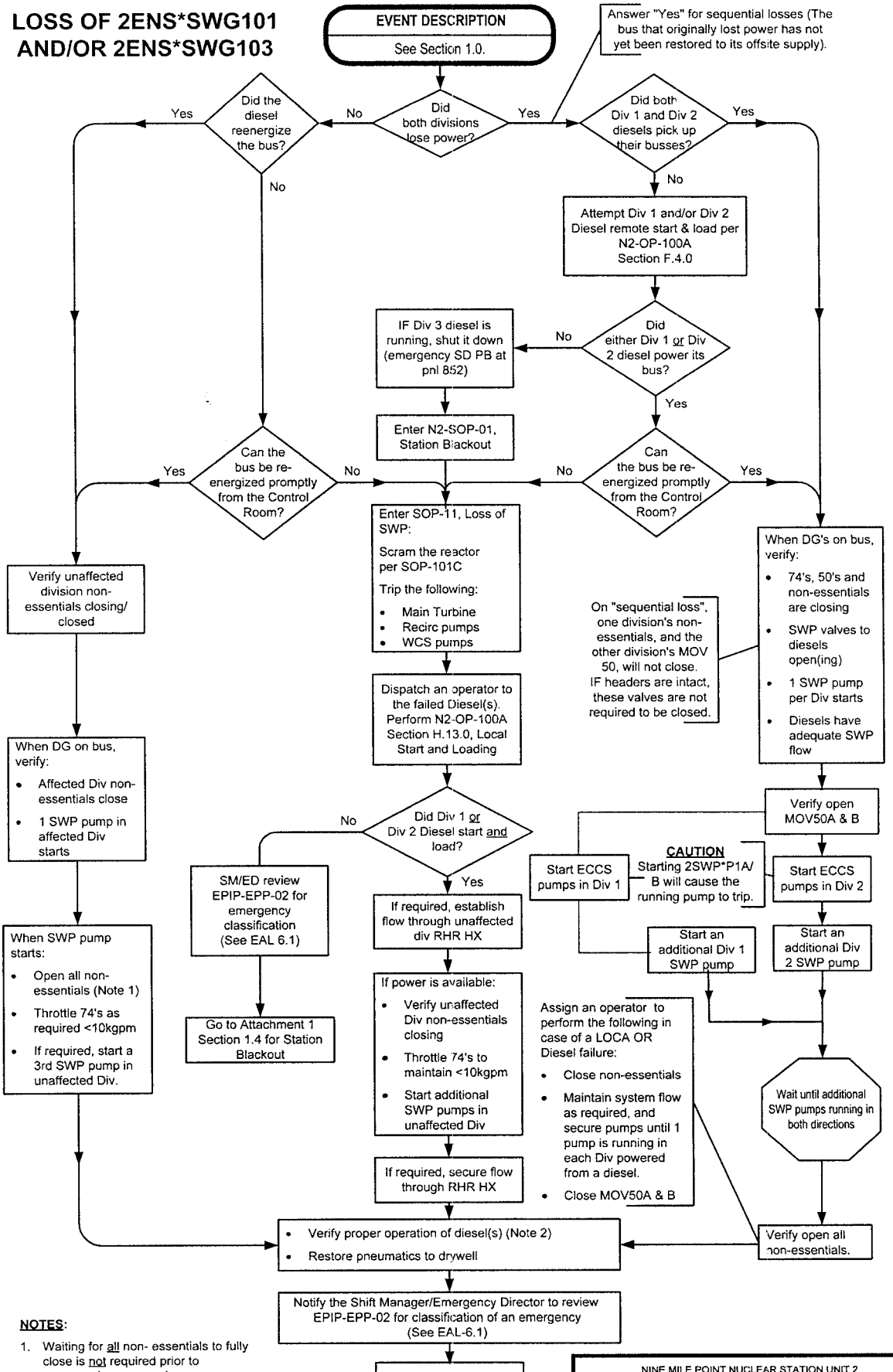
EVENT DESCRIPTION
See Section 1.0.

