

**PP&L-SUSQUEHANNA  
TRAINING CENTER**

**SIMULATOR SCENARIO**

**Scenario Title:** NRC INITIAL LICENSE OPERATOR EXAMINATION

**Scenario Duration:** 2 Hours

**Scenario Number:** NRC0201

**Revision/Date:** Rev 0, 4/1/2002

**Course:** PC017, NRC Initial License Operator Examination

**Operational Activities:**

- |   |  |
|---|--|
| <ol style="list-style-type: none"> <li>1. D/G Surveillance</li> <li>2. Breaker 1A20204 Trip</li> <li>3. Trip of RPS MG A</li> <li>4. Control Rod Scram</li> <li>5. Stuck Control Rod</li> </ol> | <ol style="list-style-type: none"> <li>6. Power reduction for Stuck Rod</li> <li>7. Leak in Drywell</li> <li>8. HPCI Auto Start Failure</li> <li>9. MSL Rupture Inside Drywell</li> <li>10. Drywell Spray Valve Failure</li> </ol> |
|---|--|

**Prepared By:**

*[Signature]*  
Instructor

6/13/02  
Date

**Reviewed By:**

*[Signature]*  
Nuclear Operations Training Supervisor

6/13/02  
Date

**Approved By:**

*[Signature]*  
Supervising Manager/Shift Supervisor

7-29-2002  
Date

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## SCENARIO SUMMARY

The scenario begins with both Units at 100% power EOL. RCIC system is out of service due to oil system contamination. D/G 'B' is running and synchronized to Bus 1B IAW SO-024-001. D/G run time requirements have been met, the crew will unload and shutdown D/G 'B' IAW SO-024-001. When D/G load is reduced to  $\approx 1000\text{KW}$ , output breaker 1A20204 will trip open resulting in D/G 'B' being declared inoperable per Technical Specification 3.8.1.

An RPS MG set 'A' shaft seizure results in RPS bus 1Y201A de-energizing and a concurrent scram of rod 42-27 to position 10. The RPS bus loss results in isolation system actuation and half scram condition requiring transfer to alternate power source. The critical component is the Reactor Recirculation Pump motor cooler affected by isolation of chilled water. Rod 42-27 will be stuck at position 10, Off-Normal procedures require a 20% power reduction if the rod is not capable of being inserted to position 00.

Following the power reduction a small leak develops in the primary containment. The crew should perform scram imminent actions and manually scram the reactor. HPCI will fail to auto-start, requiring the crew to perform a component by component start of the system for injection. After the reactor scram the break size increases in main steam line A requiring entry into Emergency Operating Procedures for RPV Control and Primary Containment Control. Plant Aux Load Shed will result in loss of condensate and feedwater injection. The leak size will allow the crew to maintain RPV water level above TAF during the transient. The crew will initiate Suppression Chamber Sprays, when Suppression Chamber pressure exceeds 13 psig, Drywell Sprays are required. When drywell sprays are attempted the Drywell spray valve A(B) will fail to open. This will require the crew to shift to the other loop to spray the Drywell.

When Drywell Spray has been performed and actions are in progress to restore RPV water level to +13" to +54", the scenario will be terminated.

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## SCENARIO OBJECTIVES

### The SS/US will:

1. Shut down the Reactor when it is determined Reactor safety is in jeopardy, or when operating parameters exceed any RPS setpoint and scram does not occur (00.AD.131).
2. Ensure initiation of ESF equipment if automatic operation was not properly initiated (00.AD.131).
3. Inform other shift members and plant management of changes in plant status, potential problems or limitations (00.AD.131).
4. Implement appropriate portions of Reactivity Management and Controls program (00.AD.047).
5. Implement control of LCOs, TROs, and Safety Function Determination program (00.AD.273)
6. Ensure that required actions per Technical Specifications are met when a LCO is not met (00.TS.002).
7. Implement Appropriate Portions of the Diesel Start Log (24.AD.001).
8. Implement Loss of RPS (58.ON.004).
9. Implement Alarm Response procedures (00.AR.005).
10. Implement Rod Drift (55.ON.013).
11. Perform a 10% Power Change with Rods/Recirc Flow (00.GO.012).
12. Implement Scram (00.ON.018).
13. Implement Containment Isolation (59.ON.006)
14. Implement RPV Control (00.EO.026).
15. Implement Primary Containment Control (00.EO.027).

### The PCOs will:

1. Perform Monthly Diesel Generator Operability Test (24.SO.002).
2. Perform Offsite Power Source and Onsite Class 1E Operability Test (24.SO.001).
3. Implement Appropriate Portions of the Diesel Start Log (24.AD.001).
4. Implement Alarm Response procedures (00.AR.005).
5. Implement Loss of RPS (58.ON.004).
6. Implement Rod Drift (55.ON.013).
7. Perform a 10% Power Change with Rods/Recirc Flow (00.GO.012).
8. Implement Scram (00.ON.018).
9. Perform HPCI manual startup (52.OP.002).
10. Perform maximizing CRD flow (55.OP.001).
11. Implement RPV Control (00.EO.026).
12. Implement Primary Containment Control (00.EO.027).
13. Perform RHR Operation in Containment Suppression Pool Sprays (49.OP.004).
14. Perform LPCI injection through heat exchanger (49.OP.013)

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**CRITICAL TASKS**

- ★ Sprays the Drywell when Suppression Chamber exceeds 13 psig.
- ★ Limits Drywell Spray flow to between 1000 and 2800 gpm for the first 30 seconds.
- ★ Maintain RPV water level above -161" with available injection sources.

- ★ Denotes Simulator Critical Task

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SCENARIO REFERENCES

1. D/G SURVEILLANCE – BREAKER 1A20204 TRIP

SO-024-001B MONTHLY DIESEL GENERATOR OPERABILITY TEST  
OP-024-005 DIESEL GENERATOR START LOG  
OI-024-004 DIESEL GENERATOR OPERATING LOG  
SO-024-013 OFFSITE POWER SOURCE AND ONSITE CLASS 1E OPERABILITY TEST  
T.S. 3.8.1 AC SOURCES – OPERATING  
AR-015-D13 DG B SUPPLY BKR TO BUS 1B/2B TRIP  
OP-AD-004 OPERATIONS STANDARDS FOR ERROR AND EVENT PREVENTION

2. TRIP OF RPS MG SET 'A'

ON-158-001 LOSS OF RPS

3. ROD 42-27 SCRAM TO POSITION 10, STUCK CONTROL ROD, 20% POWER REDUCTION

ON-155-001 CONTROL ROD PROBLEMS  
T.S.3.1.3 CONTROL ROD OPERABILITY  
CORE REACTIVITY CONTROL BOOK  
GO-100-012 POWER MANEUVERS

4. SMALL LEAK IN DRYWELL

ON-100-101 SCRAM  
OP-152-001 HPCI SYSTEM

5. MSL 'A' RUPTURE INSIDE DRYWELL

EO-000-102 RPV CONTROL  
EO-000-103 PRIMARY CONTAINMENT CONTROL  
OP-149-004 RHR SYSTEM OPERATION IN CONTAINMENT SPRAY MODE  
AR-112-D03 DW/SUPP CHAMBER HI/LOW PRESSURE  
AR-104-B03 PRI CONTAINMENT HI/LOW PRESSURE

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**SCENARIO SPECIAL INSTRUCTIONS**

1. Initialize the simulator to IC-20, both units at 100% power EOL.
2. Set up the simulator for the scenario by performing the following:
  - a. Start 'A' and 'B' ESW pumps.
  - b. Start up and load D/G 'B' to 4KV Bus 1A202 IAW SO-024-001.
  - c. Raise load to  $\approx$ 3800 KW.
  - d. Remove RCIC from service:
    - Close and status control pink tag RCIC F007 & F008.
    - Place the RCIC Div  $\frac{1}{2}$  out of service switches to INOP.
    - Place the controller in MAN set @ '0'.
    - Depressurize the steam supply line by opening F054, then re-close.
3. Type `restorepref YPP.NRC0201`; verify the following pre-inserts and Program Button assignments. Also verify that the Environment Window shows 0 Event Trigger active.
  - `bat RCB.RCICOOS` SIMULATES RCIC OUT OF SERVICE
  - `bat HPB.HPCIFAIL` HPCI FAILURE TO AUTO START
  - `IMF MV07:HV151F021A 0` RHR F021A FAILED CLOSED
  - `IMF MV07:HV151F021B 0` RHR F021B FAILED CLOSED
  - `[P-1] IMF BR03:1A20204` BREAKER 1A20204 TRIP
  - `[P-2] bat YPB.NRC0201A` RPS MS SET 'A' TRIP, ROD 42-27 SCRAM TO POSN 10
  - `[P-3] MRF RM179024 RESET` MSL RAD MON 'A' RESET
  - `[P-4] MRF RM179026 RESET` MSL RAD MON 'C' RESET
  - `[P-5] IMF RR164010 1 4:00` SMALL LEAK INTO DRYWELL
  - `[P-6] IMF 183007 5 0 0` MSL 'A' BREAK IN DRYWELL
  - `[P-7] DMF MV07:HV151F021A` RHR F021A FAILED CLOSED
  - `[P-8] DMF MV07:HV151F021B` RHR F021B FAILED CLOSED
4. Prepare a turnover sheet indicating:
  - a. Both Units are at 100% power EOL.
  - b. RCIC is out of service due to oil system contamination and will not be returned to service this shift.
  - c. D/G 'B' is running and synchronized to Bus 1B IAW SO-024-001. D/G run time requirements have been met, unload and shutdown D/G 'B' IAW SO-024-001.
  - d. ESW Pumps 'A' and 'B' are in service.
5. Prepare a markup copy of SO-024-001 up to step 6.1.17 s. (3) including a surveillance coversheet.
6. Prepare a markup copy of OP-024-005, Attachment A and place it in the D/G Start Log Book.
7. Prepare an LCO sheet indicating RCIC has been out of service for 12 hours due to oil system contamination.

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**SCENARIO EVENT DESCRIPTION FORM**

**Initial Conditions:** Initialize the Simulator to IC-20. Place the Simulator to RUN. Ensure the Program Buttons are assigned as indicated on the Special Instructions sheet via the appropriate Preference File. Assign Shift positions. Direct the start of the 5 minute panel walkdown.

EVENT	TIME	DESCRIPTION
1		UNLOAD AND SHUTDOWN 'B' EDG
2		BREAKER 1A20204 TRIP FOR 'B' EDG
3		TRIP RPS MG SET 'A'
4		CONTROL ROD 42-27 SCRAM TO POSITION 10
5		STUCK CONTROL ROD
6		POWER REDUCTION FOR STUCK ROD
7		SMALL LEAK IN DRYWELL
8		HPCI AUTO START FAILURE
9		MSL 'A' RUPTURE IN DRYWELL
10		DRYWELL SPRAY VALVE FAILURE

SCENARIO EVENT FORM

Event No: 1, 2  
 Brief Description: Unload and Shutdown 'B' EDG / Breaker 1A20204 Trip

POSITION	TIME	STUDENT ACTIVITIES
PCOP		Reduces 'B' DG load to 1000 KW to 380 KW.
		Recognize and reports breaker 1A20204 tripped.
		Dispatches a plant operator to breaker 1A20204 to investigate.
		Verifies Bus 1B remains energized.
		May refer to ON-104-202, LOSS OF 4 KV BUS 1B.
US		Contacts EM to investigate breaker problem.
		Refers to Technical Specification 3.8.1, Condition B.
		Declares D/G 'B' inoperable on Unit 1.
		Makes notifications IAW OP-AD-002, STANDARDS FOR SHIFT OPERATIONS.
		Directs performance of SO-024-013.
		May direct shutdown of D/G 'B' after 15 minutes cooldown is complete.
PCOP		When directed, performs a shutdown of D/G 'B'.

★ Denotes Critical Task

<b>NOTES:</b>	

**INSTRUCTOR ACTIVITIES, ROLE PLAY,  
AND INSTRUCTOR'S PERSONAL NOTES**

Event No: 1, 2

Brief Description: Unload and Shutdown 'B' EDG / Breaker 1A20204 Trip

**INSTRUCTOR ACTIVITY:**

Monitor the load decrease and trip breaker 1A20204 at  $\approx$ 1000 KW load or immediately following the load reduction, Depress P-1.

[P-1] IMF BR03:1A20204 OC TRIP ON BKR 1A20204

NOTE: D/G load will be reduced to a value between 1000 KW and 380 KW.

**ROLE PLAY:**

As plant operator dispatched to breaker 1A20204, wait 2 mins. and report the breaker is tripped. All other bus 1A202 conditions are normal.

As plant operator at the D/G, report the D/G is running unloaded and conditions are normal, standpipe high level is ONLY ALARM.

As Electrical Maintenance sent to breaker 1A20204, wait 2 mins. and report the breaker is tripped, appears to be related to Unit 1 breaker only, further investigation is required to determine why. We will inform you of any new information.

SCENARIO EVENT FORM

Event No: 3, 4, 5, 6  
 Brief Description: TRIP RPS MG SET 'A' / ROD 42-27 SCRAM TO POSITION 10 / STUCK ROD / POWER REDUCTION

POSITION	TIME	STUDENT ACTIVITIES
PCOM		Reports RPS half scram condition.
		Selects display rods drifting, identifies rod 42-27 as drifting.
		Selects rod 42-27 to monitor position, reports rod position.
		Identifies status light for scram valves open.
		Selects display scram valves open, identifies scram valves open on rod 42-27.
		Implements ON-155-001, CONTROL ROD PROBLEMS
US		Directs the implementation of ON-155-001, CONTROL ROD PROBLEMS.
		Directs PCO to fully insert rod 42-27 to position 00.
		Contacts Reactor Engineering.
		Contact FIN Team/Maintenance to investigate HCU and control rod 42-27.
PCOM		Attempts to insert rod 42-27 to position 00.
		Notifies US rod 42-27 did not insert, rod remains at position 10.
US		Direct PCO to reduce reactor power by 20% or reduce core flow to value specified in the CRC Book.
		Notifies Chemistry and Health Physics of power change.
PCOM		Reduces reactor power as directed by US.
		Plots power change on P/F map.

★ Denotes Critical Task

NOTES:	



**INSTRUCTOR ACTIVITIES, ROLE PLAY,  
AND INSTRUCTOR'S PERSONAL NOTES**

**Event No:** 3, 4, 5, 6

**Brief Description:** TRIP RPS MG SET 'A' / ROD 42-27 SCRAM TO POSITION 10 / STUCK ROD / POWER  
REDUCTION

**INSTRUCTOR ACTIVITY:**

When actions for breaker 1A20204 trip are complete, insert the loss of RPS MG Set 'A' and scram control rod 42-27 to position 10; Depress P-2.

[P-2] bat YPB.NRC0201A

**ROLE PLAY:**

As Reactor Engineer when contacted about the stuck rod a position 10, state I will run a monitor and take a look at core parameters for now. I need to get our options outlined and talk to some folks, then I'll get back to you.

As plant operator sent to HCU 42-27 wait 3 mins., report the scram valves appear open by local indication and the lines are hot.

As FIN Team/Maintenance sent to investigate rod 42-27 wait 10 mins., report a blown fuse was found and we are still investigating to find a cause. When we have completed our investigation I will call you.

SCENARIO EVENT FORM

Event No: 3, 4, 5, 6  
 Brief Description: TRIP RPS MG SET 'A' / ROD 42-27 SCRAM TO POSITION 10 / STUCK ROD / POWER REDUCTION

POSITION	TIME	STUDENT ACTIVITIES
PCOP		Identifies RPS MG Set 'A' power available light OFF.
		Dispatches plant operator to RPS MG Set 'A'.
		Implements ON-158-001, LOSS OF RPS.
US		Directs implementation of ON-158-001, LOSS OF RPS.
		Directs PCO to transfer to alternate power source.
		Directs PCO to monitor Reactor Recirc Pump motor temperatures.
PCOP		Transfers RPS 'A' to alternate power source.
		Directs plant operator to reset the MSL Rad Monitors 'A' & 'C'.
US		Directs PCO to reset RPS half scram on Div 1.
		Directs PCO to reset N4S isolation signals and restore RRP cooling.
PCOM		Resets RPS half scram.
PCOP		Resets N4S isolation logic.
		Resets and opens RBCW to RRP.

★ Denotes Critical Task

NOTES:	

**INSTRUCTOR ACTIVITIES, ROLE PLAY,  
AND INSTRUCTOR'S PERSONAL NOTES**

**Event No:** 3, 4, 5, 6

**Brief Description:** TRIP RPS MG SET 'A' / ROD 42-27 SCRAM TO POSITION 10 / STUCK ROD / POWER  
REDUCTION

**INSTRUCTOR ACTIVITY:**

When requested to reset the MSL Rad Monitors A & C, Depress P-3 and P-4.