IF	THEN
A CRD pump was lost,	Enter N2-SOP-30.
A Recirc. pump was lost,	Enter N2-SOP-29.
A MSOP pump was lost,	Enter N2-SOP-68.
An IAS compressor was lost,	Enter N2-SOP-19.
A half scram occurred,	Enter N2-SOP-97.
A total loss of condensate flow occurred,	Close all 2CND-V13* AND 2CND-V18* valves.

Perform Attachment 1 Section 1.6

N2-SOP-03 - LOSS OF AC POWER

LOSS OF 2ENS*SWG101 AND/OR 2ENS*SWG103



NOTES:

1. Waiting for all non- essentials to fully close is not required prior to commencing re- opening.
2. Voltage ~ 4160V Frequency ~ 60 hz
   SWP flow ≥ 780gpm D1/2 ≥ 650gpm D3

ATTACHMENT 9: ENERGIZING 2NNS-SWG015 (STUB BUS)

NOTE: The following steps are performed at Panel 852 UNLESS otherwise noted.

9.1 Prerequisites

9.1.1 PRIOR to executing the following steps, power must be available from one of the following sources:

- 2NPS-SWG003 (Attachment 7)
- 2ENS*SWG103 (Division II Emergency Switchgear) (Attachment 8)

9.1.2 Attachment 1 Section 1.6 Fault Identification and Isolation is complete.

9.1.3 Upon completion of Attachment 9, return to Attachment 1 Section 1.7 as appropriate to restore power to the plant.

9.1.4 At Panel 804 (CB 288'), verify reset 86-2NNSY15 (4.16KV BUS NNS-015 PROTECTION LOCKOUT RELAY)

9.2 Energizing 2NNS-SWG015 (Stub Bus) from 2NPS-SWG003

N/A, 2NNS-SWG015 will NOT be energized from 2NPS-SWG003 .....(__)

9.2.1 Verify closed 3-6.

9.2.2 Close 15-3.

9.2.3 Return to Attachment 1 Section 1.6.

9.3 Energizing 2NNS-SWG015 (Stub Bus) from 2ENS*SWG103

N/A, 2NNS-SWG015 will NOT be energized from 2ENS-SWG003 .....(__)

****

CAUTION

Energizing 2NNS-SWG015 from 2ENS*SWG103 WHEN the Div II Diesel is supplying the bus is NOT permitted during a LOCA.

****

9.3.1 Place 15-3 in Pull-to-Lock.

NOTE: The following step requires a PA 2235 Key located in the CSO's desk.

9.3.2 IF 2NNS-SWG015 is needed for SBO recovery, THEN at Panel 852, place the Div II LOCA SIGNAL BYPASS switch to ON.

9.3.3 Do NOT exceed the emergency diesel generator rating, 4400 KW (4840 KW 2 hour limit) WHEN re-energizing STUB Bus 2NNS-SWG015.

9.3.4 At 2ENS*SWG103 (CB 261'), verify reset 86-2ENSY12. (Breaker 103-8)

9.3.5 Close 103-8.

9.3.6 Close 15-8.

9.3.7 Return to Attachment 1 Section 1.6.

N2-SOP-13 - LOSS OR DEGRADED CCP SYSTEM

EVENT DESCRIPTION
See Section 1.0.

NOTE: Trip of WCS pumps may NOT be immediately required if the station is in Mode 4/5.

IF	THEN
All CCP pumps have tripped AND none can be re-started,	• **SCRAM** the Reactor per N2-SOP-101C. • Trip BOTH Recirc pumps AND enter N2-SOP-29. • Trip WCS pumps if required.
SWP supply to the Reactor Bldg. is isolated AND can NOT be promptly restored,	
CCP system conditions have degraded to the point that systems loads will NOT have adequate cooling,	

IF	THEN
A standby CCP pump failed to auto start,	Attempt to manually start the pump.
An RHS pump is operating,	Shift seal cooling to SWP per N2-OP-13, H.7.0.
The CCP expansion tank is found empty,	Recover per N2-OP-13, E.1.0.

At least 1 main AND booster pump operating?