[P-3] MRF RM179024 RESET

[P-4] MRF RM179026 RESET

**ROLE PLAY:**

As plant operator sent to RPS MG Set, wait 2 mins. and report the area smells of something hot, the motor is to very hot to the touch. The normal source EPA breakers are open.

**SCENARIO EVENT FORM**

Event No: 7  
 Brief Description: SMALL LEAK INTO DRYWELL

POSITION	TIME	STUDENT ACTIVITIES
PCO		Recognizes/reports increasing Drywell pressure/temperature.
		Recognizes/reports AR-112-D03, DRWL/SUPP CHAMBER HI-LO PRESS.
US		Directs monitoring Primary Containment parameters.
		Directs performance of scram imminent actions.
		Directs manual scram before drywell pressure exceeds 1.72 psig.
PCOM		Performs scram imminent actions.
		Decreases TCF to $\square 65$ mlbm/hr.
		Place reactor mode switch to Shutdown.
		Verifies all rods fully inserted except rod 42-27.
		Inserts SRM and IRM detectors.
		Implements ON-100-101, SCRAM.
PCOP		Performs scram imminent actions.
		Transfer Aux Buses 11A/11B to Tie-Bus.
US		Enters EO-000-102, RPV CONTROL when drywell pressure exceeds 1.72 psig. Also has entry condition due to $< +13$ " RPV Water Level
		Directs RPV water level be restored and controlled between $+13$ " and $+54$ " with available systems.

★ Denotes Critical Task

<b>NOTES:</b>	

**INSTRUCTOR ACTIVITIES, ROLE PLAY,  
AND INSTRUCTOR'S PERSONAL NOTES**

Event No: 7  
Brief Description: SMALL LEAK INTO DRYWELL

**INSTRUCTOR ACTIVITY:**

Following the 20% power reduction insert a small leak into the drywell , Depress P-5.

[P-5] IMF RR164010 1 4:00 SMALL LEAK INTO DW

- NOTE:
1. Drywell pressure will increase to 1.0 psig in  $\approx$ 3.5 mins. and 1.72 psig in  $\approx$ 4.5 mins.
  2. When plant aux load shed occurs injection from FW/Condensate is lost.

**ROLE PLAY:**

As necessary

SCENARIO EVENT FORM

Event No: 8, 9, 10

Brief Description: HPCI AUTO START FAILURE / MSL 'A' BREAK INSIDE DRYWELL / RHR F021 FAILURE

POSITION	TIME	STUDENT ACTIVITIES
PCOP		Reports HPCI system auto start failure when drywell pressure exceeds 1.72 psig.
		Performs component by component start up of HPCI system.
		Restores RPV water level with HPCI system.
★		Maintains RPV water level above -161" with available injection sources.
US		Enters EO-000-103, PRIMARY CONTRAINMENT CONYTR0L when drywell pressure exceeds 1.72 psig.
		Directs Suppression Chamber Sprays placed in service.
PCOM		Reports loss of feedwater and condensate systems.
PCOP		Reports rapid increase in drywell pressure and temperature.
		Reports decrease in RPV water level.
US		Directs alignment of injection sources as necessary to maintain RPV level above TAF.
		Directs alignment of RHR for Drywell Sprays when Supp Chamber exceeds 13 psig.
★		Directs Drywell spray flow limited to between 1000 and 2800 gpm for first 30 seconds.
PCOP		Reports failure of Drywell spray valve, RHR F021.
US		Directs other loop of RHR placed in service for Drywell sprays.
		Request maintenance support as necessary.

★ Denotes Critical Task

<b>NOTES:</b>	

**INSTRUCTOR ACTIVITIES, ROLE PLAY,  
AND INSTRUCTOR'S PERSONAL NOTES**

Event No: 8, 9, 10

Brief Description: HPCI AUTO START FAILURE / MSL 'A' BREAK INSIDE DRYWELL / RHR F021 FAILURE

**INSTRUCTOR ACTIVITY:**

Following the reactor scram insert a MSL 'A' break inside the drywell, **Depress P-6.**

**[P-6] IMF MS183007 5 0 0 MSL 'A' BREAK INSIDE DRYWELL**

After the crew addresses the failed RHR Containment Spray valve F021A or B and makes the decision to swap to the opposite loop of RHR, delete that loop's valve failure, **Depress EITHER:**

**[P-7] DMF MV07:HV151F021A** If A Loop is to be aligned.

**OR**

**[P-8] DMF MV07:HV151F021B** If B Loop is to be aligned.

**ROLE PLAY:**

As necessary.

SCENARIO EVENT FORM

Event No: 8, 9, 10

Brief Description: HPCI AUTO START FAILURE / MSL 'A' BREAK INSIDE DRYWELL / RHR F021 FAILURE

POSITION	TIME	STUDENT ACTIVITIES
PCOP		Shutdown DW coolers and RRP's as necessary.
		Aligns RHR for DW sprays.
★		Limits DW spray flow to between 1000 and 2800 gpm for first 30 seconds.
		Reports lowering DW pressure and temperature.
US		Directs sprays terminated before Drywell/Supp Chamber pressure drops to 0 psig.
PCOP		Terminates sprays before Drywell/Suppression chamber pressure drops to 0 psig.

★ Denotes Critical Task

<b>NOTES:</b>	



**INSTRUCTOR ACTIVITIES, ROLE PLAY,  
AND INSTRUCTOR'S PERSONAL NOTES**

Event No: 8, 9, 10

Brief Description: HPCI AUTO START FAILURE / MSL 'A' BREAK INSIDE DRYWELL / RHR F021 FAILURE

**INSTRUCTOR ACTIVITY:**

None.

**ROLE PLAY:**

As necessary.

**TERMINATION CUE:**

Drywell sprays have been initiated and actions are in progress to restore RPV water level to +13" to +54" the scenario will be terminated.

# UNIT SUPERVISOR TURNOVER SHEET

UNIT: 1

Date: July 30, 2002

SHIFT 1900 to 0700  
Start End

SHIFT 0700 to 1900  
Start End

MODE 1

MODE

POWER LEVEL 100 %

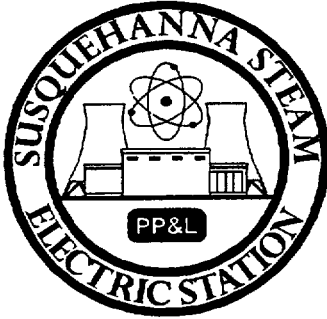
POWER LEVEL \_\_\_\_\_ %

GENERATOR OUTPUT 1150 MWe

GENERATOR OUTPUT \_\_\_\_\_ MWe

1. RCIC is out of service due to oil system contamination and will not be returned to service this shift.
2. D/G 'B' is running and synchronized to Bus 1B IAW SO-024-001. D/G run time requirements have been met, you are to unload and shutdown D/G 'B' IAW SO-024-001.
3. ESW Pumps 'A' and 'B' are in service.
4. Unit 2 is in MODE 1 at 100% power EOL.
5. Chemistry/Rx Engineering investigating Off Gas System spike observed during last Control Rod Exercising Surveillance.

COMMON:



**PP&L-SUSQUEHANNA  
TRAINING CENTER**

**SIMULATOR SCENARIO**

**Scenario Title:** NRC INITIAL LICENSE OPERATOR EXAMINATION

**Scenario Duration:** 2 Hours

**Scenario Number:** NRC0202

**Revision/Date:** Rev 0, 4/1/2002

**Course:** PC017, NRC Initial License Operator Examination

**Operational Activities:**

- |                                      |                               |
|--------------------------------------|-------------------------------|
| 1. Swap CRD Pumps                    | 6. ATWS                       |
| 2. Power Change 100 MWe              | 7. SBLC System Failure        |
| 3. RFPT Trip                         | 8. Main Turbine Trip          |
| 4. Recirc Drive Flow Instr Failure   | 9. RCIC Speed Control Failure |
| 5. Loss of CRD Flow/Inoperable Accum | 10. Loss of Aux Buses 11A/11B |

**Prepared By:**

Instructor

6/13/02  
Date

**Reviewed By:**

Nuclear Operations Training Supervisor

6/13/02  
Date

**Approved By:**

Per 7-29-02 HA [Signature]  
Supervising Manager/Shift Supervisor

7-29-2002  
Date

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## SCENARIO SUMMARY

The scenario begins with both Units at 100% power, EOL. The HPCI system is out of service for governor valve adjustments. The HPCI system will not be returned to service this shift. A minimum generation alert has been issued for the PJM network.

The crew will perform a swap of CRD pumps, Start 'B' and Stop 'A' to allow maintenance to record vibration data.

PCC will call for a 100MWe load decrease on Unit 1 due to a Minimum Generation Emergency. The crew will follow Reactor Engineering Instructions in the CRC Book to conduct the power decrease.

Following the power decrease 'A' RFP will trip. A Reactor Recirc limiter 2 runback will result in power lowering to  $\approx 65\%$ . The crew will implement Off-Normal procedures to stabilize the plant. The speed limiter will not be reset.

Reactor Recirc Flow Unit 'D' fails downscale resulting in a half scram and rod block condition. The crew will bypass the failed flow unit and remove it's input to the low flow auctioneer circuit. Technical Specifications will require declaring one of the two required APRM Flow Biased Simulated Thermal Power - High channels in Division 2 inoperable.

A loss of CRD occurs when the operating CRD Pump trips and the backup pump fails to start. Shortly after several CRD accumulators on withdrawn control rods are determined inoperable requiring the crew to manually scram the reactor.

When the reactor is scrammed, control rods will fail to insert due to a failure of RPS. When the crew injects SLC, the "A" SLC pump will start, but will eventually trip on over current. The "B" SLC pump-shaft will shear, resulting in no SLC injection. Division I ARI will fail, preventing ARI actuation. RPV water level will be lowered to control power and alternate methods of control rod insertion will be attempted.

When level is stabilized with feedwater, the Main Turbine will trip along with a loss of Aux Buses 11A and 11B and a subsequent loss of normal HP injection sources. When started, RCIC's speed control circuitry will fail at 1000 rpm and will be unrecoverable. With the unavailability of HPCI and RCIC, RPV water level will decrease to TAF requiring performance of Rapid Depressurization.

After Rapid Depressurization and subsequent RPV level restoration to >TAF, level will be restored and maintained with LPCI between -60" and -161". RPS fuses will be pulled and control rods will be fully inserted.

When all control rods are fully inserted and actions are in progress to restore RPV water level to +13" to +54", the scenario will be terminated.

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## SCENARIO OBJECTIVES

### The SS/US will:

1. Shut down the Reactor when it is determined Reactor safety is in jeopardy, or when operating parameters exceed any RPS setpoint and scram does not occur (00.AD.131).
2. Ensure initiation of ESF equipment if automatic operation was not properly initiated (00.AD.131).
3. Ensure that required actions per Technical Specifications are met when a LCO is not met (00.TS.002).
4. Implement appropriate portions of Reactivity Management and Controls program (00.AD.047).
5. Inform other shift members and plant management of changes in plant status, potential problems or limitations (00.AD.131).
6. Implement control of LCOs, TROs, and Safety Function Determination program (00.AD.273)
7. Implement Alarm Response procedures (00.AR.005)
8. Implement Recirc Drive Flow Instrument Failure (64.ON.009).
9. Implement 13.8 KV Bus 11A/11B Load Shedding on Bus UV (03.ON.006).
10. Implement Loss of CRD System Flow (55.ON.014).
11. Implement Scram (00.ON.018).
12. Implement ATWS (00.ON.026).
13. Implement RPV Control (00.EO.026).
14. Implement Level/Power Control (00.EO.031).
15. Implement Primary Containment Control (00.EO.027).
16. Implement SLC injection with RCIC (50.EO.009).
17. Implement De-energizing Scram Pilot Solenoids (58.EO.005).
18. Implement Rapid Depressurization (00.EO.030).

### The PCOs will:

1. Perform RHR operation in the Suppression Pool Cooling Mode (49.OP.003).
2. Implement Alarm Response procedures (00.AR.005)
3. Perform overriding RHR Injection (49.OP.011).
4. Perform initiation of Standby Liquid Control System (53.OP.003).
5. Perform inserting manual scram. (55.OP.006).
6. Perform swapping operating CRD pumps (55.OP.005)
7. Perform inhibiting ADS (83.OP.005).
8. Perform a 10% power change with rods/recirc flow (00.GO.012).
9. Perform Loss of CRD System Flow (55.ON.014).
10. Implement Recirc Drive Flow Instrument Failure (64.ON.009).
11. Implement 13.8 KV Bus 11A/11B Load Shedding on Bus UV (03.ON.006).
12. Implement Scram (00.ON.018).
13. Implement ATWS (00.ON.026).
14. Implement RPV Control (00.EO.026).
15. Implement Level/Power Control (00.EO.031).
16. Implement Primary Containment Control (00.EO.027).
17. Perform Rapid Depressurization (00.EO.030).
18. Reset Main Generator Lockouts (98.ON.001).

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**CRITICAL TASKS**

- ★ Inhibit ADS
  - ★ Inserts control rods IAW EO-000-113, Sheet 2, Control Rod Insertion
  - ★ Stops and prevents injection except from RCIC.
  - ★ Performs Rapid Depressurization by opening all ADS SRVs.
  - ★ Slowly restores RPV level to – 60" to – 161" with LPCI.
- 
- ★ Denotes Simulator Critical Task

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**SCENARIO REFERENCES**

1. SHIFT CONTROL ROD DRIVE PUMPS

OP-155-001 CONTROL ROD DRIVE HYDRAULIC SYSTEM  
OP-AD-004 OPERATIONS STANDARDS FOR ERROR AND EVENT PREVENTION

2. POWER DECREASE

CORE REACTIVITY CONTROL BOOK  
OP-AD-338 COMMUNICATION REQUIREMENTS FOR REACTIVITY MANIPULATIONS  
OI-AD-029 EMERGENCY LOAD CONTROL  
GO-100-012 POWER MANEUVERS

3. TRIP OF RFPT 'A'

ON-145-001 RPV LEVEL CONTROL SYSTEM MALFUNCTION  
ON-164-002 LOSS OF RECIRCULATION FLOW

4. RECIRC FLOW UNIT FAILURE DOWNSCALE

ON-164-001 RECIRC DRIVE FLOW INSTRUMENT FAILURE  
AR-103-001 RPS DIV 1 1C651  
T.S. 3.3.1.1 RPS INSTRUMENTATION

5. LOSS OF CRD

ON-155-007 LOSS OF CRD SYSTEM FLOW  
T.S. 3.1.5 CONTROL ROD ACCUMULATORS  
AR-107-D02 CRD PUMP 'B' TRIP  
ON-100-101 SCRAM

6. ATWS / LEVEL/POWER CONTROL / RPV CONTROL

EO-100-102 RPV CONTROL  
EO-100-113 LEVEL POWER CONTROL/CONTROL ROD INSERTION  
OP-184-001 MAIN STEAM SYSTEM  
ES-158-001 DE-ENERGIZING SCRAM PILOT SOLENOIDS

7. RAPID DEPRESSURIZATION / PRIMARY CONTAINMENT CONTROL

EO-100-112 RAPID DEPRESSURIZATION  
EO-100-103 PRIMARY CONTAINMENT CONTROL  
OP-149-005 RHR OPERATION IN SUPPRESSION POOL COOLING MODE

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**SCENARIO SPECIAL INSTRUCTIONS**

1. Initialize the simulator to IC-20, both Units at 100% power EOL..
2. Set up the simulator for the scenario by performing the following:

Shut HPCI F002 and F003 valves, place the Flow Controller in MAN set at 0%, and place the Div I/II inop switches to inop. Depressurize steam header.  
Place status control pink tags on HPCI F002 and F003.
3. Type `restorepref YPP.NRC0202`; verify that the following pre-inserts and Program Button assignments. Also verify that the Environment window shows 1 Event Trigger active:
  - `bat HPB.HPCIOOS` SIMULATES HPCI OOS
  - `IMF TC193025` ALL TBVs FAILED CLOSED
  - `IMF BR05:1A10104` AUX BUS 11A BKR FAILURE
  - `IMF BR05:1A10204` AUX BUS 11B BKR FAILURE
  - `TRG E1 SLC.STRT_SW` SLC START SWITCH IN START
  - `IMF PM03:1P208A (E1 3:00 0)` A SLC PUMP MOTOR SHORT CIRCUIT
  - `IMF PM05:1P208B` 1B SLC PUMP SHAFT SHEAR
  - `IMF RC150002 1000` RCIC SPEED CONTROL FAILURE, 1000 RPM
  - `[P-1] MRF RD155014 0` HV-146F014B CLOSED
  - `[P-2] MRF RD155014 100` HV-146F014B OPEN
  - `[P-3] IMF FW145009A` 'A' RFPT TRIP
  - `[P-4] IMF NM178012D` 'D' FLOW UNIT FAIL DNSC
  - `[P-5] MRF NM178008 ZERO` 'D' FLOW UNIT TO ZERO
  - `[P-6] bat RPB.ATWS-ELEC` FAILURE TO SCRAM
  - `[P-7] bat YPB.NRC0202A` LOSS OF CRD/4 ACCUMULATOR ALARMS
  - `[P-8] bat YPB.NRC0202B` MAIN TURBINE TRIP
  - `[P-9] bat RPB.ES158001A` ES-158-001 DIV 1 FUSES PULLED
  - `[P-10] bat RPB.ES158001B` ES-158-001 DIV 2 FUSES PULLED
4. Prepare a turnover sheet indicating:
  - a. Unit 1 and Unit 2 are at 100% power EOL.
  - b. HPCI is out of service for governor valve adjustments. The system will not be returned to service this shift.
  - c. Perform a swap of CRD pumps to allow maintenance to record vibration data on 'B' CRD pump.
  - d. A minimum generation alert has been issued for the PJM network.
5. Prepare an LCO sheet identifying that HPCI has been out of service for 6 hours.