- Yes → (skip)
- No → **WAIT** until 1 main AND 1 booster pump are AVAILABLE.
  → Perform Attachment 2 to restart pumps.

Is cooling capacity degraded?

- No → (skip)
- Yes →
  - Monitor system loads (**Detail A**).
  - Secure loads as required.

IF	THEN
WCS must be removed from service,	1. Throttle WCS*MOV200 until the filters are in hold. 2. Trip WCS pump(s).

Perform any of the following as required to stabilize the CCP system:

- Place standby main/booster pump in service per N2-OP-13, F.2.0/F.4.0.
- Place standby heat exchanger in service per N2-OP-13, F.7.0.
- Place CCP-TIK108, RBCLC HEAT EXCHANGER TEMP CONTROLLER in MANUAL AND maintain CCP temperature 80 - 85°F.
- Take local control of CCP-TV108 per N2-OP-13, H.3.0.

WAIT until CCP cooling is restored/ stabilized.

- Verify system operating per N2-OP-13, F.1.0.
- Verify CCP-TIK108, RBCLC HEAT EXCHANGER TEMP CONTROLLER to AUTO.
- Verify CCP-TV108 local control restored to Auto per N2-OP-13, H.3.0.

Detail A - Major System Loads

- WCS System
- Recirc Pump Cooling
- Drywell Cooling
- SFC HXs
- IAS Mini Loop HXs
- Equipment Drain Cooling
- RDS Pump Cooling
- Sample System Cooling

N2-SOP-60 - LOSS OF DRYWELL COOLING

EVENT DESCRIPTION

See Section 1.0.

- Monitor Drywell temperature.
- Monitor Drywell pressure.

IF	THEN
Drywell cooling can NOT be restored,	• Attempt to maintain drywell pressure per N2-OP-61A. • Evaluate Tech Spec 3.6.1.5, Drywell Temperature. • IF required, commence a normal plant shutdown.
Drywell pressure is expected to exceed 1.68 psig,	Enter N2-SOP-101C, Reactor Scram.

Are Drywell Cooling Isolation Valves closed?

- Yes → **Restore Cooling**
- No → **Restore Fans Only**

IF	THEN
The Drywell Cooling Isolation Valves can NOT be opened,	Continue in Fans Only leg.

A

IF	THEN
CCP cooling becomes available,	Enter the Restore Cooling leg at A

1. Place **ONLY** the following switches in OVERRIDE as necessary to re-open isolated valves:
   - For 2CCP*MOV265/2CCP*MOV124 – DRYWELL UNIT COOLER WTR DIV I LOCA OVERRIDE
   - For 2CCP*MOV273/2CCP*MOV122 – DRYWELL UNIT COOLER WTR DIV II LOCA OVERRIDE
2. Verify closed the CCP inlet isolation valves for ALL Drywell Unit Coolers.
3. As required, verify open the following:
   - 2CCP*MOV265 • 2CCP*MOV273
   - 2CCP*MOV122 • 2CCP*MOV124
4. Verify open the following:
   - 2CCP-MOV1A • 2CCP-MOV1B
   - 2CCP-MOV1C • 2CCP-MOV1D
   - 2CCP-MOV2A • 2CCP-MOV2B
   - 2CCP-MOV2C • 2CCP-MOV2D
   - 2CCP-MOV3A OR MOV3B
5. Verify DRS Unit Cooler Fans operating:
   - 2DRS-UC1A • 2DRS-UC1B
   - 2DRS-UC1C • 2DRS-UC1D
   - 2DRS-UC2A • 2DRS-UC2B
   - 2DRS-UC2C • 2DRS-UC2D
   - 2DRS-UC3A OR UC3B

This step defeats containment isolation signals. TS 3.3.6.1 AND TS 3.6.1.3 should be evaluated.

1. Place the following in OVERRIDE as required:
   - UNIT COOLER FANS GR1 LOCA OVERRIDE
   - UNIT COOLER FANS GR2 LOCA OVERRIDE
2. Verify DRS Unit Cooler Fans operating:
   - 2DRS-UC1A • 2DRS-UC1B
   - 2DRS-UC1C • 2DRS-UC1D
   - 2DRS-UC2A • 2DRS-UC2B
   - 2DRS-UC2C • 2DRS-UC2D
   - 2DRS-UC3A OR UC3B

WHEN conditions are corrected, verify the following:
1. DRS operating per N2-OP-60.
2. ALL OVERRIDE switches have been restored.

N2-SOP-11 LOSS OR DEGRADED SWP SYSTEM

EVENT DESCRIPTION

See Section 1.0.

NOTE: Trip of WCS pumps may NOT be immediately required if the station is in Mode 4/5.

A

NOTES:
EALs to Evaluate
- 8.4.3, Intake level < 237 ft
- 8.4.7, Intake level < 233 ft

Evaluate Tech Spec 3.7.1 for Service Water and Ultimate Heat Sink.

IF	THEN
All SWP pumps have tripped AND none can be re-started,	• **SCRAM** the Reactor per N2-SOP-101C. • Trip the Turbine per N2-SOP-21. • Trip BOTH Recirc pumps AND enter N2-SOP-29. • Trip WCS pumps, if required.
SWP Non-Essential Headers are isolated AND can NOT be restored,	
SWP intake can NOT be restored AND maintained above 233 ft,	

IF	THEN
All SWP pumps have been tripped for APPROX. 1 minute or less AND a pump is available,	Start the available SWP pump.
SWP pump flow is GREATER THAN 10,000 gpm,	Throttle SWP*MOV74s as required to maintain pump flow LESS THAN 10,000 gpm.
Additional SWP flow is required,	Start additional SWP pumps.
Pump flow can NOT be maintained above low flow alarm,	Throttle SWP flow through an RHR HX as required.

IF	THEN
The SWP non-essential header isolation valves have closed AND loss of power is NOT the cause,	Continue Below

1. Verify at least one SWP pump operating per division.
2. Verify open:
   - SWP*MOV50A
   - SWP*MOV50B
3. Open Non-Essential Header isolation valve(s).
4. Start additional SWP pumps as required.

IF	THEN
NO SWP pumps are in service,	WAIT until a SWP pump is available before continuing.

IF	THEN
It is suspected that the system is NO longer full,	Recover per N2-OP-11, E.1.0

Restore SWP flow as follows:

1. Verify pump/strainer are full by observing strainer dp of 0.25 to 0.5 psid.
2. De-energize SWP*MOV74 for the pump to be started.
3. Verify the non-essential headers are isolated.
4. IF restoring both divisions of SWP, THEN open SWP*MOV50A/B.
5. Station an operator to manually open SWP*MOV74 for the pump to be started.
6. Start the SWP pump.
7. Throttle open SWP*MOV74 to establish > 2000 gpm.
8. Energize SWP*MOV74.
9. Start additional pumps per N2-OP-11, E.2.0.

- 2SWP*MOV74A(C,E) 2EHS*MCC101-2B(2D,3B)
- 2SWP*MOV74B(D,F) 2EHS*MCC301-2B(2D,3B)

IF	THEN
Intake Bay level is LESS THAN 238 ft,	Verify open SWP*MOV30A/B.
Intake Bay level is LESS THAN 234 ft,	Verify open SWP*MOV77A/B.

As required:
- Verify proper operation of traveling screens per N2-OP-12.
- Clean trash racks per N2-OP-12.
- Trip the Jet Motive Pump (SWP-P3)

WAIT until intake level can NOT be restored AND maintained above 233 ft.

IF	THEN
SWP pumps are cavitating,	Throttle SWP*MOV74's as needed to stabilize OR trip the pump.

If required, lower SWP flow as follows:
- Isolate the Turbine Bldg. SWP Header.
- Isolate the Reactor Bldg. SWP Header.

WAIT until intake level has been restored above 238 ft.

Re-enter at **A** to restore pumps/headers.

N2-SOP-101D - RAPID POWER REDUCTION

Immediate Actions Shadowed

EVENT DESCRIPTION
See Section 1.0.