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SCENARIO EVENT DESCRIPTION FORM

**Initial Conditions:** Initialize the Simulator to IC-20. Place the Simulator to RUN. Ensure the Program Buttons are assigned as indicated on the Special Instructions sheet via the appropriate Preference File. Assign Shift positions. Direct the start of the 5 minute panel walkdown.

EVENT	TIME	DESCRIPTION
1		SWAP IN SERVICE CRD PUMPS.
2		DECREASE POWER 100MWe.
3		TRIP OF RFPT 'A'.
4		RECIRC FLOW UNIT FAILURE DOWNSCALE.
5		LOSS OF CRD FLOW WITH INOPERABLE ACCUMULATORS.
6		FAILURE TO SCRAM, ATWS.
7		SLC SYSTEM FAILURE.
8		MAIN TURBINE TRIP.
9		RCIC SPEED CONTROL FAILURE
10		LOSS OF AUX BUSES 11A/11B.

SCENARIO EVENT FORM

Event No: 1  
 Brief Description: SWAP IN SERVICE CRD PUMPS

POSITION	TIME	STUDENT ACTIVITIES
US		Direct PCO to place 'B' CRD pump in service and shutdown the 'A' CRD pump.
PCOP		Implements OP-155-001, Section 3.10. <ul style="list-style-type: none"> <li>• Directs Plant Operator to verify oil levels</li> <li>• Direct Plant Operator to close 'B' discharge valve 146F014B</li> <li>• Place 'B' CRD control switch to RUN</li> <li>• Direct Plant Operator to slowly open 146F014B</li> </ul>
		Verify proper CRD flow and pressure indications. —
		Place 'A' CRD control switch to STOP.
US		Notify maintenance that 'B' CRD pump is in service.

★ Denotes Critical Task

<b>NOTES:</b>	



**INSTRUCTOR ACTIVITIES, ROLE PLAY,  
AND INSTRUCTOR'S PERSONAL NOTES**

Event No: 1  
Brief Description: SWAP IN SERVICE CRD PUMPS

NOTE: Monitor P & ID RD1.

**INSTRUCTOR ACTIVITY:**

If directed to close 'B' CRD pump discharge valve 146F014B, Depress P-1:

**[P-1] MRF RD155014 0**

When directed to reopen 146F014B, Depress P-2:

**[P-2] MRF RD155014 100**

**ROLE PLAY:**

As Plant Operator at the CRD pumps: oil levels in the motor and speed increaser are normal.

SCENARIO EVENT FORM

Event No: 2  
 Brief Description: DECREASE POWER 100MWe

POSITION	TIME	STUDENT ACTIVITIES
US		Direct the power reduction.
		Brief the crew for the upcoming reactivity evolution.
		Direct implementation of Reactor Engineering Instructions in the CRC Book.
		Direct implementation of GO-100-012, POWER MANEUVERS.
PCOM		Decreases reactor power as directed by the US and CRC Book.
		Plots power changes on the power to flow map.
PCOP		Notifies GCC when the power reduction is complete.
US		Makes notifications IAW OP-AD-002, STANDARDS FOR SHIFT OPERATIONS.

★ Denotes Critical Task

<b>NOTES:</b>	

**INSTRUCTOR ACTIVITIES, ROLE PLAY,  
AND INSTRUCTOR'S PERSONAL NOTES**

Event No: 2  
Brief Description: DECREASE POWER 100MWe

**INSTRUCTOR ACTIVITY:**

After 'B' CRD pump is in service call SSES as GCC and state a Minimum Generation Emergency is issued and SSES Unit 1 should decrease generation by 100 MWe as soon as possible.

**ROLE PLAY:**

As necessary.

SCENARIO EVENT FORM

Event No: 3  
 Brief Description: TRIP OF RFPT 'A'

POSITION	TIME	STUDENT ACTIVITIES
PCOM		Report trip of 'A' RFP.
		Reports RPV water level is decreasing and feedwater system response.
		Implements AR-101-A10, RFPT 'A' TRIP.
		Dispatches a Plant Operator to investigate the cause of the trip.
		Refers to ON-145-001, determines no actions are applicable.
		Directs Plant Operator to remove hydrogen injection to RFP 'A' using OP-145-002.
		Implements AR-101-F11, RFP A BRG OIL LO PRESS.
US		Directs implementation of ON-145-001, RPV WATER LEVEL MALFUNCTION.
		Contacts FIN Team/maintenance to investigate the cause of the trip.
		Make notifications IAW OP-AD-002, STANDARDS FOR SHIFT OPERATIONS .
PCOM		Reports Recirc pump runback, Limiter #2.
		Checks power to flow map; determines plant is not operating in a restricted region.
		Implements ON-164-002, LOSS OF RECIRCULATION FLOW.
		Selects a control rod to monitor for core flux oscillations.
US		Directs performance of ON-164-002, LOSS OF RECIRCULATION FLOW.
		Contacts Reactor Engineering for assistance.
		Notifies Health Physics and Chemistry groups of power change.

★ Denotes Critical Task

NOTES:	

**INSTRUCTOR ACTIVITIES, ROLE PLAY,  
AND INSTRUCTOR'S PERSONAL NOTES**

Event No: 3  
Brief Description: TRIP OF RFPT 'A'

**INSTRUCTOR ACTIVITY:**

When generator output has been reduced by 100MWe insert a trip of RFPT 'A', Depress P-3:

**[P-3] IMF FW145009A**

**ROLE PLAY:**

As Plant Operator sent 'A' RFP wait 2 mins. and report no abnormal conditions are visible around the pump or turbine.

As FIN Team or maintenance sent to 'A' RFP wait 10 minutes and report the turbine trip circuit is energized but the reason has not yet been identified. We will continue to investigate and let you know about any further developments.

As Reactor Engineering, report that you will run the Thermal Monitor and then come to the control room with any instructions or recommendations.

SCENARIO EVENT FORM

Event No: 4  
 Brief Description: RECIRC FLOW UNIT FAILURE DOWNSCALE

POSITION	TIME	STUDENT ACTIVITIES
PCOM		Reports RPS half scram condition on Division 2.
		Determines neutron monitoring caused the half scram.
		Determines a flow unit has failed.
		Implements ON-164-001, RECIRC DRIVE FLOW INSTRUMENT FAILURE.
		Dispatches a Plant Operator to LRR to investigate to flow unit status.
US		Directs implementation of ON-164-001, RECIRC DRIVE FLOW INSTRUMENT FAILURE.
		Contacts EWAC/maintenance to investigate the flow unit failure.
		Directs bypassing 'D' flow unit on panel 1C651 using the joystick.
		Directs placing the 'D' flow unit mode switch to ZERO.
		Directs resetting the division 2 RPS half scram signal.
		Refers to T.S 3.3.1.1, RPS INSTRUMENTATION.
		Make notifications IAW OP-AD-002, STANDARDS FOR SHIFT OPERATIONS .
PCOM		Bypasses 'D' flow unit with the joystick as directed.
		Directs the Plant Operator to place the mode switch to ZERO positions for 'D' flow unit.
		Resets RPS half scram.

★ Denotes Critical Task

NOTES:	

**INSTRUCTOR ACTIVITIES, ROLE PLAY,  
AND INSTRUCTOR'S PERSONAL NOTES**

**Event No:** 4  
**Brief Description:** RECIRC FLOW UNIT FAILURE DOWNSCALE

**INSTRUCTOR ACTIVITY:**

When the plant is stable after the recirc flow runback insert the 'D' Recirc flow unit failure downscale, **Depress P-4:**

[P-4] IMF NM178012D 'D' RECIRC FLOW UNIT DNSC

When directed to place the 'D' flow unit to ZERO in the LRR, **Depress P-5:**

[P-5] MRF NM178008 ZERO 'D' FLOW UNIT TO ZERO

**ROLE PLAY:**

As Plant Operator sent to LRR Panel 1C608 wait 2 mins. report all flow unit mode switches are in operate and flow unit 'D' has downscale indication.

If asked about additional indications, the following exist:

Amber compare light is ON for flow units 'C' and 'D'.

Along the top of panel 1C608:

- White FLOW UNIT COMPARATOR lights are ON for 'C' and 'D' flow units.
- Red UPSC THERM TRIP lights are ON for all Div 2 APRMs.
- Red THERM FIRST lights are ON for all Div 2 APRMs.
- Amber UPSC lights are ON for all Div 2 APRMs.

As FIN Team/maintenance acknowledge the direction to investigate the flow unit failure. No other feedback will be provided.

SCENARIO EVENT FORM

Event No: 5

Brief Description: LOSS OF CRD FLOW WITH INOPERABLE ACCUMULATORS

POSITION	TIME	STUDENT ACTIVITIES
PCOP		Reports trip of 'B' CRD pump.
		Refer to AR-107-D02, CRD PUMP 'B' TRIP.
		Implements ON-155-007, LOSS OF CRD SYSTEM FLOW.
		Closes flow control valve FV-146F002 using FC-C12-1R600 in MANUAL.
		Attempts to START 'A' CRD pump.
		Reports 'A' CRD pump failed to start.
		Dispatches a Plant Operator to check breakers 1A20107 AND 1A20407.
		Reports charging water header pressure.
PCOM		Reports control rod accumulator trouble alarms.
		Reports all trouble alarms are for withdrawn control rods.
		Dispatches a Plant Operator to the HCU to report status.
US		Directs implementation of ON-155-007, LOSS OF CRD SYSTEM FLOW.
		Contacts FIN Team/maintenance to investigate the accumulator troubles.
		Directs placing mode switch to S/D within 20 minutes when two or more accumulator are determined inoperable for withdrawn control rods with steam dome pressure >900 psig.
		Refers to T.S. 3.1.5, Control Rod Accumulators.
		Make notifications IAW OP-AD-002, STANDARDS FOR SHIFT OPERATIONS .
PCOM		Places Mode Switch to Shutdown, informs US of failure to scram.

★ Denotes Critical Task

NOTES:	



**INSTRUCTOR ACTIVITIES, ROLE PLAY,  
AND INSTRUCTOR'S PERSONAL NOTES**

Event No: 5  
Brief Description: LOSS OF CRD FLOW WITH INOPERABLE ACCUMULATORS

**INSTRUCTOR ACTIVITY:**

NOTE: Before continuing the scenario insert the failure to scram, **Depress P-6:**

**[P-6] bat RPB.ATWS-ELEC**

After RPS half scram is RESET insert a loss of CRD system flow and several control rod accumulator trouble alarms, **Depress P-7:**

**[P-7] bat YPB.NRC0202A**

NOTE: Times for accumulator alarms are:

Rod 46-47	45 seconds
Rod 38-39	2 minutes
Rod 10-19	2 minutes 30 seconds
Rod 14-23	3 minutes

**ROLE PLAY:**

As Plant Operator sent to 'B' CRD pump breaker 1A20407 wait 2 mins. and report over current relay 50/51 has a target dropped.

As Plant Operator sent to 'A' CRD pump breaker 1A20107 wait 2 mins. report no abnormal conditions exist on the breaker.

As Plant Operator sent to HCUs for accumulator trouble alarms report pressures less than 900 psig for rod 46-47, rod 38-39, rod 10-19, and rod 14-23.

NOTE: In order to avoid a long time delay in candidate activities, make it clear that neither pump appears to be capable for return to service any time soon.

SCENARIO EVENT FORM

Event No: 6, 7  
 Brief Description: ATWS / SLC FAILURE

POSITION	TIME	STUDENT ACTIVITIES
PCOM		Inserts manual scram via Scram Pushbuttons, reports continued failure to scram.
		Initiates ARI, reports failure to scram via ARI.
US		Enters EO-000-102, RPV CONTROL, exits EO-100-102 and enters EO-100-113, LEVEL POWER CONTROL.
★		Directs initiating SLC and inhibiting ADS.
PCOP		Initiates SLC, notifies US of SLC system problems.
★		Inhibits ADS.
US		Directs RPV level lowered to $-60''$ but $>-161''$ .
		Directs establishing RPV level target band of $-60''$ to $-110''$ .
		Directs bypassing MSIV and CIG interlocks.
		Directs overriding RCIC injection.
PCOM		Lowers and controls RPV level to $<-60''$ but $>-161''$ using available injection systems (FW/Condensate).
		Attempts to establish RPV level in target band of $-60''$ to $-110''$ .
PCOP		Bypasses MSIV and CIG interlocks IAW OP-184-001, MAIN STEAM SYSTEM.

★ Denotes Critical Task

NOTES:	

**INSTRUCTOR ACTIVITIES, ROLE PLAY,  
AND INSTRUCTOR'S PERSONAL NOTES**

Event No: 6, 7  
Brief Description: ATWS / SLC FAILURE / MT TRIP / LOSS OF AUX BUSES 11A/11B

**INSTRUCTOR ACTIVITY:**

Ensure event trigger activates to trip 'A' SLC pump 3 minutes after start.

**IMF PM03:1P208A (E1 3:00 0)      A SLC PUMP MOTOR SHORT CIRCUIT**

**ROLE PLAY:**

As NPO directed to investigate SLC pumps, wait ~3 minutes and report the A pump is not running (do not give this report until the pump has tripped) and the motor appears to have some scorching; the B pump motor is running but the shaft is sheared.

SCENARIO EVENT FORM

Event No: 8, 9, 10

Brief Description: MT TRIP / RCIC SPEED CTL FAILURE / LOSS OF AUX BUSES 11A/11B

POSITION	TIME	STUDENT ACTIVITIES
★ US		Directs control rods inserted IAW EO-100-113 Sheet 2, CONTROL ROD INSERTION.
		Directs implementation of ES-158-001, DE-ENERGIZING SCRAM PILOT SOLENOIDS.
		Directs venting of Scram Air Header.
		Directs SLC injection with RCIC IAW ES-150-002.
PCOM		Informs US of main turbine trip and TBV failure to open.
		Recognizes/reports loss of feedwater, condensate and CW systems.
PCOM/P		Directs Plant Operator to vent scram air header.
PCOP		Reports Aux Buses 11A/11B are de-energized.
US		Directs Electrical Maintenance to investigate Aux Bus problem.
PCOP		Attempts to maintain level between -60" and -161" with RCIC.
		Recognizes/reports RCIC speed control malfunction.
		Recognizes/reports RPV level can no longer be maintained >-161".

★ Denotes Critical Task

NOTES:	NOTE: US may not direct ES-150-002 due to RCIC speed control problems.

**INSTRUCTOR ACTIVITIES, ROLE PLAY,  
AND INSTRUCTOR'S PERSONAL NOTES**

Event No: 8, 9, 10

Brief Description: MT TRIP / RCIC SPEED CTL FAILURE / LOSS OF AUX BUSES 11A/11B

**INSTRUCTOR ACTIVITY:**

When RPV water level is lowered into the target band insert a trip of the main turbine, **Depress P-8:**

**[P-8] bat YPB.NRC0202B MAIN TURBINE TRIP**

**NOTE:** When main generator lockout occurs the Aux Buses 11A/11B should fail to transfer and will de-energize and cause a loss of feedwater and condensate.

**NOTE:** The above file also deletes the Accumulator Fault malfunctions so that all rods can be fully inserted later in the scenario.

**ROLE PLAY:**

1. As Electrical Maintenance if directed to investigate Aux Bus breaker problem, wait ~3 minutes and inform crew that a bus fault is present; you are continuing to investigate.
2. As NPO directed to vent the Scram Air Header, wait ~3 minutes and report that you are unable to get the cap off of the 147007 valve's vent line and that the cap appears to be galled; you request Mechanical maintenance assistance.
3. As OSC/AUS directed to perform ES-150-002, acknowledge the direction and perform no further actions.