IF	THEN
MFLCPR is greater than 0.95,	BEFORE power is lowered to < 75%, begin inserting the first four CRAM rods PRIOR to further Recirc flow reduction.

IF	THEN
Further power reductions are required WHILE executing this procedure,	Re-enter at this point
Core flow is <54 mlbm/hr,	Enter N2-SOP-29, Sudden Reduction in Core Flow, and perform concurrently

Lower Reactor power by using Recirc flow AND/OR CRAM rods.

Determine Reactor Rodline AND monitor core thermal limits.

Reactor power ≤ 65%.

Yes

- Verify clean steam reboiler auto transfer to Aux Steam.
- Verify HVH steam supply auto transfer to Aux Steam.
- Verify sufficient Cond Demins in service per N2-OP-5.
- Place HDL pumps in recirc per N2-OP-8, G.1.0.

No

As required, continue with N2-OP-101C(101D,101A).

NOTE: If cram rods cannot be inserted due to equipment failures but power reduction below 75% is required, then attempt to maintain 1/2% (17 MWth) per minute power reduction, if possible, and immediately notify Rx Eng.

NOTE:

The following actions are typically performed for down power evolutions:

- ❑ Update rodline notice at panel 2CEC*PNL603.
- ❑ Notify Central Regional Control (315-460-2421).
- ❑ Notify Constellation dispatcher (410) 468-3750.

(EOP)

N2-SOP-101C - IMMEDIATE AND GENERAL ACTIONS

EVENT DESCRIPTION
See Section 1.0.

Immediate Actions Shadowed

IF	THEN
Automatic Scram is anticipated AND time permits,	Reduce Recirc Flow to 55 mlbm/hr per N2-SOP-101D.
Mode switch is NOT in REFUEL position,	Place MODE Switch to SHUTDOWN position.
RPS is NOT tripped,	Arm AND depress BOTH Manual Scram pushbuttons on either side of 2CEC*PNL603.

Verify automatic responses.

(C1)
- ❑ 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	THEN
All feedwater pumps have tripped,	Place ALL 2FWS-LV10 and LV55 controllers to "manual" and verify the valves are full closed.

IF	THEN
The Reactor scram can be promptly reset (and remain reset),	Reset the scram.
The Reactor scram CANNOT be reset,	Close 2RDS-V28 if directed by the SSS/CRS.

Reset the scram as follows:
1. Notify radwaste to operate all pumps for 2DER-TK2A.
2. Place all four SDV high level bypass switches to BYPASS.
3. IF intiated, reset ARI per N2-OP-36B, H.3.0.
4. Using scram reset switches, reset the scram; verify all 8 pilot solenoid lights lit.
5. Reseat rods if necessary by applying insert signal.
6. Verify SDV vent and drain valves open.

Notify the Shift Manager/Emergency Director to review EPIP-EPP-02 for classification of an emergency.

Perform Concurrently

A — Continue with "Level Control" flowchart.

WHILE continuing, 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.

B — Continue with "Pressure Control" flowchart.

IF	THEN
WCS is in one pump three filter lineup,	Throttle close 2WCS*MOV200 (AND if required, throttle open 2WCS-M0V110) to obtain approximately 225 gpm WCS flow.
Outside temperature is <50 degrees,	1. If required, isolate the Reactor Building by placing 2HVR*AOD1A (OR *AOD1B) to close AND verify the following: • Reactor Building ventilation isolates • GTS starts 2. Perform N2-OP-52 actions for Reactor Building isolation (Sections H.1.0, H.5.0).

N2-SOP-101C - LEVEL CONTROL

A

Objective
Stabilize and control level at 178 - 183" (or as directed by EOPs) with feedwater in auto (preferred) or manual.