SCENARIO EVENT FORM

Event No: 8, 9, 10

Brief Description: MT TRIP / RCIC SPEED CTL FAILURE / LOSS OF AUX BUSES 11A/11B

POSITION	TIME	STUDENT ACTIVITIES
★ US		Directs all injection stopped and prevented except from RCIC.
★ PCOM/P		Stops and prevents all injection except from RCIC.
US		Enters EO-100-112, RAPID DEPRESSURIZATION.
		Directs that Suppression Pool level is verified >5'.
★		Directs Rapid Depressurization by opening all ADS SRVs.
PCOM/P		Verifies Suppression Pool level >5'.
★		Rapidly depressurizes reactor by opening ADS SRVs valves.
★ US		Directs slowly restoring RPV level to -60" to -161" with LPCI.
★ PCOM/P		Slowly restores RPV level to -60" to -161" with LPCI.

★ Denotes Critical Task

NOTES:	

**INSTRUCTOR ACTIVITIES, ROLE PLAY,  
AND INSTRUCTOR'S PERSONAL NOTES**

Event No: 8, 9, 10

Brief Description: MT TRIP / RCIC SPEED CTL FAILURE / LOSS OF AUX BUSES 11A/11B

**INSTRUCTOR ACTIVITY:**

None.

**ROLE PLAY:**

As necessary.

SCENARIO EVENT FORM

Event No: 8, 9, 10

Brief Description: MT TRIP / RCIC SPEED CTL FAILURE / LOSS OF AUX BUSES 11A/11B

POSITION	TIME	STUDENT ACTIVITIES
★ PCOP		Inserts control rods IAW EO-100-113 Sheet 2.
		Coordinates ES-158-001 with AUS/NPO.
		Verifies indications as Div 1 RPS fuses are pulled.
		Verifies control rod insertion as Div 2 RPS fuses are pulled.
		Verifies all rods fully inserted; informs US.
US		Directs SLC injection terminated, restores ES-150-002.
		Exits EO-100-113 Sheets 1 and 2; re-enters EO-100-102.
		Directs establishing water level +13" to +54".
PCOM		Establishes water level +13" to +54" with LPCI.
US		Enters EO-100-103, PRIMARY CONTAINMENT CONTROL.
		Directs both loop of RHR placed in Suppression Pool Cooling.
PCOM/P		Places both loops of RHR in Suppression Pool Cooling IAW OP-149-005, RHR OPERATION IN THE SUPPRESSION POOL COOLING MODE.

★ Denotes Critical Task

NOTES:	



**INSTRUCTOR ACTIVITIES, ROLE PLAY,  
AND INSTRUCTOR'S PERSONAL NOTES**

**Event No:** 8, 9, 10

**Brief Description:** MT TRIP / RCIC SPEED CTL FAILURE / LOSS OF AUX BUSES 11A/11B

When RPV water level is restored >-161" following RD proceed with pulling RPS fuses.

**ROLE PLAY:**

As Operator dispatched to perform ES-158-001, wait ~2 minutes and report that you are ready to pull the Div 1 RPS fuses.

**INSTRUCTOR ACTIVITY:**

Pull Div 1 RPS fuses, Depress P-9:

[P-9] bat RPB.ES158001A ES-158-001 DIV 1 FUSES PULLED

**ROLE PLAY:**

As Operator call the control room and report you have completed pulling Div 1 RPS fuses and you are now going to the LRR to pull Div 2 fuses at this time.

**INSTRUCTOR ACTIVITY:**

When RPV level is stabilized at <-60" but >-161" following Rapid Depressurization, pull Div 2 RPS fuses to complete ES-158-001, Depress P-10:

[P-10] bat RPB.ES158001B ES-158-001 DIV 2 FUSES PULLED

**ROLE PLAY:**

As Operator, wait ~2 minutes and report that RPS Div 2 fuses have been pulled and ES-158-001 is now completed.

**TERMINATION CUE:**

When all control rods are inserted and actions are in progress to restore RPV water level to +13" to +54", the scenario may be terminated.

# UNIT SUPERVISOR TURNOVER SHEET

UNIT: 1

Date: July 30, 2002

SHIFT 1900 to 0700  
Start End

SHIFT 0700 to 1900  
Start End

MODE 1

MODE

POWER LEVEL 100 %

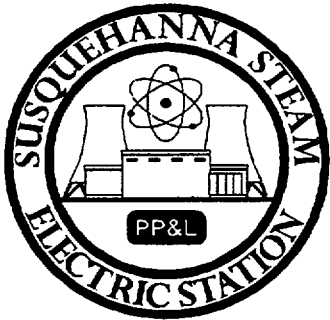
POWER LEVEL \_\_\_\_\_ %

GENERATOR OUTPUT 1151 MWe

GENERATOR OUTPUT \_\_\_\_\_ MWe

1. HPCI is out of service for governor valve adjustments. The system will not be returned to service this shift.
2. Perform a swap of CRD pumps to allow maintenance to record vibration data on 'B' CRD pump.
3. A minimum generation alert has been issued for the PJM network.
4. Unit 2 is in MODE 1 at 100% power EOL.
5. Chemistry/Rx Engineering investigating Off Gas System spike observed during last Control Rod Exercising Surveillance

COMMON:



**PP&L-SUSQUEHANNA  
TRAINING CENTER**

**SIMULATOR SCENARIO**

**Scenario Title: NRC INITIAL LICENSE OPERATOR EXAMINATION**

**Scenario Duration: 2 Hours**

**Scenario Number: NRC0203**

**Revision/Date: Rev 0, 4/23/2002**

**Course: PC017, NRC Initial License Operator Examination**

**Operational Activities:**

- |   |                                   |
|---|-----------------------------------|
| 1. Transfer SUB 10 to SUT 10                | 5. Loss of Instrument Air         |
| 2. Increase Reactor Power                   | 6. Recirc Loop Suction Line Break |
| 3. FW Flow Transmitter Failure Low          | 7. Auto ADS Logic Failure         |
| 4. Steam Leak Detection Failure / HPCI ISOL | 8. HV-151-F015B Auto-Open Failure |

**Prepared By:**

*[Signature]*

Instructor

*6/13/02*

Date

**Reviewed By:**

*[Signature]*

Nuclear Operations Training Supervisor

*6/13/02*

Date

**Approved By:**

*REC 7-29-02 HA [Signature]*

Supervising Manager/Shift Supervisor

*7-29-02*

Date

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## SCENARIO SUMMARY

Unit 1 is 50% power, Unit 2 is MODE 4. Power ascension was suspended while maintenance performed an inspection of Start Up Transformer 10 following inadvertent fire system deluge actuation. Start Up Bus 10 is supplied from Start Up Bus 20 with the tie breaker 0A10502 closed. Standby Liquid Control Pump 1B is inoperable while maintenance investigates a high motor vibration. Maintenance has completed the inspection of Start Up Transformer 10, the crew will restore the electric plant line up to normal by transferring Start Up Bus 10 to Start Up Transformer 10.

The crew will continue with power ascension by pulling control rods and raise power  $\approx 10\%$ .

The 'B' feedwater flow transmitter fails low causing the feedwater level control system to raise RPV water level to  $\approx +44"$ . The crew will perform Off-Normal procedures and transfer from 3 element to single element control with feedwater control being returned to automatic control. RPV water level should be restored to  $+35"$ .

A failure in the Steam Leak Detection System causes the HPCI Steam Supply Outboard Isolation Valve HV-155-F003 to automatically close making the HPCI system inoperable. HPCI will not be restored.

After the Steam Leak Detection problem the Instrument air header will develop a leak. The leak will be unisolable and worsen over time. The crew will implement the Loss of Instrument Air Off-Normal procedure and manually scram the reactor before instrument air header pressure reaches 65 psig.

Following the manual scram and stabilization of plant parameters, a small Recirculation Loop suction line break will occur requiring the crew to enter and perform the action of the Primary Containment Control procedure. Shortly after the crew initiates Suppression Chamber Spray the leak will increase in size and will eventually require the crew to rapidly depressurize the RPV due to water level reaching TAF. The high Drywell temperature and depressurized plant conditions cause violation of the RPV Saturation temperature curve, requiring the crew to perform RPV Flooding. Fuel Zone water level may decrease below the useable value limit of  $-290"$  which also requires entry into RPV Flooding. The injection valve on the 'B' loop of RHR will fail to auto-open; the crew will be required to manually open the valve in order to achieve flooding pressure.

When RPV Flooding pressure has been achieved the scenario will be terminated.

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## SCENARIO OBJECTIVES

### The US/SS will:

1. Inform other shift members and plant management of changes in plant status, potential plant problems or limitations. (00.AD.131)
2. Implement appropriate portions of Reactivity Management and Controls program. (00.AD.047)
3. Implement control of LCOs, TROs, and Safety Function Determination program. (00.AD.273)
4. Ensure that required actions per Technical Specifications are met when a LCO is not met. (00.TS.002)
5. Implement Alarm Response procedures. (00.AR.005)
6. Implement Loss of Instrument Air. (18.ON.003)
7. Implement scram. (00.ON.018)
8. Implement RPV Control. (00.E0.026)
9. Implement Primary Containment Control. (00.E0.027)
10. Implement Rapid Depressurization. (00.E0.030)
11. Implement RPV Flooding. (00.E0.032)
12. Ensure that required actions per Technical Specifications are met when a LCO is entered. (00.TS.003)
13. Shutdown the reactor when it is determined reactor safety is in jeopardy, or when operating parameters exceed any RPS setpoint and scram does not occur. (00.AD.131)

### The PCOs will:

1. Perform overriding RHR injection. (49.OP.011)
2. Implement Alarm Response procedures. (00.AR.005)
3. Perform LPCI injection through heat exchanger. (49.OP.013)
4. Perform RHR operation in Containment Spray Mode. (49.OP.005)
5. Perform automatic/manual startup of RCIC system. (51.OP.010)
6. Perform Division 1(2) response during automatic initiation. (51.OP.007)
7. Perform overriding CS injection. (51.OP.004)
8. Perform maximizing CRD flow. (55.OP.001)
9. Perform manual operation of ADS. (83.OP.001)
10. Perform Loss of Instrument Air. (18.ON.003)
11. Perform Scram. (00.ON.018)
12. Perform RPV Control. (00.E0.026)
13. Perform Primary Containment Control. (00.E0.027)
14. Perform Rapid Depressurization. (00.E0.030)
15. Perform RPV Flooding. (00.E0.032)

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**CRITICAL TASKS**

- ★ Performs Rapid Depressurization when RPV level drops to -161".
  
- ★ Performs RPV Flooding when RPV water level becomes indeterminate by increasing injection flowrate to raise RPV pressure 81 psig above Suppression Chamber pressure.
  
- ★ Manually opens RHR F015B valve to inject to the RPV.
  
  
- ★ Denotes Simulator Critical Task

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**SCENARIO REFERENCES**

1. TRANSFER STARTUP BUS 10 TO STARTUP TRANSFORMER 10

OP-003-001 13.8KV COMMON ELECTRICAL EQUIPMENT  
OP-AD-004 OPERATIONS STANDARDS FOR ERROR AND EVENT PREVENTION

2. POWER ASCENSION

CORE REACTIVITY CONTROL BOOK  
GO-100-002 PLANT STARTUP, HEATUP AND POWER OPERATION  
OP-AD-338 COMMUNICATION REQUIREMENTS FOR REACTIVITY MANIPULATIONS

3. FEEDWATER FLOW TRANSMITTER 'B' FAILS LOW

ON-145-001 RPV LEVEL CONTROL SYSTEM MALFUNCTION  
AR-101-B17 RX WATER HI-LO LEVEL

4. STEAM LEAK DETECTION FAILURE / HPCI ISOLATION

AR-114-C02 HPCI TURBINE TRIP SOLENOID ENERGIZED  
AR-114-F05 HPCI LEAK DETECTION LOGIC 'B' HI TEMP  
AR-114-B02 HPCI OUT OF SERVICE  
T.S. 3.5.1 ECCS OPERATING  
T.S. 3.2.6 PRIMARY CONTAINMENT ISOLATION INSTRUMENTATION

5. LOSS OF INSTRUMENT AIR

AR-124-A01 INSTRUMENT AIR LOOP A LO PRESSURE  
AR-124-B01 INSTRUMENT AIR HEADER LO PRESSURE  
ON-118-001 LOSS OF INSTRUMENT AIR  
ON-100-101 SCRAM

6. RECIRC LOOP 'B' SUCTION LINE BREAK

EO-000-102 RPV CONTROL  
EO-000-103 PRIMARY CONTRAINMENT CONTROL  
OP-149-004 RHR OPERATION IN CONTAINMENT SPRAY MODE  
AR-112-D03 DW/SUPP CHAMBER HI/LOW PRESSURE  
AR-104-B03 PRI CONTAINMENT HI.LOW PRESSURE  
EO-100-112 RAPID DEPRESSURIZATION  
EO-100-114 RPV FLOODING

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**SCENARIO SPECIAL INSTRUCTIONS**

1. Initialize the simulator to IC-16, (170 for NRC Exam) Unit 1 at 50% power EOL. Unit 2 is 100% power EOL.
2. Set up the simulator for the scenario by performing the following:
  - a. Remove SUT 10 from service.
    - Supply SUB 10 from SUB 20 with the tie breaker 0A10502 closed.
    - Open SUT 10 MOAB 1R105.
    - Transfer 4KV buses to SUB 20.
  - b. Perform GO-100-002 step 6.71.
3. Type **restorepref YPP.NRC0203**; verify that the following pre-inserts and Program Button assignments. Also verify that the Environment window shows 0 Event Trigger active:
  - **MRF DB106723 OPEN**            BKR FOR 1B SLC PUMP OPEN
  - **IMF MV06:HV151F015B**       RHR INJ F015B FAILS TO AUTO OPEN
  - **IMF RL01:B21C1K5A**            DIV 1 ADS AUTO LOGIC FAILURE
  - **IMF RL01:B21C1K5B**            DIV 2 ADS AUTO LOGIC FAILURE –
  - **[P-1] IMF TR02:FTC321N002B 0 0 2.5**       FW FLOW XMTR 'B' FAILS LOW
  - **[P-2] IMF TH02:TEE41N24B 350 0 74**       TSH-E41-1N006B FAILS HIGH –HPCI AREA
  - **[P-3] IMF IA11802 5**            IA COMMON HEADER RUPTURE – 5%
  - **[P-4] MMF IA11802 20IA** COMMON HEADER RUPTURE – 20%
  - **[P-5] IMF RR164011B 0.5 300**       RECIRC LOOP 'B' SUCTION LINE BRK – 0.5%
  - **[P-6] MMF RR164011B 40 300 0.5**       RECIRC LOOP 'B' SUCTION LINE BRK – 40%
  - **[P-7] MMF RR164011B 5 120 40**       RECIRC LOOP 'B' SUCTION LINE BRK – 5%
4. Prepare a turnover sheet indicating:
  - a. Unit 1 is at 50% power, Unit 2 is at 100% power EOL.
  - b. Power ascension on Unit 1 was suspended while maintenance performs an inspection of Startup Transformer 10 following inadvertent fire system deluge actuation.
  - c. Startup Transformer 10 has been out of service for 3 hours, 4KV ESS buses were transferred to Startup Bus 20.
  - d. Startup Bus 10 is supplied from Startup Bus 20 with the tie breaker 0A10502 closed.
  - e. Maintenance has completed the inspection of Start Up Transformer 10, all permits have been cleared, restore the electric plant line up to normal by transferring Start Up Bus 10 to Start Up Transformer 10.

**SCENARIO SPECIAL INSTRUCTIONS**

Continued:

- f. When the electric plant is returned to normal, continue with the power ascension starting at GO-100-002 step 6.72 and Start up rod sequence B-2 at step 538. Notify Reactor Engineering at 65% reactor power.
  - g. SLC pump 1B is out of service while maintenance investigates high motor vibration.
5. Prepare an LCO sheet identifying that Startup Transformer 10 has been out of service for 3 hours.
  6. Prepare an LCO sheet identifying that SBLC has been out of service for 2 hours.

**SCENARIO EVENT DESCRIPTION FORM**

**Initial Conditions:** Initialize the Simulator to IC-16. Place the Simulator to RUN. Ensure the Program Buttons are assigned as indicated on the Special Instructions sheet via the appropriate Preference File. Assign Shift positions. Direct the start of the 5 minute panel walkdown.

EVENT	TIME	DESCRIPTION
1		TRANSFER SUB 10 TO SUT 10
2		CONTINUE POWER ASCENSION
3		FEEDWATER FLOW TRANSMITTER 'B' FAILS LOW
4		STEAM LEAK DETECTION FAILURE / HPCI ISOLATION
5		LOSS OF INSTRUMENT AIR
6		RECIRC LOOP 'B' SUCTION LINE BREAK
7		AUTO ADS LOGIC FAILURE
8		LOOP 'B' RHR INJECTION VALVE HV-151F015B FAILS TO AUTO-OPEN

SCENARIO EVENT FORM

Event No: 1

Brief Description: TRANSFER SUB 10 TO SUT 10

POSITION	TIME	STUDENT ACTIVITIES
US		Direct PCO to transfer Startup Bus 10 to Startup Transformer 10.
PCOP		Implements OP-003-001, 13.8KV COMMON ELECTRICAL EQUIPMENT, Section 3.8
		Closes MOAB 1R105.
		Places SU XFMR 10 TO BUS 10 SYNC SEL HS-00014 to ON.
		Closes breaker 0A10301.
		Verifies Tie Breaker 0A010502 OPENS.
		Places SU XFMR 10 TO BUS 10 SYNC SEL HS-00014 to OFF.
		Aligns all control switch flags to actual breaker position.

★ Denotes Critical Task

<b>NOTES:</b>	



**INSTRUCTOR ACTIVITIES, ROLE PLAY,  
AND INSTRUCTOR'S PERSONAL NOTES**

Event No: 1  
Brief Description: TRANSFER SUB 10 TO SUT 10

**INSTRUCTOR ACTIVITY:**

None.

**ROLE PLAY:**

As necessary.

SCENARIO EVENT FORM

Event No: 2  
 Brief Description: CONTINUE POWER ASCENSION

POSITION	TIME	STUDENT ACTIVITIES
US		Direct the power ascension.
		Brief the crew for the upcoming power increase.
		Direct implementation of Reactor Engineer Instruction in the CRC Book.
		Direct the implementation of GO-100-102, PLANT STARTUP, HEATUP AND POWER OPERATION.
PCOM		Increases reactor power as directed by the US and CRC Book.
		Plots power change on the power to flow map.
		Maintains Load Set ≈100 MWe above existing load.
PCOP		Notifies GCC before the power increase begins.
US		Makes notifications IAW OP-AD-002, STANDARDS FOR SHIFT OPERATIONS.

★ Denotes Critical Task

<b>NOTES:</b>	

**INSTRUCTOR ACTIVITIES, ROLE PLAY,  
AND INSTRUCTOR'S PERSONAL NOTES**

Event No: 2  
Brief Description: CONTINUE POWER ASCENSION

**INSTRUCTOR ACTIVITY:**

None.

**ROLE PLAY:**

As necessary

SCENARIO EVENT FORM

Event No: 3  
 Brief Description: FEEDWATER FLOW TRANSMITTER 'B' FAILS LOW

POSITION	TIME	STUDENT ACTIVITIES
PCOM		Reports AR-101-B17, RX WATER HI-LO LEVEL.
		Reports RPV level has increased and is now controlling at $\approx +45$ ".
		Recognizes/reports 'B' FW Flow indication is zero.
US		Directs actions of ON-145-001, RPV LEVEL CONTROL SYSTEM MALFUNCTION.
		Directs placing FWLC in MAN, then Single Element, then back to AUTO to return RPV level to +35".
		Directs I&C to investigate 'B' Feedwater Flow instrumentation failure.
		Contacts Reactor Engineering for 'B' FW Flow instrument failure impact on core thermal power calculation.
		Directs monitoring OG and MSL radiation levels due to reactor power spike.
PCOM		Places Master FWLC Controller LIC-C32-1R600 in MAN.
		Places FWLC in Single Element by depressing Green pushbutton HS-106102.
		Nulls Master FWLC Controller, places controller in AUTO, and slowly restore RPV level to +35".
PCOP		Monitors OG and MSL radiation levels at 1C600 as directed.

★ Denotes Critical Task

<b>NOTES:</b>	

**INSTRUCTOR ACTIVITIES, ROLE PLAY,  
AND INSTRUCTOR'S PERSONAL NOTES**

Event No: 3  
Brief Description: FEEDWATER FLOW TRANSMITTER 'B' FAILS LOW

**INSTRUCTOR ACTIVITY:**

When reactor power is raised to  $\approx 60\%$ , or when directed by Chief Examiner, insert a 'B' FW flow transmitter failure low, **Depress P-1:**

**[P-1] IMF TR02:FTC321N002B 0 0 2.5**

**ROLE PLAY:**

1. As I&C sent to investigate 'B' FW Flow Instrumentation failure, wait 3 mins. and report the transmitter is failed and will require repair or replacement. I will provide a time estimate for repairs as soon as one is available.
2. As Reactor Engineering, report that I will run a Thermal Monitor and report the results as soon as they are available.
3. Note this event may be affected by the time schedule of the leading edge flow meter implementation schedule.

SCENARIO EVENT FORM

Event No: 4  
 Brief Description: STEAM LEAK DETECTION FAILURE / HPCI ISOLATION

POSITION	TIME	STUDENT ACTIVITIES
PCOP		Reports AR-114-F05, HPCI LEAK DETECT LOGIC B HI TEMP.
		Reports AR-114-C02, HPCI TURBINE TRIP SOLENOID ENERGIZED.
		Reports AR-114-B05, HPCI OUT OF SERVICE.
		Reports HPCI STM SUPPLY OB ISO valve HV-155-F003 is CLOSED.
		Reports PUMP SUCT FROM SUPP POOL valve HV-155-F042 is CLOSED.
		Determines TSH-E41-1N600B is tripped and indicates 350°F.
		Dispatch a Plant Operator to HPCI Equipment Room to investigate potential high temperature condition using appropriate safety precautions.
US		Contacts I&C to investigate TSH-E41-1N600B.
		Declares HPCI System inoperable.
		Refers to T.S. 3.5.1, ECCS OPERATING – Condition 'D'.
		Makes notifications IAW OP-AD-002, STANDARDS FOR SHIFT OPERATIONS.

★ Denotes Critical Task

NOTES:	

**INSTRUCTOR ACTIVITIES, ROLE PLAY,  
AND INSTRUCTOR'S PERSONAL NOTES**

Event No: 4.

Brief Description: STEAM LEAK DETECTION FAILURE / HPCI ISOLATION

**INSTRUCTOR ACTIVITY:**

When the Master FW Controller is restored to AUTO inert a Steam Leak Detection Failure and HPCI auto isolation, Depress P-2:

[P-2] IMF TH02: TEE411N24B 350 0 74

**ROLE PLAY:**

1. As Plant Operator sent to investigate HPCI Equipment Area wait 2 mins. and report all conditions in the HPCI room are normal.
2. A I&C sent to investigate TE-E41-1N600B acknowledge the direction to investigate, no further actions will be taken.

SCENARIO EVENT FORM

Event No: 5  
 Brief Description: LOSS OF INSTRUMENT AIR

POSITION	TIME	STUDENT ACTIVITIES
PCOP		Reports lowering Instrument Air pressure.
		Respond to AR-124-E01, SERVICE AIR LO PRESS and AR-124-A01, INSTRUMENT AIR LOOP A LO PRESSURE.
		Dispatches a Plant Operator to investigate IA system.
		Implements ON-118-001, LOSS OF INSTRUMENT AIR.
US		Enter ON-100-101, SCRAM and directs Scram Imminent Actions as air pressure decreases.
PCOP		Shifts Aux Buses 11A/11B to S/U Buses.
PCOM		Reduces recirc flow to $\approx$ 65 Mlbm/hr.
		Starts MSOP and TGOP.
US		Directs PCOM to scram the reactor prior to IA header pressure reaching 65 psig.
PCOM		Places Mode Switch to Shutdown.
		Performs actions of ON-100-101, SCRAM.
		Inserts SRMs and IRMs.
		Trips Main Turbine at 150 MWe.
US		Enters EO-100-102, RPV CONTROL.
		Directs RPV level maintained + 13" to + 54" with available systems.
		Directs RPV pressure stabilized <1087 psig.

★ Denotes Critical Task

<b>NOTES:</b>	



**INSTRUCTOR ACTIVITIES, ROLE PLAY,  
AND INSTRUCTOR'S PERSONAL NOTES**

Event No: 5  
Brief Description: LOSS OF INSTRUMENT AIR

**INSTRUCTOR ACTIVITY:**

When the crew has completed addressing Steam Leak Detection System Failure and HPCI Isolation insert an instrument air leak, **Depress P-3:**

**[P-3] IMF IA118002 5      IA COMMON HEADER RUPTURE – 5%**

**ROLE PLAY:**

As Plant Operator sent to IA, wait 2 mins. and report that all IA and SA compressors are running, the SA cross tie appears to be operating normally but IA pressure is slowly decreasing. If asked, inform the crew that I will investigate the system for a possible leak.

**INSTRUCTOR ACTIVITY:**

When the US directs the crew to perform Scram Imminent Actions increase the severity of the rupture to 20%, **Depress P-4:**

**[P-4] MMF IA118002 20      IA COMMON HEADER RUPTURE – 20%**

**ROLE PLAY:**

As Plant Operator sent to IA, report that I have located a large air leak at the common IA header piping just downstream of the receivers; I do not see any way to isolate the leak, and header pressure is dropping rapidly.

SCENARIO EVENT FORM

Event No: 6, 7  
 Brief Description: RECIRC LOOP 'B' SUCTION LINE BREAK / AUTO ADS LOGCIC FAILURE

POSITION	TIME	STUDENT ACTIVITIES
PCOP		Reports increasing Drywell pressure and temperature.
US		Enters EO-100-103, PRIMARY CONTAINMENT CONTROL. Directs initiation of Suppression Chamber Sprays.
PCOP		Sprays the Suppression Chamber IAW OP-149-004, RHR OPERATION IN CONTAINMENT SPRAY. Reports rapidly decreasing RPV water level.
US		Re-enters EO-100-102 due to high Drywell pressure. Directs injection with available systems.
PCOP		Attempts to maintain RPV water level + 13" to + 54" with RCIC. Verifies initiations, isolations, and DG starts as directed. Injects with available systems as directed. Reports RPV water level is approaching/at - 161". Reports failure of automatic ADS function.
★ US		Directs rapid depressurization when RPV level drops to - 161". When RPV level decreases to - 161", enters EO-100-112, RAPID DEPRESSURIZATION Directs opening of all ADS SRVs.

★ Denotes Critical Task

NOTES:	
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**INSTRUCTOR ACTIVITIES, ROLE PLAY,  
AND INSTRUCTOR'S PERSONAL NOTES**

**Event No:** 6, 7  
**Brief Description:** RECIRC LOOP 'B' SUCTION LINE BREAK / AUTO ADS LOGCIC FAILURE

**INSTRUCTOR ACTIVITY:**

When the crew scrams the reactor and RPV water level is stable at + 13" to + 54", initiate a small break inside the primary containment, **Depress P-5:**

**[P-5] IMF RR164011B 0.5 300 RECIRC LOOP B SUCTION LINE BREAK - .5%**

When the crew has commenced Suppression Chamber Spray, increase the severity of the recirc loop rupture to 40%, **Depress P-6:**

**[P-6] MMF RR164011B 40 300 0.5 RECIRC LOOP B SUCTION LINE BREAK - 40%**

**ROLE PLAY:**

As necessary.

SCENARIO EVENT FORM

Event No: 8  
 Brief Description: RHR F015B FAILS TO AUTO-OPEN

POSITION	TIME	STUDENT ACTIVITIES
★ PCOP		Rapidly depressurizes reactor by opening all ADS SRVs.
US		Determines RPV water level instrumentation is no longer valid due to violation of the Saturation Curve.
Note 1		Recognizes that RPV water level cannot be determined due to violating the RPV Saturation Curve: Exits EO-100-102 and Enters EO-100-114, RPV FLOODING.
★		Directs RPV Flooding when RPV water level becomes indeterminate by increasing injection flowrate to raise RPV pressure to 81 psid above Suppression Chamber pressure.
Note 2		Directs that injection be increased to maximum with available systems to raise reactor pressure to 81 psid above Suppression Chamber pressure.
★ PCOP		Increases injection to maximum with available systems to raise reactor pressure to 81 psid above Suppression Chamber pressure.
		Recognizes/reports RHR F015B failed to auto-open.
★		Manually opens RHR F015B to inject to the vessel.
		Controls injection flowrate to maintain RPV Flooding Pressure.

★ Denotes Critical Task

<b>NOTES:</b>	NOTE 1: Fuel Zone level may decrease <-290" requiring entry into RPV Flooding.
	NOTE 2: Crew must terminate containment sprays and direct all ECCS flow to the RPV in order to establish RPV Flooding pressure.

**INSTRUCTOR ACTIVITIES, ROLE PLAY,  
AND INSTRUCTOR'S PERSONAL NOTES**

**Event No:** 8  
**Brief Description:** RHR F015B FAILS TO AUTO-OPEN

**INSTRUCTOR ACTIVITY:**

When the crew has commenced RPV flooding, decrease the size of the Recirc rupture to allow achieving flooding pressure, Depress P-7:

MMF RR164011B 5 120 40 RECIRC LOOP B SUCTION LINE BREAK - 5%

**ROLE PLAY:**

As necessary.

**TERMINATION CUE:**

When RPV Flooding Pressure is established, the scenario will be terminated.

# UNIT SUPERVISOR TURNOVER SHEET

UNIT:   1  

Date: July 24, 2002

SHIFT 1900 to 0700  
Start End

SHIFT 0700 to 1900  
Start End

MODE   1  

MODE

POWER LEVEL   50   %

POWER LEVEL            %

GENERATOR OUTPUT   503   MWe

GENERATOR OUTPUT            MWe

---

1. Power ascension on Unit 1 was suspended while maintenance performs an inspection of Start Up Transformer 10 following Inadvertent fire system deluge actuation.

---

2. Start Up Transformer 10 has been out of service for 3 hours, 4 KV ESS buses were transferred to Start Up Bus 20.

---

3. Start Up Bus 10 is supplied from Start Up Bus 20 with breaker 0A10502 closed.

---

Maintenance has completed the inspection of Start Up Transformer 10, all permits have been cleared.

Restore the electric plant line up to normal by transferring Start Up Bus 10 to Start Up Transformer 10 IAW OP-003-001 Section 3.8.

DO NOT transfer 4Kv buses to normal lineup until Maintenance calls back and and concurs with that activity.

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5. When the electric plant is returned to normal, continue with the power ascension starting at GO-100-002 step 6.72 and Start up rod sequence B2 at step 538. Notify Reactor Engineering at 65% reactor power.

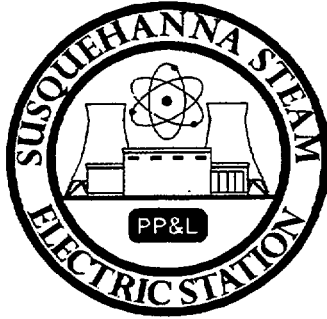
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6. SLC pump 1B is out of service while maintenance investigates high motor vibration. —

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7. Unit 2 is in MODE 1 at 100% power EOL.

COMMON:



**PP&L-SUSQUEHANNA  
TRAINING CENTER**

**SIMULATOR SCENARIO**

**Scenario Title: NRC INITIAL LICENSE OPERATOR EXAMINATION**

**Scenario Duration: 2 Hours**

**Scenario Number: NRC0204**

**Revision/Date: Rev 0, 4/24/2002**

**Course: PC017, NRC Initial License Operator Examination**

**Operational Activities:**

- |                                       |                                     |
|---------------------------------------|-------------------------------------|
| 1. Secure RHRSW Pump 1A               | 5. Generator Lockout / Turbine Trip |
| 2. RHRSW Rad Monitor Fails Upscale    | 6. RPS 'B' Failure to Trip / ATWS   |
| 3. Loss of Iso Phase Bus Duct Cooling | 7. Squib Valves Fail                |
| 4. Power Reduction                    | 8. 'A' EHC Pump Trip                |

**Prepared By:**

*[Signature]*

Instructor

*6/13/02*

Date

**Reviewed By:**

*[Signature]*

Nuclear Operations Training Supervisor

*6/13/02*

Date

**Approved By:**

*R&C 7-29-02*

*[Signature]*

Supervising Manager/Shift Supervisor

*7.29.2002*

Date

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## SCENARIO SUMMARY

The scenario begins with Unit 1 at 90% power EOL and Unit 2 at 100% power EOL. EHC pump 1B is out of service for breaker maintenance. RHR loop 'A' has just been secured from Suppression Pool Cooling and RHRSW pump is running for maintenance to record vibration data. The crew will shutdown 1A RHR SW pump.

Following shutdown of 1A RHRSW the RHRSW radiation monitor will fail upscale. The crew will direct Chemistry to obtain a grab sample of RHRSW to validate the indicated high radiation condition. The US will declare the RHRSW radiation detector inoperable and enter T.R. 3.11.1.5.

The in service Iso Phase Bus Cooling Fan will trip, investigation will determine repairs will take a minimum of 20 hours. Bus duct temperature will increase, the crew will decrease generator output to <19,000 amps IAW Alarm Response and Operating procedures.