IF	THEN
Feed pump restart is required,	Restart feed pump per **Detail 1**.
Level CANNOT be maintained <250",	Close ALL MSIVs AND open the following to maintain level <255": ❑ MSS*MOV207 ❑ MSS*MOV111 ❑ MSS*MOV112 (2EHS*MCC102-7A, 240' NAB)
Level control is lost,	Re-enter at A

Stabilize RPV level using ANY of the following:
- ❑ Feed and Condensate
- ❑ RCIC
- ❑ CRD
- ❑ HPCS

Master FWS Controller thumbwheel tape setting has no effect until setpoint setdown is reset

As required, perform the following to establish ordered level band:
- ❑ Close 2FWS-LV10A/B/C.
- ❑ IF 2 feedpumps are running, trip one feedpump ("C" preferred).
- ❑ As required, close the following valves:
  - 2FWS-MOV47A/B/C
  - 2FWS-LV55A/B
  - 2CNM-LV137
  - 2FWS-MOV21A/B
  - 2FWS-V103A/B
  - 2ZIP-V10/11
- ❑ Establish WCS reject per N2-OP-37.
- ❑ Reset Reactor scram per General Actions flowchart.

WHEN RPV level is stable, THEN continue.

As required, perform the following:
- ❑ Reset setpoint setdown per **Detail 2**.
- ❑ Reset PAM recorders.
- ❑ Continue with N2-OP-101C, Section G.3.0.

IF required, place FWLC in single element.
1. Place FWLC in manual.
2. Place 1 Element/3 Element control switch in 1 Element.
3. If required, restore FWLC to auto.

Detail 2

Reset Setpoint Setdown
1. Verify Rx level stable above Level 3 (159.3").
2. Null FWS Master Controller by rotating the thumbwheel until the red process pointer is in the green band.
3. Depress the SETPOINT SETDOWN RESET pushbutton AND confirm amber light is extinguished.
4. Verify proper automatic control in the desired band.

Detail 1

FWS Pump Restart

Is at least 1 condensate pump running?
- No → Condensate and Feedwater injection is unavailable.
- 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 .

Start feedwater pump as follows:
1. Confirm suction pressure > 500 psi.
2. Verify aux oil pump running.
3. Place pump switch to red flag.
4. WHEN 2FWS-FV2A/B/C ~ 15% open, confirm pump start.
5. Confirm flow ~ 8000 gpm.
6. Inject with 2FWS-LV55A/B (open 2FWS-V103A/B if required) OR verify open 2FWS-MOV47A/B/C AND inject with 2FWS-LV10A/B/C as required.
7. IF required, reset setpoint setdown per N2-OP-3, H.1.0.
8. For automatic control, refer to N2-OP-3, H.9.12 OR H.9.13.
9. Verify aux oil pump stops.

N2-SOP-101C - PRESSURE CONTROL

B

Objective
- Pressure controlled within prescribed band.
- Cooldown rate <100 degrees per hour (RPV pressure >420 psig for first hour).

IF	THEN
Pressure control is lost,	Re-enter at B
MSIVs are closed AND the Main Condenser is available,	WHEN desired, re-open the MSIVs per N2-OP-1, Section H.4.0 AND use the Main Condenser to control pressure.

Perform Concurrently

Control pressure (cooldown rate) within the ordered band using any of the following:
- Main Condenser using TBVs
  - Use EHC pressure set OR bypass valve opening jack.
  - Initiate condenser neck spray by opening 2CNM-MOV126.
- SRVs
- RCIC
- Steam Condensing

As required to control cooldown rate, perform the following:
- Close 2MSS-AOV87A/B/C/D and AOV88A/B.
- IF time permits, swap gland seal to main steam per N2-OP-25, Section F.2.0 OR H.3.0.
- Close 2ASS-MOV152.
- Start 2ARC-P1A(B) as follows:
  1. Confirm no fuel damage.
  2. Close 2ARC-AOV104.
  3. Place in AUTO 2ARC-AOV105.
  4. Open 2SWP-HV98A(B).
  5. Start 2ARC-P1A(B).
  6. Verify proper operation per N2-OP-9, Section F.1.1.
- Close 2ASS-AOV148.
- Fast close outboard MSIVs. (C3,4,5,6,9)

WHEN pressure control is stable OR appropriate cooldown rate has been established, THEN continue.

Continue with pressure control actions per N2-OP-101C, G.3.0.