After the generator output is reduced to <19,000 amps a main generator lockout trip will occur. A failure of RPS 'B' to trip will result in an Electrical ATWS and all control rods will fail to insert. ARI will not properly actuate, further inhibiting control rod insertion. When the crew will initiates SLC a failure of the squib valves to fire will prevent SLC injection. The crew will initiate action to inject boron with the RCIC system and inhibit ADS. The crew will decrease core power by lowering RPV water level to < -60" but > -161" using feedwater. A loss of EHC pump 1A will result in a loss of EHC hydraulic fluid pressure causing the TBVs to close; SRV operation will raise Suppression Pool Water temperature requiring the crew to enter Primary Containment Control procedure and maximize Suppression Pool Cooling. Actuation of SRVs will eventually cause Drywell pressure to increase > 1.72 psig resulting in a loss of Condensate and Feedwater injection due to initiation of Plant Aux Load Shed circuitry; the crew will restore and maintain RPV water level with HPCI and RCIC systems.

The crew will be unsuccessful at rod insertion by maximizing CRD and drifting control rods. Manually driving rods and venting the scram air header will be successful for rod insertion.

When all control rods have been inserted and actions are in progress to maximize Suppression Pool Cooling and restore RPV water level to +13" to +54" the scenario will be terminated.

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## SCENARIO OBJECTIVES

### The US/SS will:

1. Inform other shift members and plant management of changes in plant status, potential plant problems or limitations. (00.AD.131)
2. Implement appropriate portions of reactivity management & control program. (00.AD.017)
3. Ensure that required actions per Technical Specifications are met when a LCO is not met. (00.TS.002)
4. Implement control of LCOs, TROs, and Safety Function Determination Program. (00.AD.273)
5. Shutdown the reactor when it is determined Reactor safety is in jeopardy, or when operating parameters exceed any RPS setpoint and scram does not occur. (00.AD.031)
6. Implement Alarm Response procedures. (00.AR.005)
7. Implement Scram. (00.ON.018)
8. Implement ATWS. (00.ON.026)
9. Implement RPV Control. (00.EO.026)
10. Implement Level/Power Control. (00.EO-031)
11. Implement Primary Containment Control. (00.EO.027)
12. Implement HPCI Suction Auto Transfer Bypass. (52.EO.009)
13. Implement Boron Injection with RCIC. (50.EO.009)
14. Implement RCIC Turbine Isolation and Trip Bypass. (50.EO.008)

### The PCOs will:

1. Perform RHRSW System shutdown – Unit 1 Pump to Unit 1 Heat Exchanger. (16.OP.011)
2. Implement Alarm Response procedures. (00.AR.005)
3. Perform RHRSW Radiation Monitor Failure.
4. Perform Removal of Iso Phase Bus Duct Fan Motor From Service. (87.OP.002)
5. Perform a 10% power change with rods/recirc flow. (00.GO.012)
6. Perform maximizing CRD flow. (55.OP.001)
7. Perform initiation of Standby Liquid Control System. (53.OP.003)
8. Implement inhibiting ADS. (83.OP.005)
9. Implement Main Turbine Trip. (93.ON.006)
10. Implement Scram. (00.ON.018)
11. Implement ATWS. (00.ON.026)
12. Implement RPV Control. (00.EO.026)
13. Implement Level/Power Control. (00.EO-031)
14. Implement Primary Containment Control. (00.EO.027)
15. Perform normal operation of RHR in Suppression Pool Cooling mode. (49.OP.003)
16. Implement HPCI Suction Auto Transfer Bypass. (52.EO.009)
17. Implement Boron Injection with RCIC. (50.EO.009)
18. Implement RCIC Turbine Isolation and Trip Bypass. (50.EO.008)

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**CRITICAL TASKS**

- ★ Lowers RPV water level to <-60" but >-161" using available injection systems.
- ★ Inserts Control Rods IAW EO-100-113, Sheet 2, Control Rod Insertion.
  
- ★ Denotes Simulator Critical Task

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**SCENARIO REFERENCES**

1. SECURE RHRSW PUMP 1A

OP-116-001 RHR SERVICE WATER  
T.R. 3.8.2.1 MOV THERMAL OVERLOAD PROTECTION – CONTINUOUS  
OP-AD-004 OPERATIONS STANDARDS FOR ERROR AND EVENT PREVENTION

2. RHRSW RAD MONITOR FAILS UPSCALE

AR-109-F01 RHRSW A HI RADIATION

3. LOSS OF ISO PHASE BUS DUCT COOLING

AR-106-G09 ISOPHASE BUS COOLER MOTOR TRIP  
AR-106-H09 ISO PHASE BUS PANEL 1C172 TROUBLE  
OP-187-001 ISO PHASE BUS DUCT COOLING SYSTEM  
ON-000-005 HOT WEATHER

4. POWER REDUCTION

GO-100-012 POWER MANEUVERS  
CORE REACTIVITY CONTROL BOOK  
OP-AD-338 COMMUNICATION REQUIREMENTS FOR REACTIVITY MANIPULATIONS

5. GENERATOR LOCKOUT / TURBINE TRIP

ON-100-101 SCRAM  
EO-100-102 RPV CONTROL

6. RPS 'B' FAILS TO TRIP / ATWS / SQUIB VALVES FAIL / A EHC PUMP TRIP

OP-AD-002 STANDARDS FOR SHIFT OPERATIONS  
EO-100-113 LEVEL POWER CONTROL / CONTROL ROD INSERTION  
ES-150-002 BORON INJECTION WITH RCIC  
ES-152-002 BYP HPCI SUCT SWAP  
ES-150-001 BYP RCIC LO PRESS ISO  
ES-158-001 DE-ENERGIZING SCRAM PILOT SOLENOIDS  
AR-106-I03 EHC HYD FLUID PUMP DSCH LO PRESS  
EO-100-103 PRIMARY CONTAINMENT CONTROL  
OP-149-005 RHR OPERATION IN SUPPRESSION POOL COOLING MODE

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**SCENARIO SPECIAL INSTRUCTIONS**

1. Set up the simulator for the scenario by performing the following:
  - a. Initialize the simulator to IC-20, both Units at 100% power EOL.
  - b. Insert rods to step 555, adjust TCF for ≈90% power.
  - c. Place TA RHRSW pump in service per OP-116-001.
  - d. Place RHRSW radiation monitor in service.
  - e. Place ESW I/S, start ESW pumps A & B.
  - f. Place handswitch to STOP for 1B EHC pump.
2. Take a snapshot to a saved IC.
3. Initialize the simulator to IC-165.
4. Type **restorepref YPP.NRC0204**; verify that the following pre-inserts and Program Button assignments. Also verify that the Environment window shows 1 Event Trigger active:
  - MRF PM011PM113B OUT 1B EHC PUMP BKR RACKED OUT
  - IMF PM01:1P113B 1B EHC BKR CONTROL POWER -
  - IMF RP158007B RPS 'B' FAIL TO TRIP
  - IMF SL153001A SQUIB VLAVE 'A' FAIL
  - IMF SL153001B SQUIB VLAVE 'A' FAIB
  - IMF RL03:63X114725D1 ARI FAILURE
  - IMF RL03:63X214725D1 ARI FAILURE
  - TRG E1 BAAA26409 EVENT TRIGGER - MODE SWITCH TO SHUTDOWN
  - TRG E1 = MRF RD155023 0 THROTTLE CRD MAN ISO CLOSED WHEN E1 IS TRUE
  - [P-1] IMF TR02:RITS11216A 1E+6 0 27 RHRSW RM 'A' FAIL UPSCALE
  - [P-2] IMF PM03:1K109A ISO PHASE BUS DUCT COOLING FAN 'A' TRIP
  - [P-3] DMF PM03:1K109A DELETE ISO PHASE BUS DUCT COOLING FAN 'A' TRIP
  - [P-4] IMF EG198004 GENERATOR LOCKOUT TRIP
  - [P-5] MRF RD155023 0 THROTTLE CRD MAN ISO CLOSED
  - [P-6] IMF PM03:1P113A 1A EHC PUMP TRIP
  - [P-7] MRF HP152007 BYPASS ES-152-002, BYP HPCI SUCT SWAP
  - [P-8] bat RDB.VSAH VENT SCRAM AIR HEADER
  - [P-9] bat RDB.RSAH RESTORE SCRAM AIR HEADER

**SCENARIO SPECIAL INSTRUCTIONS**

5. Prepare a turnover sheet indicating:
  - a. Unit 1 is at 90% power EOL, Unit 2 is at 100% power EOL.
  - b. 1B EHC pump is out of service for breaker maintenance and will not be returned to service this shift.
  - c. RHR Loop 1A has just been secured from Suppression Pool Cooling and RHRSW pump 1A is running for vibration data. Vibration recording is complete, shutdown RHRSW.
  - d. ESW pumps A & B are in service to support Suppression Pool Cooling operation.
6. Prepare a TRO sheet for bypassing RHRSW overloads IAW OP-116-001.
7. Prepare an OD-7 for the current rod pattern.
8. Prepare an OP-AD-338, Attachment E "CONTROLLED SHUTDOWN / UNPLANNED POWER REDUCTION" form. Enter 65 in step S-3 and enter 555 in step S-4 3).
9. Prepare a modified page 1 of the Shutdown Control Rod Sequence B2 in the CRC Book. Remove rod steps 561 through 556 on page 01.
10. Insert the OD-7; OP-AD-338, Attachment E; and page 01 of the Shutdown Control Rod Sequence B2 into the CRC Book on the PCOs desk.
11. Prepare an OP-149-005, Attachment C entry for the Special Log Book for biocide injection. Indicate injection was performed 4 days previous to today, the exam date.
12. Make a copy of shift assignments.

**SCENARIO EVENT DESCRIPTION FORM**

**Initial Conditions:** Initialize the Simulator to IC-165. Place the Simulator to RUN. Ensure the Program Buttons are assigned as indicated on the Special Instructions sheet via the appropriate Preference File. Assign Shift positions. Direct the start of the 5 minute panel walkdown.

EVENT	TIME	DESCRIPTION
1		SECURE RHRSW PUMP 1A
2		RHRSW RAD MONITOR FAILS UPSCALE
3		LOSS OF ISO PHASE BUS DUCT COOLING
4		POWER REDUCTION
5		GENERATOR LOCKOUT / TURBINE TRIP
6		RPS 'B' FAILURE TO TRIP / ATWS
7		SQUIB VALVES FAIL
8		1A EHC PUMP TRIP

SCENARIO EVENT FORM

Event No: 1  
 Brief Description: SECURE RHRSW PUMP 1A

POSITION	TIME	STUDENT ACTIVITIES
US		Directs shutdown of 1A RHRSW pump.
		Complies with T.R. 3.8.2.1, MOV THERMAL OVERLOAD PROTECTION - CONTINUOUS.
PCOP		Implements OP-116-001, RHR SERVICE WATER.
		Verifies the last biocide injection date in the Special Log Book.
		Notifies US to comply with T.R. 3.8.2.1.
		Places motor overload bypass switch HS-11210A1 to TEST on 0C697.
		Reduces RHRSW flow to 1500gpm by throttling closed HV-11210A.
		Stops RHRSW pump 1P506A.
		Closes HX Inlet valve HV-11210A.
		Closes HX Outlet valve HV-11215A.
		After 2 minutes returns motor overload bypass switch HS-11210A1 to OPERATE on 0C697.
		Ensures RHRSW pump Supply Fan 1V506A STOPS.

★ Denotes Critical Task

<b>NOTES:</b>	

**INSTRUCTOR ACTIVITIES, ROLE PLAY,  
AND INSTRUCTOR'S PERSONAL NOTES**

Event No: 1  
Brief Description: SECURE RHRSW PUMP 1A

**INSTRUCTOR ACTIVITY:**

None.

**ROLE PLAY:**

As necessary.

SCENARIO EVENT FORM

Event No: 2  
 Brief Description: RHR SW RAD MONITOR FAILS UPSCALE

POSITION	TIME	STUDENT ACTIVITIES
PCOP		Reports alarm AR-109-F01, RHR SW A HI RADIATION.
		Refers to AR-109-F01, RHR SW A HI RADIATION.
		Checks indication for RR-D12-1R606 on 1C600.
		Dispatches Plant Operator to check operation of indicator and trip unit RITS-11216A.
US		Notify Chemistry to obtain grab sample.
		Contact I&C to investigate RHR SW Rad Monitor problem.
		Refers to T.R. 3.11.1.5, RADIOACTIVE LIQUID PROCESS MONITORING INSTRUMENTATION.
		Declares RHR SW Rad Monitor inoperable; enters Condition B or T.R. 3.11.1.5.
		Make notifications IAW OP-AD-002, STANDARDS FOR SHIFT OPERATIONS.

★ Denotes Critical Task

<b>NOTES:</b>	

**INSTRUCTOR ACTIVITIES, ROLE PLAY,  
AND INSTRUCTOR'S PERSONAL NOTES**

Event No: 2  
Brief Description: RHRWS RAD MONITOR FAILS UPSCALE

**INSTRUCTOR ACTIVITY:**

When 1A RHRWS pump is stopped wait ~30 seconds and insert RHRWS radiation monitor failure upscale, Depress P-1.

[P-1] IMF TR02:RITS11216A 1E+6 0 27

RHRWS RM 'A' FAIL UPSCALE

**ROLE PLAY:**

As Chemistry contacted to obtain a grab sample of Unit 1 RHRWS acknowledge the request to obtain a grab sample. No further information will be provided.

As Plant Operator sent to the indicator and trip unit wait 2 mins. and report that high radiation condition is indicated.

As I&C acknowledge the request to investigate the RHRWS radiation monitor. No further information will be provided.

SCENARIO EVENT FORM

Event No: 3, 4

Brief Description: LOSS OF BUS DUCT COOLING / REDUCE GENERATOR CURRENT <19,000 AMPS

POSITION	TIME	STUDENT ACTIVITIES
PCOM		Reports alarm AR-106-G09, ISOPHASE BUS COOLER MOTOR TRIP.
		Reports alarm AR-106-H09, ISO PHASE BUS PANEL 1C172 TROUBLE.
		Verifies iso phase bus cooling fan tripped on PICSY format and/or indication lights on 1C668.
		Dispatches a Plant Operator to check breaker 1B101121 closed.
		Directs plant Operator to reset breaker 1B101121 thermal overloads.
		Refers to OP-187-001, ISO PHASE BUS DUCT COOLING SYSTEM.
		Directs plant Operator to monitor/report bus duct temperature.
		Refers to ON-000-005, HOT WEATHER.
US		Contacts FIN TEAM/Maintenance to investigate the loss of bus duct cooling.
		Directs generator output lowered to <19,000 amps.
		Contacts Reactor Engineering about the power reduction.
		Directs power reduction using instructions from the CRC Book.
		Makes notifications IAW OP-AD-002, STANDARDS FOR SHIFT OPERATIONS.
		Notify Chemistry/Health Physics power changed by 15%.
		Notify System Engineer to perform temperature trending and evaluation.
PCOM		Reduces generator output to <19,000 amps as directed.
		Plots power changes on the power to flow map.
		Maintains core flow >65 mlbm/hr.
		Implements GO-100-012, POWER MANEUVERS.
PCOP		Notify GCC power reduction is required due to loss of Iso Phase Bus Duct Cooling.

★ Denotes Critical Task

NOTES:	



**INSTRUCTOR ACTIVITIES, ROLE PLAY,  
AND INSTRUCTOR'S PERSONAL NOTES**

**Event No:** 3, 4  
**Brief Description:** LOSS OF BUS DUCT COOLING / REDUCE GENERATOR CURRENT <19,000 AMPS

**INSTRUCTOR ACTIVITY:**

1. When actions are complete for RHRSW Rad Monitor failure insert a loss of iso phase bus duct cooling, **Depress P-2:**

[P-2] IMF PM03:1K109A ISO PHASE BUS DUCT COOLING FAN 'A' TRIP

Monitor P&ID EC1 and/or LP1C172 for indications and alarm status.

2. If directed to reset the thermal overloads on breaker 1B101121, **Depress P-3:**

[P-3] DMF PM03:1K109A DELETE ISO PHASE BUS DUCT COOLING FAN 'A' TRIP

then wait 15 seconds and trip the Iso Phase Bus Duct Cooling Fan, **Depress P-2:**

[P-2] IMF PM03:1K109A ISO PHASE BUS DUCT COOLING FAN 'A' TRIP

**ROLE PLAY:**

As Plant Operator sent to 1C172 wait 2 mins. and report that the 'A' fan was selected as lead fan and it is not running. I have 3 annunciators in alarm:

- HIGH BUS TEMPERATURE
- HIGH TEMPERATURE RETURN AIR
- LOW AIR SUPPLY

**NOTE:** High Bus Temperature setpoint is 180°F.  
High Temperature Return Air setpoint is 185°F.

If temperature data is requested monitor P&ID EC1 and report data as indicated.

As Plant Operator sent to breaker 1B101121 wait 2 mins. and report the breaker is not tripped. If requested to reset the thermal overloads report they tripped almost immediately after resetting.

As maintenance sent to investigate the loss of bus duct cooling wait 5 mins. and report the cooling fan appears to be binding and the drive belts are showing abnormal wear. A minimum of 24 hours is required to repair/replace the cooling fan.

SCENARIO EVENT FORM

Event No: 5, 6, 7, 8

Brief Description: GENERATOR LOCKOUT TRIP / RPS 'B' FAIL TO TRIP / SQUIB VALVES FAIL / 1A EHC PUMP TRIP

POSITION	TIME	STUDENT ACTIVITIES
PCOM		Reports scram condition and 'B' RPS failure to trip.
		Places mode switch to SHUTDOWN.
		Arms and depresses man scram initiation pushbuttons.
		Reports failure of control rods to insert.
		Inserts SRMs and IRMs.
		Reports generator lockout and main turbine trip condition.
PCOP		Initiates ARI, reports ARI has failed.
		Ensures Isolations, Initiations, and Diesel Generator starts.
US		Enters EO-100-012, RPV CONTROL and exits to EO-100-113, LEVEL POWER CONTROL.
		Directs SLC initiated and ADS inhibited.
★		Directs insertion of control rods IAW EO-100-113 Sht. 2, CONTROL ROD INSERTION.
PCOP		Initiates SLC, reports SLC is <u>not</u> injecting.
		Inhibits ADS.
US		Directs boron injection with RCIC IAW ES-150-002, BORON INJECTION WITH RCIC.
★		Directs lowering RPV water level to < - 60" but > - 161" with a target level band of - 60" to - 110" with available systems.
		Directs overriding HPCI and RCIC system injection.
		Directs Bypassing MSIV and CIG interlocks.
		Contacts maintenance to investigate SLC system problem.

★ Denotes Critical Task

<b>NOTES:</b>	

**INSTRUCTOR ACTIVITIES, ROLE PLAY,  
AND INSTRUCTOR'S PERSONAL NOTES**

Event No: 5, 6, 7, 8  
Brief Description: GENERATOR LOCKOUT TRIP / RPS 'B' FAIL TO TRIP / SQUIB VALVES FAIL / 1A EHC PUMP TRIP

**INSTRUCTOR ACTIVITY:**

When the generator output is reduced to <19,000 amps insert a generator lockout, **Depress P-4:**

**[P-4] IMF EG198004          GENERATOR LOCKOUT TRIP**

When the mode switch is placed to SHUTDOWN, verify that event trigger actuates to cause the CRD Pressure throttling valve manual isolation valve to fail closed preventing drifting control rods with CRD.

**NOTE:** If trigger E1 fails to actuate, **Depress P-5** to cause the CRD Pressure throttling valve manual isolation valve to fail closed preventing drifting control rods with CRD.

**[P-5] MRF RD155023 0          THROTTLE CRD MAN ISO CLOSED**

One minute after the mode switch is placed to SHUTDOWN insert a trip of 1A EHC pump, **Depress P-6:**

**[P-6] IMF PM03:1P113A          1A EHC PUMP TRIP**

**ROLE PLAY:**

As necessary.

SCENARIO EVENT FORM

Event No: 5, 6, 7, 8

Brief Description: GENERATOR LOCKOUT TRIP / RPS 'B' FAIL TO TRIP / SQUIB VALVES FAIL / 1A EHC PUMP TRIP

POSITION	TIME	STUDENT ACTIVITIES
★ PCOM		Lowers RPV water level to <- 60" but > -161" using feedwater.
PCOP		Overrides HPCI and RCIC to prevent injection. Bypasses MSIV and CIG interlocks IAW OP-184-001, MAIN STEAM SYSTEM.
US		Directs RPV pressure stabilized below 1087 psig with TBVs/SRVs.
PCOP		Stabilizes pressure below 1087 psig with TBVs/SRVs.
US		Directs maximizing CRD to drift control rods.
★		Directs venting the Scram Air Header. Directs performance of ES-158-001, DE-ENERGIZING SCRAM PILOT SOLENOIDS.
★		Directs bypassing RSCS and RWM and establishing normal CRD system parameters to manually drive control rods.
PCOM		Reports alarm AR-105-103, EHC HYD FLUID PUMP DSCH LO PRESS. Reports TBVs have CLOSED.
★ PCOM/P		Directs Plant Operator to vent scram air header. Maximizes CRD to drift control rods.
PCOM		Bypasses RSCS and RWM; attempts to establish normal CRD system parameters for manual rod insertion.
★		Recognizes/reports inability to establish normal CRD system parameters but attempts manual rod insertion.

★ Denotes Critical Task

NOTES:	

**INSTRUCTOR ACTIVITIES, ROLE PLAY,  
AND INSTRUCTOR'S PERSONAL NOTES**

Event No: 5, 6, 7, 8

Brief Description: GENERATOR LOCKOUT TRIP / RPS 'B' FAIL TO TRIP / SQUIB VALVES FAIL

**INSTRUCTOR ACTIVITY:**

**NOTE:** Drywell pressure reaches 1.72 psig in ≈15 minutes.

Suppression Pool temperature reaches ≈150°F in 16 minutes.

**ROLE PLAY:**

As maintenance sent to investigate SLC failure report the pumps are operating but the discharge relief valves are lifting.

SCENARIO EVENT FORM

Event No: 5, 6, 7, 8

Brief Description: GENERATOR LOCKOUT TRIP / RPS 'B' FAIL TO TRIP / SQUIB VALVES FAIL

POSITION	TIME	STUDENT ACTIVITIES
PCOM		Inserts control rods IAW EO-100-113 Sht. 2, CONTROL ROD INSERTION.
		Reports manual control rod insertion is successful.
PCOP		Reports Suppression Pool Water temperature exceeds 90°F.
US		Enter EO-100-103, Primary Containment Control when SPT exceeds 90°F.
		Directs maximizing Suppression Pool Cooling IAW OP-149-005, RHR OPERATION IN SUPPRESSION POOL COOLING MODE.
PCOP		Places both loops of RHR in Suppression Pool Cooling IAW OP-149-005, RHR OPERATION IN SUPPRESSION POOL COOLING MODE.
PCOM		Reports loss of Condensate and Feedwater when Drywell pressure exceeds 1.72 psig.
US		Re-enters EO-100-113 when Drywell pressure exceeds 1.72 psig.
★		Directs RPV water level control with HPCI and RCIC; level band < - 60" but > - 161" with a target level band of - 60" to - 110".
		Directs performance of ES-152-002, BYPASS HPCI SUCT SWAP.
		Directs performance of ES-150-001, BYPASS RCIC LO PRESS ISO.
		Re-enters EO-100-103 when Drywell pressure exceeds 1.72 psig.
PCOM		Verifies control rod insertion as the Scram Air Header is vented.
		Verifies all rods fully inserted; informs US.

★ Denotes Critical Task

<b>NOTES:</b>	

**INSTRUCTOR ACTIVITIES, ROLE PLAY,  
AND INSTRUCTOR'S PERSONAL NOTES**

Event No: 5, 6, 7, 8

Brief Description: GENERATOR LOCKOUT TRIP / RPS 'B' FAIL TO TRIP / SQUIB VALVES FAIL

**INSTRUCTOR ACTIVITY:**

1. When ES-152-002 is requested, wait  $\approx$ 10 minutes then Bypass the HPCI Suct Swap, Depress P-7:

[P-7] MRF HP152007 BYPASS      ES-152-002, BYP HPCI SUCT SWAP

2. When Supp.Pool Water temperature reaches  $\approx$ 150°F, or 15 minutes after the ATWS, vent the Scram Air Header, Depress P-8:

[P-8] bat RDB.VSAH      VENT SCRAM AIR HEADER

**ROLE PLAY:**

1. As Plant Operator sent to perform ES-152-002 report that the field portion for booting contacts is complete, you are at step 4.1.2 in ES-152-002.
2. As Plant Operator venting the Scram Air Header, inform the control room that you have closed/checked-closed 147002A/B and uncapped and opened 147007. Air has rushed out of the header and has now stopped.

SCENARIO EVENT FORM

Event No: 5, 6, 7, 8

Brief Description: GENERATOR LOCKOUT TRIP / RPS 'B' FAIL TO TRIP / SQUIB VALVES FAIL

POSITION	TIME	STUDENT ACTIVITIES
US		Directs restoration of scram air header.
		Directs SLC injection terminated.
		Exits EO-100-113 Sheets 1 and 2; re-enters EO-100-102.
		Directs establishing RPV water level +13" to +54".
		Directs stopping actions for ES-150-002, BORON INJECTION WITH RCIC.
		Directs stopping actions for ES-158-001, DE-ENERGIZING SCRAM PILOT SOLENIODS.
PCOP		Terminates SLC injection.
		Directs Plant Operator to restore the scram air header.
		Establishes RPV water level +13" to +54" with HPCI/RCIC.
US		Reassess plant conditions
		Directs PCO to maximize Suppression Pool Cooling IAW EO-100-103

★ Denotes Critical Task

<b>NOTES:</b>	



**INSTRUCTOR ACTIVITIES, ROLE PLAY,  
AND INSTRUCTOR'S PERSONAL NOTES**

Event No: 5, 6, 7, 8

Brief Description: GENERATOR LOCKOUT TRIP / RPS 'B' FAIL TO TRIP / SQUIB VALVES FAIL

**INSTRUCTOR ACTIVITY:**

**NOTE:** Monitor P&ID RD6 for status of venting/restoring Scram Air Header.

If directed to restore the Scram Air Header following venting, wait 2 mins. then, **Depress P-9:**

**[P-9] bat RDB.RSAH            RESTORE SCRAM AIR HEADER**

**ROLE PLAY:**

As Plant Operator directed to restore the Scram Air Header, wait 2 mins. and report that you have closed and capped 147007 and re-opened 147002A, which was the supply valve that was previously open.

**TERMINATION CUE:**

When all control rods have been inserted and actions are in progress to maximize Suppression Pool Cooling and restore RPV water level to +13" to +54' the scenario will be terminated.

# UNIT SUPERVISOR TURNOVER SHEET

UNIT: 1

Date: July 30, 2002

SHIFT 1900 to 0700  
Start End

SHIFT 0700 to 1900  
Start End

MODE 1

MODE

POWER LEVEL 90 %

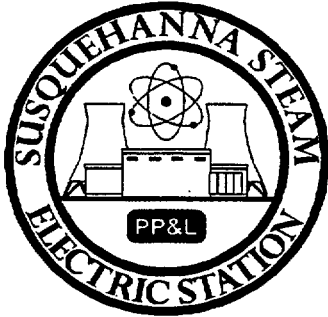
POWER LEVEL \_\_\_\_\_ %

GENERATOR OUTPUT 1030 MWe

GENERATOR OUTPUT \_\_\_\_\_ MWe

1. 1B EHC pump is out of service for breaker maintenance and will not be returned to service this shift.
2. RHR Loop 'A' has just been secured from Suppression Pool Cooling and RHRSW pump 1A is running for vibration data. Vibration recording is complete, shutdown RHRSW.
3. ESW pumps 'A' and 'B' are in service to support Suppression Pool Cooling operation.
4. Unit 2 is in MODE 1 at 100% power EOL.
5. Chemistry and RX Engineering investigating spike in Off Gas activity during last Control Rod Exercising Surveillance.

COMMON:



**PP&L-SUSQUEHANNA  
TRAINING CENTER**

**SIMULATOR SCENARIO**

**Scenario Title: NRC INITIAL LICENSE OPERATOR EXAMINATION**

**Scenario Duration: 2 Hours**

**Scenario Number: NRC0205**

**Revision/Date: Rev 0, 4/27/2002**

**Course: PC017, NRC Initial License Operator Examination**

**Operational Activities:**

- |                                     |   |
|-------------------------------------|---|
| 1. Power Reduction                  | 5. Fuel Clad Failure                    |
| 2. Shutdown 1B Condensate Pump      | 6. MSL Leak Outside Primary Containment |
| 3. NR Level Instrument Fail Upscale | 7. 'D' MSL Failure to Isolate           |
| 4. Failure of RPS A to Trip         |   |

**Prepared By:**

*[Signature]*

Instructor

*6/13/02*

Date

**Reviewed By:**

*[Signature]*

Nuclear Operations Training Supervisor

*6/13/02*

Date

**Approved By:**

*REC 7-29-02 WA [Signature]*

Supervising Manager/Shift Supervisor

*7-29-2002*

Date

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## SCENARIO SUMMARY

The scenario begins with Unit 1 at 100% power EOL and Unit 2 in MODE 4. 1B CRD pump is out of service for breaker maintenance. Condensate pump 1B has a possible ground, the crew will reduce reactor power to 80% and shutdown Condensate pump 1B for inspection.

Following the shutdown of 1B Condensate pump the 'A' Narrow Range Level instrument will fail upscale. Feedwater level control system response will stabilize RPV water level at  $\approx +23$ " in automatic. The crew will implement an Off-Normal procedure to transfer RPV water level control from averaged level control to selected level control and return to automatic control of RPV water level.

Following the water level perturbation a fuel clad failure will result in Turbine Building area high radiation and increasing main steam line radiation. The crew will respond by decreasing reactor power, radiation levels will continue to rise requiring the crew to manually scram the reactor and manually close the MSIVs and drains. When the mode switch is placed to shutdown a failure to scram will occur when RPS 'A' fails to trip. The control rods will insert when the crew initiates ARI.

Following the scram a main steam line break will occur in the Turbine Building Steam Tunnel. The 'D' MSL failed to isolate resulting in a sustained release to the Turbine Building. Release rates from the Turbine Building Vent Stack will increase above the ALERT level requiring entry into Radioactive Release Emergency Operating Procedure, EO-100-105. The crew will request performance of dose calculations and conduct a reactor cooldown at  $<100^{\circ}\text{F/hr}$ . When off-site dose calculations exceed the General Emergency level the crew will rapidly depressurize the reactor.

When the crew has performed Rapid Depressurization and actions are in progress to restore RPV water level to +13' to +54 " the scenario will be terminated.

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**SCENARIO OBJECTIVES**

The US/SS will:

1. Inform other shift members and plant management of changes in plant status, potential plant problems or limitations. (00.AD.131)
2. Shutdown the reactor when it is determined Reactor safety is in jeopardy, or when operating parameters exceed any RPS setpoint and scram does not occur. (00.AD.131)
3. Ensure that required actions per Technical Specifications are met when a LCO is not met. (00.TS.002)
4. Implement Alarm Response Procedures. (00.AR.005)
5. Respond to a loss of level signal to FWLC. (45.ON.009)
6. Implement control of LCOs, TROs, and Safety Function Determination Program. (00.AD.047)
7. Implement Fuel Clad Failure. (00.AR.006)
8. Respond to Main Steam Line Radiation. (83.AR.005)
9. Implement Abnormal Gaseous Radiation Release. (70.ON.003)
10. Implement Scram. (00.ON.018)
11. Implement ATWS. (00.ON.026)
12. Implement RPV Control. (00.EO.026)
13. Implement Secondary Containment Control. (00.EO.028)
14. Implement Radioactive Release Control. (00.EO.029)
15. Implement Rapid Depressurization. (00.EO.030)

The PCOs will:

1. Perform a 10% power change with rods/recirc flow. (00.GO.012)
2. Perform a shutdown of a Condensate pump. (44.OP.002)
3. Implement Alarm Response Procedures. (00.AR.005)
4. Respond to a loss of level signal to FWLC. (45.ON.009)
5. Implement Fuel Clad Failure. (00.AR.006)
6. Respond to Main Steam Line Radiation. (83.AR.005)
7. Implement Abnormal Gaseous Radiation Release. (70.ON.003)
8. Perform Scram. (00.ON.018)
9. Implement ATWS. (00.ON.026)
10. Perform RPV Control. (00.EO.026)
11. Perform Secondary Containment Control. (00.EO.028)
12. Perform Radioactive Release Control. (00.EO.029)
13. Implement Rapid Depressurization. (00.EO.030)

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**CRITICAL TASKS**

- ★ Manually initiate ARI
- ★ Performs Rapid Depressurization before EPB projected dose / dose rates reach General Emergency declaration criteria.
  
- ★ Denotes Simulator Critical Task.

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SCENARIO REFERENCES

1. POWER REDUCTION

CORE REACTIVITY CONTROL BOOK

OP-AD-338 COMMUNICATION REQUIREMENTS FOR REACTIVITY MANIPULATIONS  
GO-100-012 POWER MANEUVERS  
OP-AD-004 OPERATIONS STANDARDS FOR ERROR AND EVENT PREVENTION

2. SHUTDOWN 1B CONDENSATE PUMP

OP-144-001 CONDENSATE AND FEEDWATER SYSTEM

3. NARROW RANGE INSTRUMENT FAILS UPSCALE

AR-101-B17 RX WATER HI-LO LEVEL  
AR-101-A17 RX WATER HI LEVEL  
ON-145-001 RPV WATER LEVEL CONTROL SYSTEM MALFUNCTION  
T.S. 3.3.2.2 FEEDWATER / MAIN TURBINE HIGH WATER LEVEL TRIP

4. RPS 'A' FAILURE TO TRIP

ON-100-101 SCRAM  
EO-100-102 RPV CONTROL

5. FUEL CLAD FAILURE

AR-111-C03 MN STM LINE RAD MONITOR HI RADIATION  
AR-101-C05 TURB BLDG AREA PANEL 1C605 HI RADIATION  
AR-101-B05 RX BLDG AREA PANEL 1C605 HI RADIATION  
ON-070-001 ABNORMAL GASEOUS RADIATION RELEASE  
AR-015-E04 STACK MONITORING SYS 0C630/0C677 HI RADIATION  
AR-111-B03 MN STM LINE LEAK DETECTION HI TEMP  
AR-112-B03 MN STM LINE LEAK DETECTION HI TEMP  
EO-100-104 SECONDARY CONTAINMENT CONTROL  
EO-100-105 RADIOACTIVITY RELEASE CONTROL  
EO-100-112 RAPID DEPRESSURIZATION  
EO-100-103 PRIMARY COMTAINMENT CONTROL  
OP-149-005 RHR OPERATION IN SUPPRESSION POOL COOLING MODE

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**SCENARIO SPECIAL INSTRUCTIONS**

1. Initialize the simulator to IC-18, Unit 1 at 100% power EOL. Unit 2 in MODE 4.
2. Type `restorepref YPP.NRC0205`; verify that the following pre-inserts and Program Button assignments. Also verify that the Environment window shows 1 Event Trigger active:
  - MRF PM131P132B OUT      1B CRD PUMP BKR RACKED OUT
  - IMF RP158007A            RPS'A' FAILURE TO TRIP
  - IMF AV06:HV141F022D 80   MSIV F022D BIND DURING MOTION
  - IMF AV06:HV141F028D 80   MSIV F028D BIND DURING MOTION
  - TRG E1 BAAA26409        EVENT TRIGGER MODE SWITCH IN SHUTDOWN
  - TRG E1 = IMF MS1830089 0.9   'D' MSL LEAK IN TURBINE BUILDING
  - [P-1] IMF TR02:PDTC321N004A 60 0 AsIs   NR LEVEL 'A' FAILURE UPSCALE
  - [P-2] IMF RR179003 90 8:00   FUEL FAILURE 90 PINS
  - [P-3] bat YPB.NRC0205A    RAMP TB SPING RELEASE RATES
4. Prepare a turnover sheet indicating:
  - a. Unit 1 is at 100% power EOL. Unit 2 is in MODE 4.
  - b. CRD pump 1B is out of service for breaker maintenance, it is not expected to return this shift.
  - c. Condensate pump 1B has a possible ground, you are to reduce reactor power to 80% and shutdown Condensate pump 1B for inspection.
5. Make a copy of shift assignments.

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**SCENARIO EVENT DESCRIPTION FORM**

**Initial Conditions:** Initialize the Simulator to IC-18. Place the Simulator to RUN. Ensure the Program Buttons are assigned as indicated on the Special Instructions sheet via the appropriate Preference File. Assign Shift positions. Direct the start of the 5 minute panel walkdown.

EVENT	TIME	DESCRIPTION
1		POWER REDUCTION
2		SHUTDOWN 1B CONDENSATE PUMP
3		'A' NR LEVEL INSTRUMENT FAILS UPSCALE
4		FUEL CLAD FAILURE
5		RPS 'A' FAILURE TO TRIP / ATWS
6		MSL LEAK IN TURBINE BUILDING
7		'D' MSL FAILURE TO ISOLATE

SCENARIO EVENT FORM

Event No: 1, 2  
 Brief Description: POWER REDUCTION / SHUTDOWN 1B CONDENSATE PUMP

POSITION	TIME	STUDENT ACTIVITIES
US		Direct the power reduction.
		Brief the crew for the upcoming reactivity evolution.
		Direct implementation of Reactor Engineering Instructions in the CRC Book.
		Direct implementation of GO-100-012, POWER MANEUVERS.
PCOM		Decreases reactor power as directed by the US and CRC Book.
		Plots power changes on the power to flow map.
PCOP		Notifies GCC when the power reduction is started and ended.
US		Makes notifications IAW OP-AD-002, STANDARDS FOR SHIFT OPERATIONS.
		Notify Chemistry/Health Physics when reactor power changes by 15%.
		Directs implementation of OP-144-001, CONDENSATE AND FEEDWATER SYSTEM.
PCOM		Implements OP-144-001, CONDENSATE AND FEEDWATER SYSTEM.
		Depress the STOP pushbutton for 1B Condensate Pump.
		Observes condensate header pressure on PICSY format.
		Observes RPV water level and Feedwater System response.
US		Notify WCC/Maintenance 1B Condensate Pump is shutdown.

★ Denotes Critical Task

NOTES:	



**INSTRUCTOR ACTIVITIES, ROLE PLAY,  
AND INSTRUCTOR'S PERSONAL NOTES**

Event No: 1, 2

Brief Description: POWER REDUCTION / SHUTDOWN 1B CONDENSATE PUMP

**INSTRUCTOR ACTIVITY:**

None.

**ROLE PLAY:**

As necessary.

SCENARIO EVENT FORM

Event No: 3  
 Brief Description: 'A' NR LEVEL INSTRUMENT FAILS UPSCALE

POSITION	TIME	STUDENT ACTIVITIES
PCOM		Reports alarms RX WATER HI-LO LEVEL and RX WATER HI LEVEL.
		Reports 'A' NR level reading +60" and average level is ≈33.5".
		Observes FWLC response to stabilize RPV water level.
		Reports 'B' and 'C' NR level indication stabilizes at ≈22.5".
		Reports 'A' Hi Water Level Trip green status light is ON.
		Refers to AR-101-B17, RX WATER HI-LO LEVEL.
		Refers to AR-101-A17, RX WATER HI LEVEL.
		Implement ON-145-001, RPV LEVEL CONTROL SYSTEM MALFUNCTION.
US		Directs implementation of ON-145-001, RPV LEVEL CONTROL SYSTEM MALFUNCTION.
		Contacts I&C to investigate 'A' NR level instrument failure.
		Refers to T. S. 3.3.2.2; declares 'A' NR level channel inoperable, enter Condition A.
PCOM		Places FW LEVEL CTL/DEMAND SIGNAL LIC-C32-1R600 controller in MAN.
		Adjusts LIC-C32-1R600 to restore RPV water level to ≈+ 35".
		Selects level 'B' NR level signal input.
		Transfers from Averaged to Selected level
		Nulls FW LEVEL CTL/DEMAND LIC-C32-1R600 controller.
		Place FW LEVEL CTL/DEMAND LIC-C32-1R600 controller in AUTO.

★ Denotes Critical Task

NOTES:	

**INSTRUCTOR ACTIVITIES, ROLE PLAY,  
AND INSTRUCTOR'S PERSONAL NOTES**

Event No: 3

Brief Description: 'A' NR LEVEL INSTRUMENT FAILS UPSCALE

**INSTRUCTOR ACTIVITY:**

When 1B Condensate Pump is shutdown insert 'A' NR level instrument failure upscale, **Depress P-1:**

**[P-1] IMF TR02:PDTC321N004A 60 0 AsIs NR LEVEL 'A' FAILURE UPSCALE**

**ROLE PLAY:**

As I&C sent to investigate 'A' NR level problem wait 5 mins. and report the differential pressure transmitter is failed and must be replaced and calibrated. The repairs are expected to take approximately 8 hours.

SCENARIO EVENT FORM

Event No: 4  
 Brief Description: FUEL CLAD FAILURE

POSITION	TIME	STUDENT ACTIVITIES
PCOM		Reports alarm TURB BLDG AREA PANEL 1C605 HI RADIATION.
		Observes Turbine building area rad reading on PICSY.
		Reports SJAE RM and TB OFFGAS BYP AREA have rad levels increasing.
		Refers to AR-101-C05, TURB BLDG AREA PANEL 1C605 HI RADIATION.
		Evacuates Unit 1 TB of all non-essential personnel.
		Contacts HP to perform HP-TP-441.
US		Directs PCOP to monitor MSL and Offgas radiations levels on PICSY or panel 1C600.
PCOP		Report radiation levels are increasing for MSL and Offgas.
		Reports alarm MN STM LINE RAD MONITOR HI RADIATION.
		Refer to AR-11-C03, MN STM LINE RAD MONITOR HI RADIATION.
US		Directs power reduction by reducing recirc flow.
		May enter ON-100-101, SCRAM and direct scram imminent actions.
PCOM		Reduces power/recirc flow as directed.
		Performs scram imminent actions if directed.
PCOP		Checks MSL and Offgas rad monitors for indication and trend.
		Performs scram imminent actions if directed.

★ Denotes Critical Task

<b>NOTES:</b>	

**INSTRUCTOR ACTIVITIES, ROLE PLAY,  
AND INSTRUCTOR'S PERSONAL NOTES**

Event No: 4  
Brief Description: FUEL CLAD FAILURE

**INSTRUCTOR ACTIVITY:**

When FWLC master controller is restored to auto insert a fuel clad failure, Depress P-2:

[P-2] IMF RR179003 90 8:00 FUEL FAILURE 90 PINS

NOTE: Turbine building area high radiation alarm is received in  $\approx$ 2 minutes.  
Main steam line high radiation alarm is received in  $\approx$ 4 minutes.

**ROLE PLAY:**

As necessary.

SCENARIO EVENT FORM

Event No: 4, 5, 6, 7  
 Brief Description: FUEL CLAD FAILURE / RPS 'A' FAILURE TO TRIP / MSL LEAK INSIDE TURB BLDG / 'D' MSL FAILURE TO ISOLATE

POSITION	TIME	STUDENT ACTIVITIES
US		Directs manually scrambling reactor.
		Enters ON-100-101, SCRAM.
PCOM		Place the reactor mode switch to SHUTDOWN.
		Recognizes/reports failure to scram.
		Arms and depresses manual scram pushbuttons.
		Inserts SRMs and IRMs.
US		Enters EO-100-102, RPV CONTROL and Exits to EO-100-113, LEVEL POWER CONTROL.
★		Directs ARI initiation.
★ PCOP		Initiates ARI.
		Reports ARI has actuated.
PCOM		Reports all control rods are fully inserted.
US		Exits EO-100-113 and re-enters EO-100-102.
		Directs closure of MSIVs and drains.
		Directs RPV water level maintained +13" to +54".
		Directs RPV pressure maintained <1087 psig with SRVs.
		Directs PCOM to reset main generator lockouts.

★ Denotes Critical Task

NOTES:	
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**INSTRUCTOR ACTIVITIES, ROLE PLAY,  
AND INSTRUCTOR'S PERSONAL NOTES**

**Event No:** 4, 5, 6, 7

**Brief Description:** FUEL CLAD FAILURE / RPS 'A' FAILURE TO TRIP/ MSL LEAK INSIDE TURB BLDG / 'D'  
MSL FAILURE TO ISOLATE

**INSTRUCTOR ACTIVITY:**

When the crew places the Mode Switch to SHUTDOWN, verify the Event Trigger activates to initiate a steam leak in the Steam Tunnel.

When the MSIVs and drains are closed increase TB release rates, Depress P-3:

[P-3] bat YPB.NRC0205A RAMP TB SPING RELEASE RATES

**ROLE PLAY:**

As necessary.

SCENARIO EVENT FORM

Event No: 4, 5, 6, 7  
 Brief Description: FUEL CLAD FAILURE / RPS 'A' FAILURE TO TRIP/ MSL LEAK INSIDE TURB BLDG / 'D' MSL FAILURE TO ISOLATE

POSITION	TIME	STUDENT ACTIVITIES
PCOP		Manually closes MSIVs and drains.
		Reports 'D' MSL failed to isolate.
		Verifies 'D' MSL flow indication on 1C652 indication FI-C32-1R603D.
PCOM		Reports alarm RX BLDG AREA PANEL 1C605 HI RADIATION.
		Observes Reactor building area rad reading on PICSY.
		Reports CRD N & S and RB SUMP AREA have rad levels increasing.
		Refers to AR-101-B05, RX BLDG AREA PANEL 1C605 HI RADIATION.
		Evacuates Unit 1 RB of all non-essential personnel.
		Contacts HP to perform HP-TP-441.
US NOTE 1		Enters EO-100-104, SECONDARY CONTAINEMNT CONTROL.
		Contacts maintenance for the MSIV failures in 'D' MSL.
PCOP		Reports alarm STACK MONITORING SYS 0C630/0C677 HI RADIATION.
		Checks SPING, reports increasing TB Stack Noble Gas and Iodine.
PCOP		Reports alarms MN STM LINE LEAK DETECTION HI TEMP DIV 1 / 2.
		Verifies 1C614 temperature readings; reports high temperature in TB Steam Tunnel.

★ Denotes Critical Task

NOTES:	NOTE 1: A common error is Rapid Depressurization when the rad levels on elevations 645' and 719' increase to > max safe levels. There is no primary system discharging to any Secondary Containment area throughout this scenario.
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**INSTRUCTOR ACTIVITIES, ROLE PLAY,  
AND INSTRUCTOR'S PERSONAL NOTES**

Event No: 4, 5, 6, 7

Brief Description: FUEL CLAD FAILURE / RPS 'A' FAILURE TO TRIP/ MSL LEAK INSIDE TURB BLDG / 'D'  
MSL FAILURE TO ISOLATE

**INSTRUCTOR ACTIVITY:**

None.

**ROLE PLAY:**

As necessary.

SCENARIO EVENT FORM

Event No: 4, 5, 6, 7  
 Brief Description: FUEL CLAD FAILURE / RPS 'A' FAILURE TO TRIP/ MSL LEAK INSIDE TURB BLDG / 'D' MSL FAILURE TO ISOLATE

POSITION	TIME	STUDENT ACTIVITIES
US		Enters EO-100-105, RADIOACTIVITY RELEASE when TB Iodine or NG release rate exceeds ALERT Level.
		Request Off-Site Dose Calculations.
		Directs reactor cooldown < 100°F/hr.
PCOP		Initiates cooldown < 100°F/hr using SRVs.
★ US		Performs Rapid Depressurization before EPB projected dose/dose rate reaches the General Emergency declaration criteria.
		Enter EO-100-112, RAPID DEPRESSUREIZATION
		Directs RPV rapid depressurization by opening all ADS valves.
★ PCOP		Rapidly depressurizes the reactor by opening all ADS valves.
US		Directs RPV level restored and maintained +13" to +54" with available systems.
		Enters EO-100-103, PRIMARY CONTAINMENT CONTROL due to Suppression Pool temperature > 90°F.
		Directs maximizing Suppression Pool Cooling.
PCOP		Places both loops of Suppression Pool Cooling in service IAW OP-149-005, RHR OPERATION IN SUPPRESSION POOL COOLING MODE.

★ Denotes Critical Task

<b>NOTES:</b>	

**INSTRUCTOR ACTIVITIES, ROLE PLAY,  
AND INSTRUCTOR'S PERSONAL NOTES**

Event No: 4, 5, 6, 7  
Brief Description: FUEL CLAD FAILURE / RPS 'A' FAILURE TO TRIP/ MSL LEAK INSIDE TURB BLDG / 'D'  
MSL FAILURE TO ISOLATE

**INSTRUCTOR ACTIVITY:**

None.

**ROLE PLAY:**

Approximately 5 minutes after the crew enters EO-100-105 and Off-Site Dose Calculations have been requested, report to the Control Room as the TSC Dose Calculator and provide the crew the attached MIDAS report.

**NOTE:** Off-Site dose is projected to reach 1.6 rem TEDE based on existing release rate and plant conditions.

**TERMINATION CUE:**

Rapid depressurization has been performed and actions are in progress to restore RPV water level to +13" to +54".

# UNIT SUPERVISOR TURNOVER SHEET

UNIT: 1

Date: July 30, 2002

SHIFT 1900 to 0700  
Start End

SHIFT 0700 to 1900  
Start End

MODE 1

MODE

POWER LEVEL 100 %

POWER LEVEL \_\_\_\_\_ %

GENERATOR OUTPUT 1150 MWe

GENERATOR OUTPUT \_\_\_\_\_ MWe

1. CRD pump 1B is out of service for breaker maintenance, it is not expected to return this shift.
2. Condensate pump 1B has a possible ground, you are to reduce reactor power to 80% and shutdown 1B Condensate Pump 1B for inspection.
3. Unit 2 is in MODE 4.
4. Chemistry and RX Engineering still investigating spike in Off Gas activity during last Control Rod Exercising surveillance.

COMMON: