

**Facility:** River Bend Station      **Scenario No.:** SIS01.02      **Op.-Test No.:** \_\_\_\_\_

**Examiners:** \_\_\_\_\_ **Operators:** \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**Objectives:** To evaluate performance in the use of EOP-1, EOP-2, EOP-1A,  
in response to a main turbine trip with an ATWS.

**Initial Conditions:** Reactor Power : 75%

**Turnover:** RFP-1A lube oil leaks have been repaired and is ready to be placed inservice. Startup RFP-1A  
and raise reactor power.

**Type of Scram:** Auto Scram on Turbine Trip

Event No.	Malf. No.	Event Type *	Event Description
1	N/A	N/R	Startup reactor feedwater pump. Raise reactor power.
2	RMS005A	I	Radiation Monitor (RMS*RE5A) fails upscale.
3	MGEN002	I	Main generator voltage regulator "auto" control circuitry fails.
4	CRD001A	C	CRD pump trip.
5	TMS003	C	MSSMOV111 (MSR Steam Supply Valve) fails closed, causing uneven turbine heating and turbine high vibration.
6	RPS001A	M	Failure to scram (ATWS).
6A	ED003H	C	4160 VAC ENS*SWG1A Bus Fault. (after EOP entry)
6B	OR	C	SLC "B" fails to start. (after EOP entry)
6C	EHC002B	C	Main Turbine Bypass Valves Fail in the Closed Position. (after EOP entry)

\* (N) normal, (R) reactivity, (I) instrument, (C) component, (M) major

**Facility:** River Bend Station      **Scenario No.:** SIS03.03      **Op.-Test No.:** \_\_\_\_\_

**Examiners:** \_\_\_\_\_ **Operators:** \_\_\_\_\_  
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 \_\_\_\_\_

**Objectives:** To evaluate performance in the use of AOP-05, EOP-1, EOP-2, EOP-4, SAP-1, and SAP-2 (Emergency Depressurization, RPV Flooding, Containment Flooding) in response to a DBA LOCA.

**Initial Conditions:** Reactor Power : 100%

**Turnover:** Startup RCIC System IAW SOP-0035, RHR "B" is operating in Sup. Pool Cooling, High Volume  
Containment Purge is inservice.

**Type of Scram:** Manual scram due to loss of vacuum

Event No.	Malf. No.	Event Type *	Event Description
1	N/A	N	Startup RCIC system for testing.
1A	RCIC003B	I	RCIC speed controller fails upscale.
2	NMS017B	I	LPRM fails downscale.
3	OR	C	LPCS/RHR "A" line fill pump trip.
4	HDL001D	C	Heater drain pump trip.
5	CNM001A	C/R	Condenser air in-leakage. Reduce reactor power due to lowering vacuum.
6	RCS001	M	Rupture of the "A" recirculation loop (DBA LOCA).
6A	OR	C	Recirc pump "A" suction valve fails in the open position. (after EOP entry)
6B	HPSC002	C	HPSC injection valve fails to open. (after EOP entry)

\* (N) normal, (R) reactivity, (I) instrument, (C) component, (M) major

**Facility:** River Bend Station      **Scenario No.:** SIS05.02      **Op.-Test No.:** \_\_\_\_\_

**Examiners:** \_\_\_\_\_ **Operators:** \_\_\_\_\_  
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**Objectives:** To evaluate performance in the use of AOP-50 (Station Blackout), EOP-1, and EOP-2.

**Initial Conditions:** Reactor Power : 80%, Div. I diesel generator and one diesel fire pump are tagged out for maintenance, CCS - P1A tagged out, it is raining.

**Turnover:** Lower reactor power and secure reactor feedwater pump 1A. Div. I diesel generator and the diesel fire pump are tagged out for maintenance, CCS - P1A tagged out, it is raining.

**Type of Scram:** Automatic scram due to a loss of offsite power/station blackout

Event No.	Malf. No.	Event Type *	Event Description
1	N/A	R/N	Lower reactor power and secure one reactor feedwater pump
T = 0 min. 2	CNAMOV9 (override)	I	Gland seal evaporator water level regulator controller fails high due to failed high level sensor.
T = 10 min. 3	FWS006B	I	Reactor feedwater pump 'B' min. flow valve controller fails low due to flow sensor fail low.
T = 15 min. 4	ED007A/7B		Severe weather causing grid transients
T = 25 min. 5	MGEN001 ED001	M	Main generator trip / Station Blackout
6	RCIC001 HPCS001 MSS009B EHC002C	C C C	RCIC turbine trip. (after EOP entry) HPCS pump trip. (after EOP entry) MSIV seat leakage and turbine bypass valves fail open. (after EOP entry)

\* (N) normal, (R) reactivity, (I) instrument, (C) component, (M) major

**Facility:** River Bend Station      **Scenario No.:** SIS08.02 (Backup)      **Op.-Test No.:** \_\_\_\_\_

**Examiners:** \_\_\_\_\_ **Operators:** \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**Objectives:** To evaluate performance in the use of AOP-24, EOP-1, EOP-1A, and EOP-2 in response to a  
trip of both recirculation pumps and a coolant leak in the Drywell.

**Initial Conditions:** Reactor Power : 90%

**Turnover:** Raise reactor power. Perform LPCS Surveillance (STP-205-6301).

**Type of Scram :** Manual on trip of both recirc pumps or automatic on Flow Biased scram

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	N/R	Perform LPCS Surveillance. Raise reactor power.
2	NMS011F CRD008	I C	APRM fails upscale with a single control rod scram.
3	MSS011	I	PCV-144 (SJAE PCV) controller fails low (transmitter failure).
4	MSS005	C	SRV fails open.
5	OR/RCS002A	C	High vibration on recirc pump "A". Recirc pump "A" trips.
6	RCS003B	M	Recirc pump "B" seizes.
6A	RCS007	M	Coolant leak in the drywell.
6B	RPS001B RPS001C	C	Failure to scram (auto and manual). ARI will insert control rods (after EOP entry)
6C	ED004Q	C	EJS*SWG2B bus fault. (after EOP entry)

\* (N) normal, (R) reactivity, (I) instrument, (C) component, (M) major

**Facility:** River Bend Station      **Scenario No.:** SIS10.01 (Backup)      **Op.-Test No.:** \_\_\_\_\_

**Examiners:** \_\_\_\_\_ **Operators:** \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**Objectives:** To evaluate performance in the use of AOP-10, EOP-1, EOP-1A and EOP-2 in response to a  
Steam leak in the Drywell.

**Initial Conditions:** Reactor Power : 10%

**Turnover:** Plant startup, synchronize the main generator to the grid.

**Type of Scram:** Manual scram initiated due to Drywell Steam Leak

Event No.	Malf. No.	Event Type *	Event Description
1	N/A	N/R	Plant startup, synchronize the main generator to the grid. Raise reactor power by withdrawing control rods.
2	B21001B	I	RPV water level transmitter fails upscale affecting FWLC.
3	MSS010	I	Gland seal pressure regulator controller fails low (transmitter failure).
4	OR	C	High Vibration on condensate Pump 1A.
5	RPS003A	C	Loss of RPS "A".
6	MSS001	M	Drywell Steam Leak.
6A	RPS001B RPS001C	C	Failure to scram (auto and manual). ARI will insert control rods. (after EOP entry)
6B	EHC002B	C	Main Turbine Bypass Valves fail in the closed poaition. (after EOP entry)

\* (N) normal, (R) reactivity, (I) instrument, (C) component, (M) major

**COURSE:** Licensed Operator Simulator

**SCENARIO TITLE:** Turbine Trip / ATWS

**SCENARIO NUMBER:** RBS-1-SIM-HLO-SIS01.02

**SCENARIO DURATION:** 60 Minutes

PREPARED/VERIFIED BY: M.K. Cantrell DATE 8/13/00  
Sr. Operations Instructor

REVIEWED BY: J.A. Clark DATE 8/30/00  
Operations Department

VALIDATED BY: M.K. Cantrell DATE 8/13/00  
Sr. Operations Instructor

## TRAINING MATERIAL CHANGE NOTICE

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❶ Changes Performed By: \_\_\_\_\_ TEAR #: \_\_\_\_\_

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## **I. SCENARIO OBJECTIVE:**

To evaluate the crew in the use of EOP-1, EOP-2, and EOP-1A (Power/Level Control Contingency) in response to a Main Turbine trip with a failure of the reactor to scram.

## **II. EVENT OBJECTIVES:**

NOTE: With lead examiner concurrence, events may be deleted if specific exam requirements have been met.

### **Event No. 1: Reactor Feedwater Pump Startup and Reactor Power Ascension**

- a. Evaluate the crews ability to startup a Reactor Feedwater Pump and raise reactor power.

### **Event No. 2: RMS\*RE5A Upscale Failure**

- a. Evaluate the crews ability to respond to a upscale failure of the Reactor Bldg. Exhaust Rad Monitor (RMS\*RE5A).

### **Event No. 3 Main Generator Voltage Regulator "Auto" Control Circuitry Failure**

- a. Evaluate the crews ability to respond to a failure of the main generator voltage regulator "auto" control circuitry.

### **Event No. 4 CRD Pump Trip**

- a. Evaluate the crews ability to respond to a trip of Control Rod Drive Pump 1A.

### **Event No. 5: Turbine High Vibration**

- a. Evaluate the crews ability to respond to high Turbine Vibration due to uneven heating of the low pressure turbine.

**Event No. 6: ATWS**

- a. Evaluate the crews ability to respond to a failure of the reactor to scram with a subsequent loss of ENS\*SWG1A and control RPV and Containment parameters using EOP-1, EOP-1A, EOP-2, and the Power/Level Control Contingency of EOP-1A.
- b. Evaluate the crews ability to respond to a failure of ENS\*SWG1A and SLC pump "B".
- c. Evaluate the crews ability to respond to a failure of the Main Turbine Bypass Valves.

### **III. SCENARIO SUMMARY**

#### **A. Initial Conditions**

1. IC# 12
2. MOL equilibrium xenon

#### **B. Plant Conditions**

1. Reactor Power 75%

#### **C. Out of Service Equipment.**

1. "A" Reactor Feedwater Pump Lube Oil leaks have been repaired. The "A" RFP is ready to be placed inservice.
2. SRVs B21\*F041L and B21\*F047D are weeping and requires running suppression pool cooling ~ once every 48 hours.

#### **D. Evolutions \ Pending Malfunctions**

1. Startup Reactor Feedwater Pump, FWS-P1A IAW SOP-0009 and raise reactor power.
2. Fuel Bldg. Exhaust Rad Monitor (RMS\*RE5A) fails upscale. In response to this event the crew will take actions IAW ARPs.
3. Main Generator Voltage Regulator "auto".control circuitry fails. In response to this event the crew will take actions IAW ARPs and SOP-0080.
4. Control Rod Drive Pump 1A trips on a ground fault. In response to this event the crew will start CRD Pump 1B IAW ARP-601-22-A01.
5. Main Turbine high vibration due to uneven heating of the low pressure turbine. In response to this event the crew will take actions IAW ARP-870-54A-D08, AOP-0002, and SOP-0080.
6. Turbine vibration will continue to increase requiring the crew to insert a manual reactor scram. The reactor will fail to scram, the turbine will trip, ENS\*SWG1A will trip and SLC pump B will fail to start. In response to this event the crew will take actions IAW EOP-1, EOP-1A, EOP-2.

#### **E. Termination**

WITH EXAMINER CONCURRENCE when Hot Shutdown Boron weight is injected or all control rods are inserted.

#### **IV. CREW TURNOVER**

##### **A. Plant Conditions**(see attached OSS turnover sheet)

1. Reactor Power. 75%
2. MOL equilibrium xenon
3. Equipment status:
  - a. "A" Reactor Feedwater Pump Lube Oil leaks have been repaired. The "A" RFP is ready to be placed inservice.
  - b. SRVs B21\*F041L and B21\*F047D are weeping and require running suppression pool cooling ~ once every 48 hours.
4. Significant LCOs:
  - a. None
5. Evolutions completed, pending or in progress:
  - a. Startup Reactor Feedwater Pump, FWS-P1A.
  - b. Raise reactor power.

##### **B. Required Documents**

1. Blank Emergency Notification Forms

#### **V. DIRECTIONS TO THE EVALUATOR**

- A. Individual and crew evaluations will be conducted and documented in accordance with R-DAD-TQ-011, "Simulator Training", using the associated Simulator Evaluation Standards.

# VI. CONSOLE INSTRUCTOR DIRECTIONS

Event #	MFS/OR #	Malfunction Description and Information
0 Equipment Setup	<b>FREEZE</b> IC #12	Simulator initialization.
	<b>SET TRIGGERS</b>	<b>TRIG 1 .false.                    TRIG 15 RP:S1(1)</b> <b>TRIG 16 AN:0119A(60) .eq. TRUE</b> <b>TRIG 17 .false.                    TRIG 18 .false.</b> <b>TRIG 19 .false.                    TRIG 20 .false.</b>
	<b>TRIG 15</b>	Event trigger for Turbine Trip. (MODE Switch in Shutdown)
	<b>TRIG 16</b>	Event Trigger for bus failure. (SLC A INOP Annunciator P601-19-#60)
	imf EHC001	Main Turbine Trip.  <b>ACTIVATION TYPE <u>TRIG 15</u></b>
	imf ED003H	4160 VAC ENS*SWG1A Bus Fault  <b>ACTIVATION TYPE <u>TRIG 16</u></b>
	ior -ANN xal1680_5a_ c_8 OFF	Scram Pilot Air Header Low Pressure Annunciator OFF  <b>ACTIVATION TIME = <u>00:00:00</u></b>

Event #	MFS/OR #	Malfunction Description and Information
	ior -SW C41-C001B NEUTRAL  (680-18B-)	SLC "B" fails to start. (NEUTRAL)  <b>ACTIVATION TIME = <u>00:00:00</u></b>
	imf RPS001A	Failure to Scram (all)  <b>ACTIVATION TIME = <u>00:00:00</u></b>
	imf EHC002B	Main Turbine Bypass Valves Fail Closed  <b>ACTIVATION TIME = <u>00:00:00</u></b>
	imf MSS007M	Relief Valve Fails (Leaks) B21*F041L <b>ACTIVATION TIME = <u>00:00:00</u></b>
	imf MSS007P	Relief Valve Fails (Leaks) B21*F047D <b>ACTIVATION TIME = <u>00:00:00</u></b>
		<b>Take simulator out of FREEZE.</b>  Stop Feedwater Pump 1A.  Depress the Lube Oil Start P/B on P680 to start the RFP Lube Oil system.  Start 3rd Condensate pump.  Raise Suppression Pool Temperature to ~86°F by cycling open/closed SRVs F041L and F047D.  Acknowledge and reset all annunciators.  Allow plant parameters to stabilize.  <b>Place simulator in FREEZE.</b>

Event #	MFS/OR #	Malfunction Description and Information
		Take simulator out of FREEZE.
<b>1</b>  <b>Problem Time:</b>  N/A		RFP Startup.  Raise Reactor Power.
		<b>ROLE PLAY:</b>  Respond as Turbine Bldg. Operator that you are standing by to support the starting of Feedwater Pump 1A.  You and System Engineering have completed all pre-startup checks.  After pump startup, report that the pump appears to be operating normally.
		<b>ROLE PLAY:</b>  Respond as RE, recommend the crew raise power to 80 - 85% as soon as possible using Recirc FCV. When power is ~90%, RE will evaluate and determine whether to continue with FCV or control rods.
		<b>ROLE PLAY:</b>  Respond as Auxiliary Control Room as necessary.

Event #	MFS/OR #	Malfunction Description and Information
<p>2</p> <p><b>Problem Time:</b></p> <p>after RFP started and power raised</p>	<p><b>TRIG 17</b></p> <p>imf RMS005A 0.100 R0 1e-7 T17</p>	<p>RMS*RE5A Gas Fails Upscale</p> <p><b>ACTIVATION TIME = <u>00:00:00</u></b></p>
		<p><b>Role Play</b></p> <p>Respond as Reactor Bldg. Operator to investigate RMS*RE5A failure. Report back that the Fuel Bldg. Filter Train is operating.</p> <p>It appears that RMS*RE5A has overheated internally. There is NO fire present, but the cabinet paint appears to be scorched.</p> <p>Respond as Chemistry to take grab sample, if requested.</p> <p>Respond as RP to survey the Fuel Bldg. when notified of failure.</p>
		<p><b>Role Play</b></p> <p>Respond as I&amp;C and System Engineering to investigate RMS*RE5A failure. Report back that there appears to be significant internal damage and will require further investigation. (Failed Upscale).</p> <p>If necessary, respond as I&amp;C and recommend securing the "B" Fuel Bldg. Filter Train and leave the "A". Train running for troubleshooting.</p> <p>As required, respond as Backpanel and report that RMS*RE5A has failed upscale.</p>



Event #	MFS/OR #	Malfunction Description and Information
<b>3</b>  <b>Problem Time:</b>  after RMS failure	<b>TRIG 18</b>  imf MGEN002 T18	Main Generator Voltage Reg. Trips to Manual  <b>ACTIVATION TIME = <u>00:00:00</u></b>
		<b>Role Play</b>  [If requested] Respond as SNEO, System Engineering, and I&C to investigate the Main Generator Voltage Regulator failure.  After approximately 5 minutes inform the control room that there appears to be internal damage and that there is an odor like burned insulation coming from the Main Generator Voltage Regulator control cabinet. There is no evidence of a fire at this time. The VR problem will require additional investigation and you'll need to open the cabinet. Initial assessment is that the plant can continue to be operated with the Main Generator Voltage Regulator in "manual".
		<b>Role Play</b>  As System Engineering recommend that the control room place the VR in MANUAL IAW SOP-0080, Step 5.6 "Transferring the VR from Auto to manual".  As System Operator, request the RBS raise VARS to 0, when they can.

Event #	MFS/OR #	Malfunction Description and Information
<b>4</b>  <b>Problem Time:</b>  after VR failure	<b>TRIG 19</b>  ior -ANN xal1601_22a_ c_1 ON T19	CRD PUMP HIGH SEAL LEAKAGE annunciator. (Setpoint PS7A is 1 psig raising)  <b>ACTIVATION TIME = <u>00:00:00</u></b>
	imf CRD001A T19 D1:0	CRD Pump "A" auto trip.  <b>ACTIVATION TIME = <u>00:01:00</u></b>
		<b>NOTE</b>  Allow the crew to start CRD pump "B" before providing local status on CRD pump "A".
		<b>Role Play</b>  [If requested] Respond as the Auxiliary Bldg. SNEO to investigate the CRD pump "A" high seal leakage.  After approximately 3 minutes inform the control room that CRD pump "A" has a bad seal leak and water from the leak is spraying down the entire area. Request to isolate CRD pump "A" with RP support. Inform the control room that some water has sprayed on CRD pump "B", but it appears to be running normally.

Event #	MFS/OR #	Malfunction Description and Information
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4 (cont.)		<p><b>NOTE</b></p> <p>When CRD pump "A" is reported isolated, remove the following malfunction.</p>
	<p><b>Remove:</b> dor -ANN xall601_22a_ c_1 ON</p>	<p>"CRD PUMP A HIGH SEAL LEAKAGE" annunciator. (Setpoint PS7A is 1 psig raising)</p>
		<p><b>Role Play</b></p> <p>[If requested] Respond as electrical maintenance to check out the breaker for CRD pump "A".</p> <p>After approximately 5 minutes, inform the control room that CRD pump "A" tripped on a ground fault condition possibly due to moisture in the motor. The motor will have to be inspected and tested and this will take at least 6 hours.</p>
		<p><b>Role Play</b></p> <p>[If requested] Respond as mechanical maintenance to check out the seal failure for CRD pump "A".</p> <p>After approximately 10 minutes, inform the control room that the seal will have to be replaced. This will take at least a day.</p>

Event #	MFS/OR #	Malfunction Description and Information
<b>5</b>  <b>Problem Time:</b>  ~ 3 min. after CRD 1A trips	<b>TRG 20</b>  imf TMS003 T20  ior -SW MSS-MOV111 CLOSE T20  (870-52-C3)	Main Turbine High Vibration  (NOTE: It takes ~7 min. until receipt of annunciator.)  MSSMOV111 (CLOSE) Steam Supply Shutoff Valve  <b>ACTIVATION TIME = <u>00:00:00</u></b>
		<b>ROLE PLAY:</b>  Respond as the Turbine Bldg. operator and System Engineer to investigate the turbine high vibration.  After ~ 5 minutes inform the Control Room that you can feel excessive vibration on TB 123' elevation.  Respond as Turbine Bldg. and I&C to investigate the failure of MSS-MOV111. Report that the valve has failed closed possibly due to a failed relay. It will require further investigation.
	<b>DELETE</b> dmf TMS003	Delete MFS when Turbine has tripped.
<b>6</b>  <b>Problem Time:</b>  N/A		ATWS Event

Event #	MFS/OR #	Malfunction Description and Information
6 (cont.)		<b>ROLE PLAY:</b> Respond as the Control Bldg. operator and Electrical Maintenance to investigate the trip of ENS*SWG1A.  After ~ 5 minutes inform the Control Room that the breaker has tripped and cannot be reset.
	dor -SW C41-C001B NEUTRAL  (SLC B)	<b>ROLE PLAY:</b> Respond as Electrical Maintenance to investigate the failure of SLC "B".  After Power/Level Control as been implemented, inform the Control Room that there was a problem with the SLC "B" switch and it has been repaired.
		<b>NOTE:</b>  Delay installing Enclosure 14 (Bypassing RC&IS Interlocks) to maintain higher reactor power ensuring suppression pool temperature exceeds 110°F.
	EOP 11 <b>REMOVE</b> dmf RPS001A  <b>Remove:</b> dor -ANN xal1680_5a_ c_8 OFF	<b>NOTE:</b>  <b>WITH EXAMINER CONCURRENCE:</b>  Report installation of EOP, 11 (Vent Scram Air Header) after crew has implemented Power/Level Control Contingency (injection into the RPV has been commenced) to insert all control rods.  Scram Pilot Air Header Low Pressure Annunciator

Event #	MFS/OR #	Malfunction Description and Information
	Use the following RFs to implement EOP Encls.  irf, EOP -10 -12 -14 -15 -20 -16 -24 -27	<p><b>ROLE PLAY:</b></p> <p>Respond as Operators and Technicians to install EOP Enclosures as requested by the CRS.</p> <p>(10) Scram Solenoids (JUMPERED)</p> <p>(12) Defeating RPS and ARI Logic Trips (JUMPERED)</p> <p>(14) RC&amp;IS Interlocks (JUMPERED)</p> <p>(15) Alternate SLC Injection.</p> <p>(20) Defeat DW Clg ISOL (JUMPERED)</p> <p>(16) Cntmt IAS ISOL (JUMPERED)</p> <p>(24) MSIV/MSL LVL 1 ISOL (JUMPERED)</p> <p>(27) Prevent Inj LP ECCS (JUMPERED)</p>
7	<b>FREEZE</b>	<p>WITH EXAMINER CONCURRENCE when:</p> <p>Hot Shutdown Boron weight is injected or all Control Rods are inserted.</p>

## VII. OPERATOR ACTIONS

### EVENT NUMBER 1

#### Brief Description:

Startup Reactor Feedwater Pump, FWS-PlA IAW SOP-0009 and raise reactor power.

Position	Operator Actions	S/U	Comments
CRS	Direct and coordinate startup of the RFP Pump 1A per SOP-0009.  Direct crew to raise reactor power per GOP-0005.		
ATC/UO	Startup RFP Pump 1A per SOP-0009: <ul style="list-style-type: none"><li>• verify open V28 (Disch. Vlv. Bypass).</li><li>• verify open CCS-V280 (Seal Wtr Supply Vlv).</li><li>• verify CNM-H/A68A (Min Flow Cntrlr) in AUTO.</li><li>• ensure RFP has been warmed.</li><li>• verify RFP is not rotating.</li><li>• start the RFP by maintaining the START pushbutton depressed until FV2A (Min Flow Vlv) has opened and the RFP has started.</li><li>• verify motor amps are &gt;200 but &lt;311.</li></ul>		

Position	Operator Actions	S/U	Comments
ATC/UO (cont.)	<ul style="list-style-type: none"> <li>• open MOV26A (RFP Disch. Vlv.).</li> <li>• verify closed MOV109 (RFP Bypass Vlv.).</li> <li>• monitor motor and gear increaser lube oil coolers.</li> <li>• monitor seal cooler temperatures.</li> </ul> <p>Raise reactor power per GOP-0005.</p>		
UO	<p>Assist in starting RFP Pump 1A as directed.</p> <p>NOTE: It may be necessary to startup the RFP Lube Oil system IAW SOP-0009.</p>		



**EVENT NUMBER 2****Brief Description:**

The Division I Fuel Building Exhaust Ventilation Radiation Monitor (RMS\*RE5A) fails upscale.

Position	Operator Actions	S/U	Comments
CRS	<p>Direct crew to determine cause of DIV 1 Fuel Bldg. Exhaust Radiation Monitor (RMS*RE5A) annunciator per ARP-863-75-H03, C02, E02 and DRMS.</p> <ul style="list-style-type: none"><li>• direct/verify Fuel Bldg. Ventilation System responded correctly (secure one train).</li><li>• implement AOP-0003 to verify applicable isolations.</li><li>• enter EOP-0003, as required.</li></ul> <p>Refer to TRM 3.3.11.3 (Radioactive Gaseous Effluent Monitoring Instrumentation), Table 3.3.11.3-1, and 3.3.6.2 (Secondary Containment Isolation Instrumentation) and determine that RMS*RE5A is not required to be operable for current plant conditions.</p> <p>[Crew should initiate a Tracking LCO and have Chemistry take a grab sample.]</p>		
ATC	None		

Position	Operator Actions	S/U	Comments
UO	<p>Implement required actions for the upscale failure of RMS*RE5A per ARP-863-75-H03, C02, E02, and DRMS:</p> <ul style="list-style-type: none"> <li>• monitor DRMS Grid 3 or 6 and determine status of monitor (RMS*RE5A).</li> <li>• inform CRS that RMS*RE5A is indicating failed upscale.</li> <li>• implement AOP-0003 to verify applicable isolations</li> <li>• verify Fuel Bldg. Ventilation System responded correctly (secure one train IAW SOP-0062).</li> </ul>		

**EVENT NUMBER 3****Brief Description:**

Main Generator Voltage Regulator "auto" control circuitry fails. The crew will control the Main Generator Voltage Regulator control circuitry manually.

Position	Operator Actions	S/U	Comments
CRS	<p>Direct and coordinate crew response Main Generator Voltage Regulator failure IAW ARP-608-09-E03.</p> <p>Direct and coordinate crew, System Eng., and I&amp;C response to this failure. Direct/verify the following:</p> <ul style="list-style-type: none"><li>• VR shifted to manual control.</li><li>• generator output voltage is controlled manually.</li></ul>		
ATC	<p>Implement required actions for the Main Generator Voltage Regulator failure IAW ARP-608-09-E03 and SOP-0080:</p> <ul style="list-style-type: none"><li>• verify VR shifts from Automatic to Manual mode.</li><li>• depress the VR Mode Select MAN p/b.</li><li>• adjust VR Manual Adjust Raise/Lower p/b to obtain 0 VARS.</li><li>• control VR output in Manual.</li></ul>		

Position	Operator Actions	S/U	Comments
UO	<p>Assist crew in response to the Main Generator Voltage Regulator failure.</p> <p>Contact SNEO, System Eng., and I&amp;C to investigate the Main Generator Voltage Regulator failure as directed by CRS.</p>		

**EVENT NUMBER 4****Brief Description:**

Control Rod Drive Pump 1A trips on a ground fault due to a seal leak that causes water to enter the motor. The crew will start CRD pump 1B.

Position	Operator Actions	S/U	Comments
CRS	<p>Direct and coordinate crew response to CRD Pump High Seal Leakage alarm (ARP-601-22-C01).</p> <p>Direct and coordinate crew and Electrical Maintenance response to the trip of CRD pump 1A. Direct/verify the following:</p> <ul style="list-style-type: none"><li>• start CRD pump 1B per ARP-601-22-A01.</li><li>• Rx Bldg. Operator check CRD pumps locally.</li><li>• isolate the "A"CRD pump.</li></ul> <p>(IF REQUIRED) Refer to T.S. 3.1.5 (Control Rod Scram Accumulators) and determine that if 2 or more CR accumulators are inoperable with reactor steam dome pressure <math>\geq</math> 600 psig take action IAW B.1 and B.2.1 OR B.2.2.</p>		
ATC	<p>Monitor RC&amp;IS for control rod accumulator faults when CRD pump 1A trips.</p>		

Position	Operator Actions	S/U	Comments
UO	<p>Implement required actions for trip of CRD pump 1A per ARP-601-22-A01:</p> <ul style="list-style-type: none"> <li>• start stby CRD aux. oil pump (C001BP).</li> <li>• place flow controller (F002) in MANUAL and CLOSE.</li> <li>• start stby CRD pump.</li> <li>• slowly open flow controller (F002) to achieve 45 gpm.</li> <li>• place flow controller (F002) in AUTO.</li> <li>• isolate the "A"CRD pump.</li> </ul> <p>Contact Rx Bldg. Operator and Electrical Maintenance to investigate the trip of CRD pump 1A.</p>		

**EVENT NUMBER 5****Brief Description:**

Main Turbine High Vibration indication is received due to uneven heating of the low pressure turbine. The crew will respond to this event by reducing turbine load IAW ARP-870-54A-D08, AOP-0002, and SOP-0080.

Position	Operator Actions	S/U	Comments
CRS	<p>Direct and coordinate crew response to Turbine High vibration due to uneven heating per ARP-870-54A-D08, AOP-0002, AOP-0007, and SOP-0080. Direct/verify the following:</p> <ul style="list-style-type: none"><li>• stop reactor power ascension.</li><li>• reduce turbine load by reducing reactor power as necessary (crew may or may not reduce power).</li><li>• reduce steam supply to MSR #2 to balance MSR steam pressure and minimize uneven heating.</li><li>• contact the Turb. Bldg. Operator and System Engineering to investigate the high vibration condition.</li></ul>		

Position	Operator Actions	S/U	Comments
ATC	<p>Implement ARP-870-54A-D08, AOP-0002, AOP-0007, and SOP-0080:</p> <ul style="list-style-type: none"> <li>• stop reactor power ascension.</li> <li>• reduce reactor power as necessary to lower turbine loading, as directed by CRS.</li> </ul>		
UO	<p>Acknowledge and report high Turbine High Vibration.</p> <p>Implement ARP-870-54A-D08, AOP-0002, AOP-0007, and SOP-0080:</p> <ul style="list-style-type: none"> <li>• monitor turbine vibration and determine which bearing(s) caused the alarm.</li> <li>• reduce steam supply to MSR #2 to balance MSR steam pressure and minimize uneven heating. Take MSRs out-of-service IAW SOP-0010.</li> <li>• report to the CRS when turbine vibration limits are exceeded.</li> </ul>		



**EVENT NUMBER 6****Brief Description:**

Turbine vibration will continue to increase requiring the crew to insert a manual reactor scram. The reactor will fail to scram, the turbine will trip, and ENS\*SWG1A will trip. In response to this event the crew will take actions IAW EOP-1, EOP-1A, EOP-2.

Position	Operator Actions	S/U	Comments
CRS	<p>When turbine vibration limits are exceeded, insert a manual reactor scram.</p> <p>Implement EOP-1 and EOP-1A due to failure to scram. Direct/verify the following:</p> <ul style="list-style-type: none"><li>• verify the mode switch is in SHUTDOWN.</li><li>• monitor and control RPV level (-162"to 51"), pressure (stabilized 930 to 1060 psig), and reactor power.</li><li>• recognize failure of TB Bypass valves.</li><li>• verify ARI is initiated.</li><li>• initiate SLC and alt. SLC (direct/verify crew response to trip of ENS*SWG1A and failure of SLC "B"to start: contact EM, MM, and Control Bldg. operator).</li><li>•</li></ul>		

Position	Operator Actions	S/U	Comments
CRS (cont.)	<ul style="list-style-type: none"> <li>• inhibit ADS.</li> <li>• override ECCS as necessary to prevent injection.</li> <li>• trip both recirc pumps</li> <li>• install EOP Enclosures as required by EOPs (10,11,12,14,15,16,20, 24,27)</li> <li>• direct alternate methods of control rod insertion per EOP-1A.</li> </ul> <p>Implement EOP-2 due to High Sup. Pool Temp., High Sup. Pool Level., and High DW Temp. Direct/verify the following:</p> <ul style="list-style-type: none"> <li>• place RHR in Sup. Pool Cooling.</li> <li>• reject Sup. Pool to Radwaste.</li> <li>• start all available DW coolers (as required).</li> </ul> <p>Direct initiation of SLC "B" once repaired.</p>		

Position	Operator Actions	S/U	Comments
CRS (cont.)	<p>Implement EOP-1A Level/Power Control, if Sup. Pool temp. exceeds 110 degrees F., while power is &gt;5% and a SRV is open. Direct/verify the following:</p> <ul style="list-style-type: none"> <li>• terminate and prevent all injection into the RPV except Boron and CRD (including RCIC)</li> </ul> <p>Slowly recommence injection into the RPV when Rx power is below 5%, RPV level is -100 inches, or all SRVs are closed with the Condensate/Feedwater system.</p> <p>NOTE: If RPV water level is &lt; -190" and cannot be restored Emergency Depressurization is required.</p> <p>If Suppression Pool Temp. cannot be maintained in the safe region of the HCTL curve then direct the crew to reduce Rx pressure within the safe zone of the HCTL curve.</p> <p>When all control rods are inserted, direct the UO to secure SLC.</p> <p>Re-enter EOP-1 from EOP-1A.</p>		

Position	Operator Actions	S/U	Comments
CRS (cont.)	<p>Direct the ATC to restore RPV level to between 10 and 51 inches.</p> <p>[IF REQUESTED (after scenario)]</p> <p>Declare a SAE due to failure of RPS to initiate and complete a reactor scram with failure of manual scram methods (EAL 7).</p>		
ATC	<p>Manually scram the reactor as directed by CRS:</p> <ul style="list-style-type: none"> <li>• arm and depress the manual scram pushbuttons.</li> <li>• place the MODE switch in shutdown.</li> </ul> <p>Recognize and report failure of the reactor to scram and main turbine tripped.</p> <p>Implement AOP-0001 and AOP-0002.</p>		

Position	Operator Actions	S/U	Comments
ATC (cont.)	<p>Implement EOP-1 and EOP-1A as directed by CRS:</p> <ul style="list-style-type: none"> <li>• initiate ARI.</li> <li>• trip both recirc pumps.</li> <li>• recognize and report failure of TB Bypass valves (failed closed).</li> <li>• insert control rods.</li> <li>• [When directed] terminate and prevent injection into the RPV.</li> <li>• [When directed] slowly recommence injection into the RPV with the Condensate/Feedwater System.</li> <li>• recognize and report all rods are in after the scram air header is vented (ENCL. 11).</li> </ul> <p>Restore and maintain RPV level between 10 and 51 inches.</p>		
UO	<p>Maintain Control Room logs.</p> <p>Implement EOP-1 and EOP-1A as directed by CRS:</p> <ul style="list-style-type: none"> <li>• stabilize pressure 930 - 1060 psig using SRVs.</li> <li>• trip RCIC</li> </ul>		

Position	Operator Actions	S/U	Comments
UO (cont.)	<ul style="list-style-type: none"> <li>• initiate SLC and alt. SLC (report trip of SLC "A" and failure of SLC "B". Contact EM, MM, and CB. operator to investigate the trip of ENS*SWG1A and failure of SLC "B").</li> <li>• inhibit ADS</li> <li>• maximize CRD cooling water d/p. override ECCS as necessary to prevent injection. terminate and prevent injection into the RPV from all systems except Boron and CRD.</li> <li>• [When directed] Reduce Rx pressure to maintain RPV pressure in the safe zone of the HCTL.</li> </ul> <p>Implement EOP-2, as directed by CRS:</p> <ul style="list-style-type: none"> <li>• place RHR in Sup. Pool Cooling. reject the Sup. Pool to Radwaste. start all available DW Coolers (as required).</li> </ul> <p>Initiate SLC "B" once repaired.</p> <p>Secure SLC when directed.</p> <p>Implement AOP-0003 to verify applicable isolations.</p>		

### VIII. CRITICAL TASKS

1. Take action to reduce reactor power by inserting control rods and/or injecting Boron.
2. If Suppression Pool temperature reaches 110°F, with reactor power >5%, an SRV open, and RPV water level >100", implement Level/Power Control Contingency of EOP-1A and lower RPV water level.

### IX. QUANTITATIVE SUMMARY

A.	Total Malfunctions:	8
B.	Malf. after EOP entry:	3
C.	Abnormal Events:	2
D.	Major Transients:	2
E.	EOPs entered:	3
F.	EOP Contingency Procedures used:	1
G.	Simulator Run Time:	50 min.
H.	EOP Run Time:	20 min.

### X. REFERENCES

- A. R-DAD-TQ-011, "Simulator Training".
- B. NRC NUREG 1021 ES-301, Dynamic Simulator  
Requalification Examination
- C. BWR Owners Group Simulator Scenario Development  
Guidelines.

# **OPERATIONS SHIFT SUPERINTENDENT RELIEF CHECKSHEET**

Offgoing

Superintendent \_\_\_\_\_  
(Print)

Oncoming

Superintendent \_\_\_\_\_  
(Print)

Off-Going Shift

☐ ☐

N D Date \_\_\_\_\_

Part I - To be reviewed prior to assuming the shift

o Unit Status Mode 1 Rx Power 75% Pull Sheet #108

o Evolutions(completed/in progress/planned);  
General Information

Startup RFP 1A and Raise Reactor Power to 80% with flow,  
then contact Reactor Engineering for additional guidance.  
(Actions have been completed through SOP-0009, Step 4.4.8)

o Significant LCO Status

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

o Equipment Status

RFP 1A is ready to be placed inservice. Lube oil leaks  
have been repaired.  
SRVs B21\*F041L and B21\*F047D are weeping and require  
running suppression pool cooling ~ once every 48 hours.

\_\_\_\_\_

o Night Orders

o Standing Orders

o Board Walkdown

\_\_\_\_\_  
(Signature: Oncoming OSS Review Complete)



**COURSE:** Licensed Operator Simulator

**SCENARIO TITLE:** Loss of Condenser Vacuum /  
DBA LOCA

**SCENARIO NUMBER:** RBS-1-SIM-HLO-SIS03.03

**SCENARIO DURATION:** 60 Minutes

PREPARED/VERIFIED BY: M.K. Cantrell DATE 8/13/00  
Sr. Operations Instructor

REVIEWED BY: J.A. Clark DATE 8/30/00  
Operations Department

VALIDATED BY: M.K. Cantrell DATE 8/13/00  
Sr. Operations Instructor

## TRAINING MATERIAL CHANGE NOTICE

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❶ Changes Performed By: \_\_\_\_\_ TEAR #: \_\_\_\_\_

Change Description: \_\_\_\_\_

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(NOTE: Ensure that reference section is updated as appropriate)

Affected Page(s): \_\_\_\_\_

Approved: \_\_\_\_\_ Date: \_\_\_\_\_

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❷ Changes Performed By: \_\_\_\_\_ TEAR #: \_\_\_\_\_

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Approved: \_\_\_\_\_ Date: \_\_\_\_\_

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**I. SCENARIO OBJECTIVE:**

To evaluate the crew in the use of AOP-0005, EOP-1, EOP-2, EOP-4, SAP-1, and SAP-2 (Emergency Depressurization, RPV Flooding, and Containment Flooding) in response to a loss of condenser vacuum followed by a rupture of the "A" Recirculation Loop.

**II. EVENT OBJECTIVES:**

NOTE: With lead examiner concurrence, events may be deleted if specific exam requirements have been met.

**Event No. 1: RCIC System Startup**

- a. Evaluate the crews ability to startup RCIC System per SOP-0035 for governor trouble shooting and respond to a RCIC controller failure causing the RCIC turbine trip .

**Event No. 2: LPRM Downscale Failure**

- a. Evaluate the crews ability to respond to an LPRM downscale failure and an inoperable APRM.

**Event No. 3: LPCS/RHR "A" Line Fill Pump Trip**

- a. Evaluate the crews ability to respond to a trip of the LPCS/RHR "A" line fill pump.

**Event No. 4: Heater Drain Pump Trip**

- a. Evaluate the crews ability to respond to a trip of a Heater Drain Pump.

**Event No. 5: Loss of Condenser Vacuum**

- a. Evaluate the crews ability to respond to a loss of condenser vacuum.

**Event No. 6: DBA LOCA**

- a. Evaluate the crews ability to respond to a DBA LOCA (Recirc Loop "A" rupture) with a subsequent failure of the "A" Recirc Pump Suction Valve in the open position and a failure of the HPCS injection valve to open.

### **III. SCENARIO SUMMARY**

#### **A. Initial Conditions**

1. IC# 13
2. MOL equilibrium xenon

#### **B. Plant Conditions**

1. Reactor Power 100%

#### **C. Out of Service Equipment.**

1. LPRMs 30-07A, 22-07D, 14-23A, 46-23C are bypassed.

#### **D. Evolutions \ Pending Malfunctions**

1. Startup RCIC System IAW SOP-0035. After RCIC is running, RCIC speed controller fails high and RCIC turbine trips. In response to this event the crew will take actions IAW ARPs.
2. LPRM 30-39A fails downscale. In response to this event the crew will take actions IAW ARPs.
3. LPCS/RHR "A" line fill pump trips on overcurrent. In response to this event the crew will take action IAW ARPs.
4. Heater Drain Pump trips. In response to this event the crew will take action IAW AOP-0007, ARPs, and SOP-0010.
5. Loss of condenser vacuum due to failure of turbine expansion joint. In response to this event the crew will take actions IAW AOP-0005.
6. The pressure transient associated with the reactor scram, closing of the MSIVs, and turbine trip causes a rupture of the "A" recirculation loop with a subsequent failure of the "A" Recirc Pump Suction Valve in the open position. In response to this event the crew will take action IAW EOP-1, EOP-2, and EOP-4 (Emergency Depressurization, RPV Flooding, and Containment Flooding).

## **E. Termination**

WITH EXAMINER CONCURRENCE when the crew has completed the following:

- EOP-4 (Emergency Depressurization, RPV Flooding, and Containment Flooding) has been implemented.
- AOP-0003 has been implemented and verification is in progress or completed.
- RPV and Containment parameters are stable.

#### **IV. CREW TURNOVER**

##### **A. Plant Conditions**(see attached OSS turnover sheet)

1. Reactor Power 100%.
2. MOL equilibrium xenon
3. Equipment status:
4. Significant LCOs:
  - a. None
5. Evolutions completed, pending or in progress:
  - a. Startup RCIC System IAW SOP-0035 to trouble shoot the RCIC governor valve

##### **B. Required Documents**

1. Blank Emergency Notification Forms
2. STP-050-0700

#### **V. DIRECTIONS TO THE EVALUATOR**

- A. Individual and crew evaluations will be conducted and documented in accordance with R-DAD-TQ-011, "Simulator Training", using the associated Simulator Evaluation Standards.



# VI. CONSOLE INSTRUCTOR DIRECTIONS

Event #	MFS/OR #	Malfunction Description and Information
0  Equipment Setup	<b>FREEZE</b> IC #13	Simulator initialization.
	<b>SET TRIGGERS</b>	TRIG 1 .false.            TRIG 2 .false. TRIG 3 .false.            TRIG 17 .false. TRIG 18 .false.           TRIG 19 .false. TRIG 20 .false.           TRIG 15 RP:S1(4)==0
	ior -LO CNM- MOV-G ON  ior -LO CNM- MOV-R OFF	CNM-MOV+G (ON) Vacuum Brkr Green LTG CNM-MOV+R (OFF) Vacuum Brkr Red LTR  <b>ACTUATION TIME 00:00:00</b> (680-15C)
	ior - SW B33-MOV23A NEUTRAL  (680-4C)	B33*MOV23A+S (OPEN) Recirc Pump A Suction Valve Switch  <b>ACTUATION TIME 00:00:00</b>
	<b>TRIG 15</b> RP:S1(1)	Event Trigger for Steam Leak. (MODE Switch to Shutdown)
	imf MSS001 500.00 T15 R4:00 0.00  Sev. 500 Ramp 4:0	Steam Leak in the Drywell.  <b>ACTIVATION TYPE TRIG 15</b>
	ior -SW CNM- MOV OPEN T15  (680-15C)	CNM-MOV+S (OPEN) Vacuum Brkr Control Switch  <b>ACTIVATION TYPE TRIG 15</b>

Event #	MFS/OR #	Malfunction Description and Information
	irf NIS002_	LPRMs BYPASS:  3007A BYPASS 1423A BYPASS 2207D BYPASS 4623C BYPASS
	imf HPCS002	HPCS injection Valve F004 fails to open.  <b>ACTUATION TIME 00:00:00</b>
		<b>Take simulator out of FREEZE.</b>  Place RHR B in Sup. Pool Cooling.  Place High Volume Containment Purge inservice.  Verify 5 Drywell unit coolers are left running.  Start Special Log #4 (Sup. Pool Temp.).  Acknowledge and reset all annunciators.  <b>Place simulator in FREEZE.</b>
		<b>Take simulator out of FREEZE.</b>
1		<b>ROLE PLAY</b>
<b>Problem Time:</b>		As System Engineering and Rx. Bldg. Operator support RCIC System Flow Test, as required. Request flow to be established to obtain 600 gpm.
after RCIC is running	<b>TRIG 17</b> imf RCIC003B T17 imf RCIC001 d10	RCIC Speed Controller fails high  <b>ACTIVATION TIME = 00:00:00</b>

Event #	MFS/OR #	Malfunction Description and Information
1 (cont.)  When directed to reset RCIC overspeed trip		<div>ROLE PLAY</div> <div>As System Engineering and Rx. Bldg. Operator investigate the trip of RCIC. Report back that there is no local indication of why RCIC overspeed tripped.</div>
	<div>dmf RCIC003B</div> <div>dmf RCIC001</div>	<div>ROLE PLAY</div> <div>As I&amp;C investigate the trip of RCIC. After ~5 min. report back that there appears to be a problem with the speed controller and will require additional troubleshooting.</div>
2  Problem Time:  after RCIC trip	<div>TRIG 18</div> <div>imf NMS017B_3039A T18</div>	<div>LPRM 30-39A fails downscale</div> <div>ACTIVATION TIME = 00:00:00</div>
		<div>ROLE PLAY</div> <div>As Reactor Engineering respond and investigate the failure of LPRM 30-39A.</div> <div>When requested inform crew that the following LPRMs are out of service and bypassed:</div> <div><div>30-07A14-23A</div><div>22-07D46-23C</div></div>

Event #	MFS/OR #	Malfunction Description and Information
2 (cont.)	irf NIS002	Bypass LPRM 30-39A  When requested by the crew.
3  after LPRM failure	<b>TRIG 19</b>  ior -LO E21-LFP-A ON T19  ior -LO E21-LFP-G OFF T19  ior -SW E21-LFP STOP T19  (601-21C)  -ANN xal1601_21a_h_8 ON T19  -ANN xal1601_20a_c_4 OFF T19	E21-LFP-A (ON) LPCS/RHR line fill pump LTA  E21-LFP-G (OFF) LPCS/RHR line fill pump LTG  E21-LFP-S (STOP) LPCS/RHR line fill pump switch
	irf ECCS003	<b>ROLE PLAY:</b>
		Respond as SNEO and EM to investigate the trip of the LPCS/RHR A line fill pump. Report that the pump breaker is in the tripped position and will not reset.
		Report that the RHR A system has water flow at the high point vent and the LPCS system does not.
		If requested, rack out the following ECCS pump breaker:  LPCS pump breaker
If RHR "A" is not in SP Cooling within ~7 minutes	dor ANN xal1601_20a_c_4 OFF	

Event #	MFS/OR #	Malfunction Description and Information
4  after line fill pump trip	<b>TRIG 20</b>  imf HDL001D T20	Heater Drain Pump D Trip
		<b>ROLE PLAY:</b>  Respond as the Control Bldg. Operator to investigate the trip of the Heater Drain Pump. Report that the pump breaker tripped on phase overcurrent (2 out of 3 tripped) and cannot be reset. (NNS-SWG1B)
		<b>ROLE PLAY:</b>  Respond as Electrical Maintenance, and report that the breaker appears to have been severely damaged and will require to be replacement.
		<b>ROLE PLAY:</b>  Respond as R.E. to assist in power reduction, recommend inserting Group (Step 205) to position 8.
		<b>ROLE PLAY:</b>  Respond as the Turb. bldg. Operator and report that the oil level for HDL-1C Pump is OK.
	<b>TRIG 3</b>  ior -LO HDL- LV4B-R OFF T3  -LO HDL- LV4B-G ON T3	HDL-LV4B+G(ON) 3rd PT HTR B DRAIN VALVE LTG  HDL-LV4B+R(OFF) 3rd PT HTR B DRAIN VALVE LTR  (870-53C-4)

Event #	MFS/OR #	Malfunction Description and Information
4 (cont.)	<b>DELETE</b>  dor 870-53C-	NOTE: Delete Overrides when requested as Turbine Bldg. Operator.  HDL-LV4B+G(ON) 3rd PT HTR B DRAIN VALVE LTG  HDL-LV4B+R(OFF) 3rd PT HTR B DRAIN VALVE LTR
		<b>ROLE PLAY:</b>  Respond as chemistry and report that it is OK to pump forward with HDL-1C Pump.
		<b>ROLE PLAY:</b>  Respond as ACR as necessary.  If necessary, contact MCR as System Operator, and request RBS to raise power to 100% due system load demands.
5  <b>Problem Time:</b>  after LPRM Failure	<b>TRIG 1</b>  imf CNM001  Sev: 30% Ramp: 05:00 T1	Main Condenser Air In-Leakage  Simulates a loss of condenser vacuum due to a small hole in the Turbine expansion joint. (Eventual rupture)  <b>ACTUATION TIME = <u>00:00:00</u></b>
		<b>ROLE PLAY</b>  As Turb. Bldg. Operator investigate the lowering condenser vacuum.

Event #	MFS/OR #	Malfunction Description and Information
<b>5</b> (cont.)  after initial response to loss of Vac. (with exmnr OK)	imf CNM001  Sev: 40% Ramp: 03:00	ROLE PLAY  Wait approximately 5 minutes after initial notification of possible boot leak and tell control room leak has increased.
		Role Play  Respond as various SNEOs when called to investigate the cause of the increased Offgas flowrate and lowering vacuum. If asked to verify valve lineups allow approximately 10 minutes for each lineup and report that all valves are properly aligned. Do not report any cause for condenser air in-leakage for approximately 15 minutes.
		Role Play  Respond as Radiation Protection to assist operations in problem investigation. Advise SRO that the maximum stay time for the east and west condenser bays is 5 minutes (each).
		Role Play  After approximately 15 minutes call the control room on the gaitronics as the SNEO which was sent to investigate the condenser bay. Report that there is a loud sucking noise coming from very high on the west side of the main condenser in the vicinity of number one low pressure turbine boot.

Event #	MFS/OR #	Malfunction Description and Information								
5 (cont.)	ior -SW CNM- MOV OPEN T15  (680-15C)	<p><b>NOTE:</b></p> <p>Ensure this override is active as soon as the crew inserts a manual scram, to simulate boot failure.</p> <p>CNM-MOV+S (OPEN) Vacuum Brkr Control Switch</p> <p><b>ACTUATION TIME = <u>00:00:00</u></b></p>								
		<p><b>ROLE PLAY:</b></p> <p>Provide the following Leakage Reports as requested:</p> <table><tr><td>Leakage Report #5</td><td>~ 63 gpm</td></tr><tr><td>Leakage Report #6</td><td>~ 90 gpm</td></tr><tr><td>Leakage Report #7</td><td>~108 gpm</td></tr><tr><td>Leakage Report #8</td><td>~139 gpm</td></tr></table>	Leakage Report #5	~ 63 gpm	Leakage Report #6	~ 90 gpm	Leakage Report #7	~108 gpm	Leakage Report #8	~139 gpm
Leakage Report #5	~ 63 gpm									
Leakage Report #6	~ 90 gpm									
Leakage Report #7	~108 gpm									
Leakage Report #8	~139 gpm									
6  <b>Problem Time:</b>  ~ 4 min. after the scram	<b>TRIG 2</b>  imf RCS001 T2	<p>Recirculation Loop A Rupture</p> <p><b>ACTUATION TIME = <u>00:00:00</u></b></p>								



Event #	MFS/OR #	Malfunction Description and Information
6 (cont.)		<b>ROLE PLAY:</b> Respond as necessary to investigate the failure of the "A" Recirc Pump Suction Valve in the open position.  Inform the Control Room that the valve has failed in the open position and cannot be closed.
	drf ESSC003	<b>ROLE PLAY:</b> Respond as necessary to rack-in the LPCS pump breaker.
	Use the following RFs to implement EOP Encls.  irf EOP	<b>ROLE PLAY:</b> Respond as Operators and Technicians to install EOP Enclosures as requested by the CRS.
	-19  -20	(19) HPCS High Water Level Iso. (JUMPERED)  (20) Drywell Cooling (JUMPERED)
7	<b>FREEZE</b>	WITH EXAMINER CONCURRENCE when the crew has completed the following: <ul style="list-style-type: none"> <li>• EOP-4 (Emergency Depressurization, RPV Flooding, and Containment Flooding) has been implemented.</li> <li>• AOP-0003 has been implemented and verification is in progress or completed.</li> <li>• RPV and Containment parameters are stable.</li> </ul>

## VII. OPERATOR ACTIONS

### EVENT NUMBER 1

#### Brief Description:

Startup RCIC System in accordance with SOP-0035 and respond to a RCIC speed controller failure and RCIC Turbine trip.

Position	Operator Actions	S/U	Comments
CRS	Direct and coordinate RCIC Surveillance IAW SOP-0035.  Direct and coordinate crew response to RCIC Turbine Trip IAW ARPs.  Refer to T.S. 3.5.3: (verify within 1 hour that HPCS is OPERABLE).		
ATC	None		
UO	Startup RCIC IAW SOP-0035: <ul style="list-style-type: none"><li>• verify suppression pool cooling and containment purge is inservice.</li><li>• start the Gland Seal Compressor (C002C).</li><li>• open F045 (RCIC Stm Supply Stop Vlv).</li><li>• verify F019 (RCIC Min Flow to Sup Pool Valve) opens.</li><li>• open F059 (RCIC Test Return Vlv to CST)</li></ul>		

Position	Operator Actions	S/U	Comments
UO (cont.)	<ul style="list-style-type: none"> <li>• open F022 (RCIC Test Bypass Vlv to CST) as required to establish desired discharge pressure.</li> <li>• adjust R600 (RCIC Flow Controller) as desired to control system flow.</li> </ul> <p>Respond to RCIC Turbine trip:</p> <ul style="list-style-type: none"> <li>• contact System Engineering, Rx. Bldg. Operator, and I&amp;C to investigate.</li> </ul> <p>Shutdown RCIC IAW SOP-0035 if directed.</p>		

**EVENT NUMBER 2****Brief Description:**

LPRM 30-39A fails downscale, resulting in inadequate LPRMs per level for APRM "F", thus APRM "F" becomes INOP.

Position	Operator Actions	S/U	Comments
CRS	<p>Direct and coordinate crew response to LPRM failure per ARPs. Direct/verify the following:</p> <ul style="list-style-type: none"><li>• I&amp;C and Reactor Engineering to investigate problem with LPRM 30-39A.</li></ul> <p>Direct crew to bypass LPRM 30-39A.</p> <p>Refer to REP-0037, LPRM Operability to determine that APRM "F" has insufficient LPRMs per level.</p> <p>Refer to T.S. 3.3.1.1. (Declare APRM "F" INOP due to insufficient LPRMs per level IAW T.S. Bases B3.3.1.1, function 2.b safety analysis section). Place APRM F in bypass.</p>		
ATC	<p>Acknowledge LPRM DOWNSCALE annunciator, inform CRS, and implement ARP-680-06-C04:</p>		

Position	Operator Actions	S/U	Comments
ATC (cont.)	<p>Identify which LPRM has given the downscale alarm; inform CRS.</p> <ul style="list-style-type: none"> <li>• compare power level indication with other channels.</li> <li>• [When directed] demand an OD-3 report.</li> </ul> <p>Bypass APRM F, when directed by CRS.</p>		
UO	<p>Verify and monitor backpanel indications for APRM F, other power level indications, and trip unit status lights.</p> <p>Recognize DOWNSCALE indication and inform CRS.</p> <p>[when directed] bypass LPRM 30-39A.</p>		

**EVENT NUMBER 3****Brief Description:**

LPCS/RHR A line fill pump trips on overcurrent. In response to this event the crew will take action IAW ARPs.

Position	Operator Actions	S/U	Comments
CRS	<p>Direct/verify crew response to trip of LPCS/RHR line fill pump IAW ARP-601-21-C07 and ARP-601-20-C04:</p> <ul style="list-style-type: none"><li>• SNEO and EM to investigate.</li><li>• check that the LPCS and RHR A systems are filled.</li><li>• start the RHR A system in suppression pool cooling.</li><li>• rack out the LPCS pump</li></ul> <p style="text-align: center;"><b>OR</b></p> <ul style="list-style-type: none"><li>• rack out RHR 'A' and LPCS Pump Bkrs</li></ul> <p>Determine that is inoperable per T.S. 3.5.1 (ECCS and RCIC)</p>		<p>T.S. 3.5.1 A 7 day LCO</p> <p style="text-align: center;"><b>OR</b></p> <p>T.S. 3.5.1 C 72 hour LCO</p>
ATC	None		

Position	Operator Actions	S/U	Comments
UO	<p>Implement required actions for the trip of LPCS/RHR line fill pump as follows:</p> <ul style="list-style-type: none"> <li>• determine and report trip of line fill pump.</li> <li>• direct SNEO and EM to investigate.</li> <li>• check that the LPCS and RHR A systems are filled.</li> <li>• start the RHR A system in suppression pool cooling.</li> <li>• direct racking out the LPCS pump.</li> </ul>		

**EVENT NUMBER 4****Brief Description:**

Heater Drain Pump trips. In response to this event the crew will take action IAW AOP-0007, AOP-0006, and AOP-0024 ARPs, and SOP-0010.

Position	Operator Actions	S/U	Comments
CRS	<p>Direct/verify crew response to trip of Heater Drain Pump IAW AOP-0007, AOP-0006, AOP-0024 ARP-680-02-A08, and SOP-0010.</p> <ul style="list-style-type: none"><li>• maintain reactor power less than or equal to 100%.</li><li>• start HDL Pump 1C and isolate HDL Pump 1D.</li></ul>		
ATC	<p>Implement the required action for the trip of Heater Drain Pump as follows:</p> <ul style="list-style-type: none"><li>• maintain reactor power less than or equal to 100% rated thermal power.</li><li>• reduce core flow to less than or equal to 100% of rated core flow (84.5 Mlbs/hr).</li></ul> <p>Determine which HDL Pump has tripped.</p> <p>Start HDL Pump 1C and isolate HDL Pump 1D per SOP-0010:</p> <ul style="list-style-type: none"><li>• start the idle HDL-P1C HTR DRN PUMP.</li><li>• open HDL-MOV55C BACKUP HTR DRN PUMP DISCHARGE VALVE.</li></ul>		



Position	Operator Actions	S/U	Comments
ATC (cont.)	<ul style="list-style-type: none"> <li>close HDL-MOV55D HTR DRN PUMP DISCHARGE VALVE.</li> </ul>		
UO	<p>Implement required actions for the trip of Heater Drain Pump as follows:</p> <ul style="list-style-type: none"> <li>monitor feedwater temperature.</li> <li>if feedwater temp. is below the 3% loss of feedwater heating line, make the appropriate log entry and initiate a Condition Report.</li> </ul> <p>Assist in starting Heater Drain Pump:</p> <ul style="list-style-type: none"> <li>open HDL-MOV58C HTR DRN PUMP VENT.</li> <li>open HDL-LV20B 25%/manual.</li> <li>close HDL-MOV58C HTR DRN PUMP VENT.</li> </ul>		

**EVENT NUMBER 5****Brief Description:**

Condenser vacuum is lowering due to an unknown source of leakage into the condenser requiring a manual reactor scram due to the inability to maintain condenser vacuum. After actions are taken to stabilize the plant, the boot will rupture resulting in total loss of vacuum.

Position	Operator Actions	S/U	Comments
CRS	<p>Direct and coordinate crew response to lowering condenser vacuum per AOP-0005 and Offgas ARPs. Direct/verify the following:</p> <ul style="list-style-type: none"><li>• ATC to monitor main condenser vacuum.</li><li>• reduction of reactor power to maintain condenser vacuum greater than or equal to 25"Hg. per AOP-0005.</li><li>• when vacuum cannot be maintained greater than or equal to 25"Hg, then manually scram the reactor.</li></ul> <p>Implement AOP-0001, AOP-0002, and AOP-0003 on reactor scram, turbine trip, and to verify isolations.</p>		

Position	Operator Actions	S/U	Comments
CRS (cont.)	<p>Direct/verify UO to place MSIV control switches to the closed position after MSIV closure.</p> <p>Direct/verify crew to establish RPV pressure control.</p>		
ATC	<p>Perform immediate actions of AOP-0005:</p> <ul style="list-style-type: none"> <li>• reduce reactor power to maintain condenser vacuum greater than or equal to 25"Hg.</li> <li>• when vacuum cannot be maintained greater than or equal to 25"Hg, then manually scram the reactor.</li> </ul> <p>Implement AOP-0001 and AOP-0002:</p> <ul style="list-style-type: none"> <li>• arm &amp; depress all four MANUAL SCRAM pushbuttons.</li> <li>• place the REACTOR MODE SWITCH to SHUTDOWN.</li> <li>• verify all control rods are fully inserted.</li> <li>• verify feedwater system is operating to restore reactor water level.</li> <li>• verify reactor pressure is being maintained.</li> </ul>		

Position	Operator Actions	S/U	Comments
ATC (cont.)	<ul style="list-style-type: none"> <li>• verify recirc pumps are running on the LFMG.</li> <li>• verify turbine is tripped.</li> </ul> <p>Perform subsequent actions of AOP-0005, AOP-0001 and AOP-0002.</p>		
UO	<p>Respond to lowering Condenser Vacuum per AOP-0005.</p> <p>Coordinate with the SNEOs to investigate the lowering condenser vacuum.</p> <p>Implement AOP-0001, AOP-0002, and AOP-0005 subsequent actions as directed.</p> <p>Implement AOP-0003 to verify applicable isolations.</p> <p>Place MSIV control switches to the closed position as directed.</p> <p>[If directed] establish RPV pressure control (stabilize pressure below 1060 psig).</p>		

**EVENT NUMBER 6****Brief Description:**

The pressure transient associated with the reactor scram, closing of the MSIVs, and the turbine trip causes a rupture of the "A" recirculation loop with a subsequent failure of the "A" Recirc Pump Suction Valve in the open position and a failure of the HPCS injection Isolation Valve to open. In response to this event the crew will take action IAW EOP-1, EOP-2, and EOP-4, Emergency Depressurization, RPV Flooding, and Containment Flooding.

Position	Operator Actions	S/U	Comments
CRS	<p>Direct and coordinate crew actions in response to indications of a rupture of the "A" recirculation loop.</p> <p>Implement AOP-0003 to verify isolations.</p> <p>Implement EOP-1 and EOP-2. Direct/verify the following:</p> <ul style="list-style-type: none"><li>• install EOP Enclosures as directed (19,20).</li><li>• start all available Drywell coolers.</li></ul> <p>Determine a loss of all RPV water level indication has occurred. Direct/verify the following:</p> <p>Emergency Depressurization:</p> <ul style="list-style-type: none"><li>• open 7 ADS/SRVs</li><li>• verify MSIVs, MSL drain valves, and RCIC isolation valves are closed.</li></ul>		

Position	Operator Actions	S/U	Comments
CRS (cont.)	<p>RPV Flooding:</p> <ul style="list-style-type: none"> <li>• inject into RPV with the following systems to attempt to achieve 51 psig above Containment pressure:</li> <li>- HPCS (direct/verify crew to manually open HPCS Inj. Iso. Valve (F004).</li> <li>- Feedwater/Condensate</li> <li>- LPCS</li> <li>- LPCI</li> <li>- CRD(maximum flow)</li> </ul> <p>Implement EOP-2 Hydrogen Control.</p> <ul style="list-style-type: none"> <li>• determine containment and drywell H2 concentrations</li> <li>• operate all Div I and Div II H2 igniters</li> </ul> <p>Attempt to isolate the "A" Recirc Loop.</p> <p>Containment Flooding:</p> <ul style="list-style-type: none"> <li>• lineup and inject with Service Water via RHR crosstie (Encl. 22)</li> </ul> <p>[IF REQUESTED (after scenario)]</p> <p>Declare a SAE due to the inability to maintain reactor water level. (EAL 1).</p>		

Position	Operator Actions	S/U	Comments
ATC	<p>Recognize and report indications of a DBA LOCA.</p> <ul style="list-style-type: none"> <li>- High Drywell press.</li> <li>- Low RPV level.</li> <li>- RPV depressurized.</li> </ul> <p>Attempt to isolate the "A" Recirc Loop as directed by the CRS.</p> <ul style="list-style-type: none"> <li>• recognize and report failure of the "A" Recirc Loop to isolate.</li> </ul> <p>Inject into the RPV using Feedwater/Condensate to attempt to obtain RPV pressure 51 psig above Containment pressure.</p>		
UO	<p>Maintain Control Room Logs.</p> <p>Implement AOP-0003 and verify applicable isolations.</p> <p>Identify and report ECCS and DG status.</p> <ul style="list-style-type: none"> <li>• recognize, report, and manually open HPCS Inj. Iso. Valve (F004).</li> </ul> <p>Assist the CRS to determine the validity of RPV level indication.</p> <ul style="list-style-type: none"> <li>• recognize that level has decreased below top of active fuel; inform CRS</li> </ul>		

Position	Operator Actions	S/U	Comments
UO (cont.)	<p>Implement EOP-1 and EOP-2 due to High Drywell d/p and High Drywell Temperature as directed by the CRS:</p> <ul style="list-style-type: none"> <li>• start all available Drywell coolers</li> <li>• install EOP Enclosures</li> </ul> <p>[When directed] open 7 ADS/SRVs.</p> <p>[When directed] implement RPV Flooding.</p> <p>[When directed] implement EOP Encl. 20 to restore drywell cooling.</p> <p>[When directed] obtain Drywell and Containment Hydrogen concentrations.</p> <p>[When directed] start all Hydrogen igniters.</p> <p>[When directed] Place RHR A and B in Suppression Pool Cooling.</p> <p>[When directed] implement Containment Flooding.</p>		



#### **VIII. CRITICAL TASKS**

1. Reduce and maintain reactor  $\leq$  100% with recirculation flow or control rods.
2. Initiate Emergency Depressurization when RPV level cannot be determined.
3. Implement Containment Flooding per SAP-1 and SAP-2 when RPV pressure cannot be maintained above Minimum RPV Flooding Pressure.

#### **IX. QUANTITATIVE SUMMARY**

A.	Total Malfunctions:	8
B.	Malf. after EOP entry:	2
C.	Abnormal Events:	3
D.	Major Transients:	1
E.	EOPs entered:	3
F.	EOP Contingency Procedures used:	3
G.	Simulator Run Time:	50
H.	EOP Run Time:	20

#### **X. REFERENCES**

- A. R-DAD-TQ-011, "Simulator Training".
- B. NRC NUREG 1021 ES-301, Dynamic Simulator Requalification Examination
- C. BWR Owners Group Simulator Scenario Development Guidelines.

OPERATIONS SHIFT SUPERINTENDENT RELIEF CHECKSHEET

??  
??

Offgoing Oncoming  
Superintendent \_\_\_\_\_ Superintendent \_\_\_\_\_  
(Print) (Print) ?Off-Going Shift  
????????????????????  
?????????

??  
??

Part I - To be reviewed prior to assuming the shift

o Unit Status Mode 1 Rx Power 100% Step 206

o Evolutions(completed/in progress/planned);  
General Information

Startup RCIC (SOP-0035, Completed through Step 4.2.3)

Governor response troubleshooting.

o Significant LCO Status

None

o Equipment Status

RHR B running in Sup. Pool cooling. High Volume Containment

Purge is inservice.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

o Night Orders o Standing Orders o Board Walkdown

(Signature: Oncoming OSS Review Complete)

**COURSE:** Licensed Operator Simulator

**SCENARIO TITLE:** Station Blackout

**SCENARIO NUMBER:** RBS-1-SIM-HLO-SIS05.02

**SCENARIO DURATION:** 60 Minutes

PREPARED/VERIFIED BY: M.K. Cantrell DATE 8/13/00  
Sr. Operations Instructor

REVIEWED BY: J.A. Clark DATE 8/30/00  
Operations Department

VALIDATED BY: M.K. Cantrell DATE 8/13/00  
Sr. Operations Instructor

## TRAINING MATERIAL CHANGE NOTICE

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❶ Changes Performed By: \_\_\_\_\_ TEAR #: \_\_\_\_\_

Change Description: \_\_\_\_\_

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(NOTE: Ensure that reference section is updated as appropriate)

Affected Page(s): \_\_\_\_\_

Approved: \_\_\_\_\_ Date: \_\_\_\_\_

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**I. SCENARIO OBJECTIVE:**

To evaluate the crew in the use of AOP-0050, EOP-1, and EOP-2 in response to a Station Blackout.

**II. EVENT OBJECTIVES:**

NOTE: With lead examiner concurrence, events may be deleted if specific exam requirements have been met.

**Event No. 1: Lower Reactor Power and Secure Reactor Feedwater Pump**

- a. Evaluate the crews ability to lower reactor power and secure Reactor Feedwater Pump.

**Event No. 2: Gland Seal Evaporator Water Level Regulator Controller Fails High.**

- a. Evaluate the crews ability to respond to a failure of CNA-LVEWFV, Gland Seal Evaporator Water Level Regulator Controller.

**Event No. 3: Reactor Feedwater Pump "B" Minimum Flow Valve Controller Fails Open.**

- a. Evaluate the crews ability to respond to a failure of RFP 'B' minimum flow valve controller.

**Event No. 4: Severe Weather and Grid Transients**

- a. Evaluate the crews ability to respond to a severe weather warning and grid transients.

**Event No. 5: Main Generator Trip.**

- a. Evaluate the crews ability to respond to a Main Generator Trip using AOP-0001 and AOP-002.

**Event No. 6: Station Blackout.**

- a. Evaluate the crews ability to respond to a Station Blackout and to control RPV and Containment parameters using AOP-0050, EOP-1, and EOP-2.
- b. Evaluate the crews ability to respond to an overspeed trip of RCIC and a trip of the HPCS pump during a Station Blackout.
- c. Evaluate the crews ability to respond to a failure of a MSL to isolate and a Turbine Bypass Valve failing open during a Station Blackout.

### **III. SCENARIO SUMMARY**

#### **A. Initial Conditions**

1. IC# 13
2. MOL equilibrium xenon

#### **B. Plant Conditions**

1. Reactor Power 80%

#### **C. Out of Service Equipment.**

1. Diesel Fire Pump 1A is tagged out for engine rebuild.
2. Div I Standby D/G is tagged out for fuel rack repairs.

#### **D. Evolutions \ Pending Malfunctions**

1. Lower reactor power in preparation for securing Reactor Feedwater Pump 1A IAW SOP-0009.
2. The gland seal evaporator water level controller (CNA-LVEWFV) will fail high causing a low water level in the gland seal evaporator. In response to this event the crew will take action IAW ARP 870-52-F02.
3. The reactor feedwater pump 'B' minimum flow valve controller will fail low causing the RFP 'B' min. flow valve to open. In response to this event the crew will take action IAW AOP-0007.
4. A severe weather advisory is transmitted to the Main Control Room and the plant experiences grid transients. In response to this event the crew will take action IAW AOP-0029.
5. Load transients on the grid cause the Main Generator to trip. In response to this event the crew will take action IAW AOP-0001 and AOP-0002



6. Shortly after the Main Generator trips a breaker fault at Fancy Point causes a loss of offsite power. The voltage transient caused by the breaker fault damages ENS\*SWG1B which will trip the Div. II Diesel Generator. In response to this event the crew will take action IAW AOP-0050.
- 6A. The RCIC turbine will trip on overspeed and the HPCS pump will trip. In response to this event the crew will reset the trip locally and restart RCIC IAW ARPs.
- 6B. A MSIV will leak by its seat and the turbine bypass valves will fail open. In response to this event the crew will take action to isolate the MSIV and mitigate RPV water level reduction.

#### **E. Termination**

WITH EXAMINER CONCURRENCE when the crew has completed the following:

- EOP-0001 and EOP-0002 have been implemented.
- AOP-0003 has been implemented and verification is in progress or completed.
- RPV and Containment parameters are stable.
- Preparations are being made to complete re-energization using AOP-0050.

#### **IV. CREW TURNOVER**

##### **A. Plant Conditions**(see attached OSS turnover sheet)

1. Reactor Power. 80%
2. MOL equilibrium xenon
3. Equipment status:
  - a. FPW-P1A is tagged out for engine repair.
  - b. Div I Standby D/G is tagged out for fuel rack repairs. The diesel has been INOP for 4 hours and repairs are expected to last an additional 4 hours. SR 3.8.1.1 was completed 3 hours ago.
  - c. System Engineering has informed the Control Room that Reactor Feedwater Pump 1A has excessively high vibration and needs to be secured as soon as possible.
4. Significant LCOs:
  - a. 72 hour Hot Shutdown due to Div I D/G OOS.
5. Evolutions completed, pending or in progress:
  - a. Lower reactor power in preparation for securing Reactor Feedwater Pump 1A.

##### **B. Required Documents**

1. Blank Emergency Notification Forms

#### **V. DIRECTIONS TO THE EVALUATOR**

- A. Individual and crew evaluations will be conducted and documented in accordance with R-DAD-TQ-011, "Simulator Training", using the associated Simulator Evaluation Standards.

# VI. CONSOLE INSTRUCTOR DIRECTIONS

Event #	MFS/OR #	Malfunction Description and Information
0 Equipment Setup	<b>FREEZE</b> IC #13	Simulator initialization.
	<b>TRIG-20</b> .false.	Overrides to isolate feed pump min. flow valve 'B'.
	<b>TRIG-17</b> .false.	Event Trigger for Loss of Offsite Power.
	<b>TRIG-1</b> DGPDGEN(2) >100	Event trigger for ENS*SWG1B trip.
	<b>TRIG-2</b> RCNTURB>.5	Event trigger for RCIC Turbine overspeed.
	<b>TRIG-3</b> ADFHRV>.5	Event trigger for HPCS Pump Trip.
	<b>TRIG-15</b> RP:S1(1)	Event trigger for BP Valve Sticking Open. (MODE Switch to Shutdown)
	imf ED001	Loss of Offsite Power.  <b>ACTIVATION TYPE: TRIG 17 Delay: <u>1:30</u></b>
	imf ED003I	4160 Volt Stby Bus ENS*SWG1B Fault.  <b>ACTIVATION TYPE: TRIG 1</b>
	imf RCIC001	RCIC Turbine Trip.  <b>ACTIVATION TYPE: TRIG 2</b>

Event #	MFS/OR #	Malfunction Description and Information
	imf HPCS001	HPCS Pump Trip. <b>ACTIVATION TYPE: TRIG 3</b>
	imf EHC002C	1st Bypass Valve Sticks Open. <b>ACTIVATION TIME: <u>00:00:00</u></b>
	imf MSS009B sev. 100 ramp 00:00	MSIV Leakage Past Seat - 100%. <b>ACTIVATION TIME: <u>00:00:00</u></b>
	irf ED007 TEST  irf ED007 NORMAL  ior -SW EGS- SDEAM MAINT  ior -LO ENS- ACB7-G OFF  ior -LO ENS- ACB7-R ON  ior -LO EGS- SDGAA-W OFF	[Div I D/G Tag Out Setup]  (after Mode Switch in MAINT.)      ENS*ACB07+G (OFF)   ENS*ACB07+W (OFF)   EGS*SDGAA+W (OFF)

Event #	MFS/OR #	Malfunction Description and Information
		<p><b>Take simulator out of FREEZE.</b></p> <p>Depress LOCKOUT pb adjacent to DG Output Breaker.</p> <p>Place clearance cover over LOCKOUT pb.</p> <p>Place Clearance cover over EMER START pb.</p> <p>Place Div I DG OOS Switch to ON.</p> <p>Lower power to ~ 80% with rods.</p> <p>Acknowledge and reset all annunciators.</p> <p><b>Place simulator in FREEZE.</b></p>
		<p><b>Take simulator out of FREEZE.</b></p>
<p><b>1</b></p> <p><b>Problem Time:</b></p> <p>N/A</p>		<p>Lower reactor power.</p> <p>Secure Reactor Feedwater Pump 1A.</p>
	<p>If Ask.</p> <p>IRM MSC022</p>	<p><b>ROLE PLAY:</b></p> <p>Respond as necessary to support the securing Reactor Feedwater Pump 1A.</p> <p>Respond as Control Bldg. to verify RFP amperage locally. Using info. from console report amp. readings.</p> <p>Vibration trouble is on Feed pump 'A'. <b>(Reset Alarm IF Ask).</b></p>

Event #	MFS/OR #	Malfunction Description and Information
2  <b>Problem Time:</b> after RFP secured	ior -SW CNA- MOV9 CLOSE  ior -LO CNA- MOV9-G OFF  ior -LO CNA- MOV9-R ON  (870-54C-3)	CNA-MOV9 (CLOSE) SSE Lvl Cont. Isol. Valve  CNA-MOV9+G OFF  CNA-MOV9+R ON  <b>ACTIVATION TIME: 00:00:00</b>
		<b>ROLE PLAY:</b> Respond as Turbine Bldg. Operator and I&C to investigate the failure. Report that the CNA-LVEWFV controller appears to have failed sending an erroneous close signal to the valve and local SSE water level is low. (Setpoint is 9).
3  <b>Problem Time:</b> after SSE failure	ior -SW CNM- HA68B-CAM MANUAL  ior -SW CNM- HA68B-CCS SLWOPN  (680-3B-3)	Feed pump Min. Flow Controller Fails Open  CNM-HA68B-CAM Rx FWP Min Flow Controller CAM (MANUAL)  CNM-HA68B-CCS Rx FWP Min Flow Controller CCS (SLWPN)  <b>ACTIVATION TIME: 00:00:00</b>
	<b>DELETE</b>  dor -SW CNM- HA68B-CCS SLWOPN	<b>NOTE: Delete when operator responds to controller failure, OR when valve is full open.</b>  CNM-HA68B-CCS Rx FWP Min Flow Controller CCS (SLWPN)

Event #	MFS/OR #	Malfunction Description and Information
3 (cont.)		<b>ROLE PLAY:</b>  As I&C, take the request to investigate and repair the controller for FV2B. Inform the control room that you will investigate and let them know how long the repairs will take.
		<b>ROLE PLAY:</b>  (If crew does not call load dispatch or if crew does not recognize min. flow valve failure, due to low reactor power level.)  As load dispatch, call main control room and ask why load went up.
	<b>IF Ask.</b>  IOR -LO FWR-FV2B-R T20 -LO FWR-FV2B-G T20 -CNM-HA68-B-CCS SLWCLS T20 D3	<b>ROLE PLAY:</b>  As SNEO, take request to manually isolate the min. flow line for RFP 'B'. Wait ~ 5 minutes <b>Activate T20</b> , after valve closed, then report that the line has been isolated.

Event #	MFS/OR #	Malfunction Description and Information
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<b>4</b>  <b>Problem Time:</b>		<b>ROLE PLAY:</b>  As System Operator, report to the Control Room that the National Weather Advisory Service has issued a severe weather warning for the RBS area. The storm is heading in the direction of River Bend. The storm has sustained winds of 85-95 mph.
		<b>NOTE</b>  Alternate between imf #119 and #120, allowing ~ 1 minute for each swing.
	<b>INSTALL &amp; REMOVE</b> imf ED007A  imf ED007B	Network Load Decrease.  Network Load Increase.
		<b>ROLE PLAY</b>  As System Operator, inform the Control Room that the storm is causing significant problems with grid stability and that you'll keep them advised.
		<b>ROLE PLAY</b>  Support the control room as necessary for Severe Weather activities.



Event #	MFS/OR #	Malfunction Description and Information
5&6  after grid trans. w/ exmr OK	imf MGEN001	Main Generator Trip.  <b>ACTIVATION TYPE: TRIG 17</b>
		<b>ROLE PLAY</b>  Respond as an SNEO to investigate the RCIC Turbine trip. After approximately 10 minutes, report that the RCIC Turbine is tripped on overspeed but does not appear damaged. When ordered to reset the trip, reply it will take a little while because you must get dressed out.
		<b>ROLE PLAY</b>  Respond as an SNEO to investigate the trip of ENS*SWG1B. After approximately 2 minutes report that the switchgear is locked out on overcurrent and there is smell of burned insulation in the room.
		<b>ROLE PLAY</b>  Respond as Electrical Maintenance to investigate the trip of ENS*SWG1B. After approximately 5 minutes report that the bus is internally damaged and will take approximately 12 hours to repair.
		<b>ROLE PLAY</b>  Respond as SNEO and Electrical Maintenance to investigate the trip of the HPCS Pump. Report that you can smell something like burned insulation in the vicinity of the HPCS Pump Breaker and it appears to be severely damaged.

Event #	MFS/OR #	Malfunction Description and Information
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6 (cont.)		<b>ROLE PLAY</b>
		Respond as System Operator, inform Control Room that you are investigating the problem and that the highest priority is being placed on restoring power to Fancy Point.
		<b>NOTE:</b>
		Insert these RFs when requested to bypass the RCIC High temperature isolations.
	irf LDS004 BYPASS  irf LDS006 BYPASS	<b>When RCIC Temp. Isol. is bypassed per AOP-0050.</b>  E31-S2A BYPASS SWITCH (BYPASS).  E31-S4A BYPASS SWITCH (BYPASS).
		<b>ROLE PLAY</b>  Respond as the Outside SNEO to verify the "B" Diesel Fire Pump running. After approximately 5 minutes report that the pump is not running and will not start.
		<b>ROLE PLAY</b>  Respond as the Mechanical Maintenance Foreman to investigate the failure of the Diesel Fire Pump. After approximately 5 minutes report that the fuel filter is plugged and will take about 30 minutes to replace.

Event #	MFS/OR #	Malfunction Description and Information
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6 (cont.)		<b>ROLE PLAY</b>  When RPV Water Level is ~ <-50 inches and with Lead Examiner concurrence, as the Rx. Bldg. Operator report that you are ready to reset the RCIC Turbine.
	<b>REMOVE:</b>  dmf RCIC001  ECCS001  dmf MSS009B	<b>After the Control Room acknowledges the above report.</b>  RCIC Turbine Trip.  <b>When Ask:</b> Reset of RCIC turbine  MSIV Leakage Past Seat - 100%.
		<b>ROLE PLAY</b>  Call the Control Room as the Load Dispatcher and report that power can be restored, but request that only essential 4160 volt loads be re-energized due to the continued grid instability.
	<b>REMOVE:</b>  dmf ED001	<b>When CRS has acknowledged the above request.</b>  Loss of Offsite Power.

Event #	MFS/OR #	Malfunction Description and Information
6 (cont.)		<p><b>NOTE</b> Use the following RF to rack out ECCS pump breakers as requested.</p>
	irf ECCS003	LPCS Pump Breaker (OUT).
	irf ECCS004	RHR A Pump Breaker (OUT).
		<p><b>When requested by the Control Room.</b></p>
	irf RPS002	RPS A to Alternate (ALT).
	irf RPS004	<p><b>NOTE: Need to ensure power is restored to ENS*SWG1A before resetting EPA breakers.</b></p> <p>RPS EPA Breakers.</p>
	irf NIS001	Reset 20 vdc power for NI cabinets.
	Use the following RFs to implement EOP Encls.	<p><b>ROLE PLAY:</b></p> <p>Respond as Operators and Technicians to install EOP Enclosures as requested by the CRS.</p>
	irf EOP	
	-20	
		(20) Defeat DW Clg ISOL (JUMPERED)

Event #	MFS/OR #	Malfunction Description and Information
7	<b>FREEZE</b>	<p>WITH EXAMINER CONCURRENCE when:</p> <ul style="list-style-type: none"> <li>• EOP-0001 AND EOP-0002 have been implemented.</li> <li>• AOP-0003 has been implemented and verification is in progress or completed.</li> <li>• RPV and Containment parameters are stable.</li> <li>• Preparations are being made to complete re-energization using AOP-0050.</li> </ul>

## VII. OPERATOR ACTIONS

### EVENT NUMBER 1

#### Brief Description:

Lower reactor power in preparation for securing Reactor Feedwater Pump 1A IAW SOP-0009.

Position	Operator Actions	S/U	Comments
CRS	Direct and coordinate lowering of reactor power per GOP-0005.  Direct and coordinate securing of Reactor Feedwater Pump 1A IAW SOP-0009.		
ATC	Lower reactor power to ~70-75% per GOP-0005.  Secure Reactor Feedwater Pump 1A IAW SOP-0009: <ul style="list-style-type: none"><li>• close FWS-MOV26A RX FWP 1A DISCH VLV.</li><li>• verify min flow valve opens.</li><li>• monitor Feed Flow/Steam Flow mismatch and RPV level to ensure remaining pumps can maintain level.</li><li>• stop FWS-P1A RX FWP P1A.</li><li>• verify min flow valve closes 1-3 minutes after pump shutdown.</li><li>• verify FWS-MOV26A RX FWP P1A DISCH VLV is CLOSED.</li></ul>		

Position	Operator Actions	S/U	Comments
UO	<p>Assist in securing Reactor Feedwater Pump 1A IAW SOP-0009.:</p> <ul style="list-style-type: none"> <li>• verify FWL-P5A GEAR INCR AUX OIL PMP 5A auto starts.</li> </ul> <p>[NOTE: Perform the following if time permits.]</p> <ul style="list-style-type: none"> <li>• when the 23 minute time delay has passed, then verify: <ul style="list-style-type: none"> <li>- FWL-P1A RX FWP A MN OIL PMP 1A auto stops.</li> <li>- FWL-P5A RX FWP A GEAR INC AUX OIL PMP 5A auto stops.</li> <li>-FWL-P3A RX FWP A AUX OIL PMP 3A auto starts on low oil pressure.</li> <li>-FWL-P2A RX FWP A AUX OIL PMP 2A auto starts on low oil pressure.</li> </ul> </li> <li>• stop FWL-P3A RX FPW A AUX OIL PMP 3A, then place the control switch in AUTO.</li> <li>• stop FWL-P2A RX FPW A AUX OIL PMP 2A, then place the control switch in AUTO.</li> </ul>		

**EVENT NUMBER 2****Brief Description:**

The gland seal evaporator water level controller (CNA-LVEWFV) will fail high causing a low water level in the gland seal evaporator. In response to this event the crew will take action IAW ARP 870-52-F02.

Position	Operator Actions	S/U	Comments
CRS	<p>Direct and coordinate crew response to the gland seal evaporator water level controller failure IAW ARP-870-52-F02. Direct/verify the following:</p> <ul style="list-style-type: none"><li>• take manual control of steam seal evaporator supply water.</li><li>• contact Turbine Bldg. Operator and I&amp;C to investigate failure.</li></ul>		
ATC	<p>Assist in implementing required actions for the gland seal evaporator water level controller failure.</p> <p>Monitor condenser vacuum and other plant parameters.</p>		



Position	Operator Actions	S/U	Comments
UO	<p>Recognize, report, and implement required actions for the gland seal evaporator water level controller failure IAW ARP-870-54-F02.</p> <ul style="list-style-type: none"> <li>• throttle open CNA-MOVS10, SSE Level Control Bypass Valve as necessary to maintain SSE water level.</li> <li>• contact Turbine Bldg. Operator and I&amp;C to investigate failure.</li> </ul>		

**EVENT NUMBER 3****Brief Description:**

The reactor feedwater pump 'B' minimum flow valve controller will fail low causing the RFP 'B' min. flow valve to open. In response to this event the crew will take action IAW AOP-0007.

Position	Operator Actions	S/U	Comments
CRS	<p>Direct and coordinate crew response to the failure of the RFP 'B' min. flow valve IAW AOP-0007. Direct/verify the following:</p> <ul style="list-style-type: none"><li>• reduce reactor power as necessary.</li><li>• manually isolate RFP 'B' min. flow line</li><li>• SNEO and I&amp;C investigate the failure of the min. flow valve.</li><li>• initiate an Operator Aid per OSP-0001, control of Operator Aids for the isolated RFP min. flow valve.</li><li>• initiate a Condition Report, as required.</li></ul>		
ATC	<p>Implement required actions for the failure of the RFP 'B' min. flow valve IAW AOP-0007:</p> <ul style="list-style-type: none"><li>• determine and report failure of FV2B.</li><li>• take manual control of FV2B, place CNM-HA68B in MANUAL and close the valve.</li></ul>		

Position	Operator Actions	S/U	Comments
ATC (cont.)	<ul style="list-style-type: none"> <li>• direct manual isolation of the RFP1B min. flow line.</li> <li>• initiate an Operator Aid per OSP-0001, control of Operator Aids for the isolated RFP min. flow valve.</li> </ul>		
UO	<p>Assist in implementing required actions for the failure of the RFP 'B' min. flow valve IAW AOP-0007:</p> <ul style="list-style-type: none"> <li>• contact Turbine Bldg. Operator and I&amp;C to investigate failure.</li> <li>• assist ATC as directed by CRS.</li> <li>• assist in initiation of a Condition Report, as required.</li> </ul>		

**EVENT NUMBER 4****Brief Description:**

The Main Control Room is informed of a severe weather advisory warning and the plant starts to experience grid transients. In response to this event the crew will take action IAW AOP-0029.

Position	Operator Actions	S/U	Comments
CRS	Direct and coordinate crew response to Control severe weather warning and grid transients per AOP-0029. <ul style="list-style-type: none"><li>• contact System Operator to obtain status/data associated with grid transients and grid stability.</li></ul>		
ATC	Implement required actions for severe weather warning and grid transients per AOP-0029. <ul style="list-style-type: none"><li>• determine and report severity of grid transients to the CRS.</li></ul>		
UO	Assist in implementing required actions for the severe weather warning and grid transients per AOP-0029.		

## EVENT NUMBER 5 & 6

### Brief Description:

Power is lost to Fancy Point due to grid disturbances caused by severe weather. The Main Generator will trip followed almost immediately by a loss of offsite power. The voltage transient caused by the breaker fault will also damage the bus work of ENS\*SWG1B which will trip when re-energized by Div II D/G. The "B" Main Steam Line Isolation Valves will leak-by causing an RPV pressure drop and inventory loss through the drain lines to the main condenser. The RCIC turbine will trip on overspeed and the HPCS Pump will trip. When RPV water level is ~ < -50" the "B" MSL inboard MSIV will seat, terminating the inventory loss. The RCIC turbine overspeed trip will be reset and RCIC will be used to restore RPV water level. The crew will respond to these events per AOP-0050, EOP-0001, and EOP-0002.

Position	Operator Actions	S/U	Comments
CRS	<p>Direct/verify implementation of AOP-0001, AOP-0002, and AOP-0003.</p> <p>Implement EOP-1. Direct/verify the following:</p> <ul style="list-style-type: none"><li>• verify the mode switch is in SHUTDOWN.</li><li>• monitor and control RPV level (-162 inches to 51 inches) and pressure (stabilized below 1060 psig).</li><li>• verify all rods are inserted.</li></ul> <p>Direct entry into AOP-0004 on loss of offsite power.</p> <ul style="list-style-type: none"><li>• verify crew manually initiates RCIC.</li></ul>		

Position	Operator Actions	S/U	Comments
CRS (cont.)	<p>Direct entry into AOP-0050 on loss of ENS*SWG1B (Station Blackout). Direct/verify the following:</p> <ul style="list-style-type: none"> <li>• crew places RCIC Isolation Bypass Switches to Bypass.</li> <li>• SNEO investigates the RCIC Turbine trip.</li> <li>• SNEO investigates the trip of ENS*SWG1B.</li> <li>• secure Div II D/G due to loss of SSW cooling</li> <li>• crew determines cause of level/pressure loss.</li> <li>• Electrical Maintenance investigates trip of ENS*SWG1B.</li> <li>• SNEOs and/or Mechanical Maintenance Foreman investigates failure of Main Turbine Bypass Valve to close.</li> <li>• SNEOs and/or Mechanical Maintenance investigates failure of the "B" Main Steam Isolation Valves to seat.</li> <li>• crew attempts to shut B21*F098B (MSSV) to isolate MSL.</li> <li>• isolate hotwell M/U &amp; reject.</li> </ul>		

Position	Operator Actions	S/U	Comments
CRS (cont.)	<ul style="list-style-type: none"> <li>shed DC loads per Encl. 5 of AOP-0050.</li> <li>open doors to Standby DC Equipment Rooms.</li> </ul> <p>Direct/verify the following:</p> <ul style="list-style-type: none"> <li>install the EOP Enclosures, as required (3,7,20)</li> <li>when the RCIC Turbine overspeed trip is reported reset, direct/verify restart of the RCIC Turbine.</li> </ul> <p>Implement EOP-2 due to High Sup. Pool Temp., High Sup. Pool Level., and High DW Temp. Direct/verify the following when power is restored:</p> <ul style="list-style-type: none"> <li>place RHR in Sup. Pool Cooling.</li> <li>reject Sup. Pool to Radwaste.</li> <li>start all available DW coolers (as required).</li> </ul>		

Position	Operator Actions	S/U	Comments
CRS (cont.)	<p>When the Load Dispatcher reports imminent power restoration direct crew to begin re-energization preparations per AOP-0050. Direct/verify the following:</p> <ul style="list-style-type: none"> <li>• lockout all DIV I auto-start equipment.</li> <li>• restore offsite power to the plant.</li> <li>• transfer RPS A to Alternate.</li> <li>• rack-in the ECCS pump breakers.</li> <li>• start ECCS pumps and restore RPV water level to 10 - 51 inches</li> </ul> <p>[IF REQUESTED (after scenario)]</p> <p>Declare an Alert due loss of all offsite and onsite AC power for &lt; 15 minutes (EAL 5).</p> <p>Declare an SAE due to loss of all offsite and onsite AC power for &gt; 15 minutes(EAL 4).</p>		



Position	Operator Actions	S/U	Comments
ATC	<p>Recognize Main Generator trip and implement the immediate actions of AOP-0001 and AOP-0002.</p> <ul style="list-style-type: none"> <li>• arm and depress the manual scram pushbuttons.</li> <li>• place the MODE switch in shutdown.</li> <li>• verify and report all rods inserted.</li> </ul> <p>Recognize and report loss of offsite power.</p> <p>Assist in implementing subsequent actions of AOP-0050 as directed by the CRS.</p> <p>Assist in implementing EOP-1 as directed by the CRS.</p> <p>Recognize and report failure of No. 1 Main Turbine Bypass Valve to close.</p> <p>Assist in implementing EOP-2 as directed by the CRS.</p> <p>Assist in making preparations for restoring offsite power as directed by the CRS.</p>		

Position	Operator Actions	S/U	Comments
UO	<p>Recognize loss of offsite power and station blackout and implement AOP-0050.</p> <ul style="list-style-type: none"> <li>manually initiate RCIC.</li> <li>recognize and report the RCIC Turbine trip.</li> <li>coordinate with the SNEO to investigate and reset the RCIC Turbine trip as directed by the CRS.</li> <li>recognize and report trip of ENS*SWG1B.</li> <li>when RCIC overspeed trip is reset, reset RCIC trip throttle valve and start RCIC turbine as directed by the CRS.</li> <li>place RCIC Isolation Bypass Switches in Bypass.</li> <li>verify and report RCIC Isolation Bypass Switches placed in Bypass.</li> </ul>		

Position	Operator Actions	S/U	Comments
UO (cont.)	<p>Identify and report RPV water level and pressure drop.</p> <p>Identify and report Main Steam Line "B" steam flow.</p> <ul style="list-style-type: none"> <li>• attempt to shut B21*F098B (MSSV) to isolate MSL.</li> </ul> <p>Install EOP Enclosures as directed by the CRS (6,7,8,20,22)</p> <p>Report RPV water level rising once RCIC is re-started.</p> <p>Restore offsite power per AOP-0050:</p> <ul style="list-style-type: none"> <li>• lockout all DIV I auto-start equipment.</li> <li>• restore offsite power to the plant.</li> <li>• transfer RPS A to Alternate.</li> <li>• rack-in the ECCS pump breakers.</li> <li>• start ECCS pumps and restore RPV water level to 10 - 51 inches</li> <li>• place Div I RHR in Sup. Pool Cooling and reject Sup. Pool as directed by the CRS.</li> <li>• place all available Drywell Coolers in service as directed by the CRS.</li> </ul>		

## VIII. CRITICAL TASKS

1. Restore water supply to the Gland Seal Evaporator to restore and maintain condenser vacuum.
2. Take actions to mitigate the effects of a Station Blackout and restore power to the plant.

## IX. QUANTITATIVE SUMMARY

A.	Total Malfunctions:	7
B.	Malf. after EOP entry:	3
C.	Abnormal Events:	3
D.	Major Transients:	1
E.	EOPs entered:	2
F.	EOP Contingency Procedures used:	0
G.	Simulator Run Time:	60 min.
H.	EOP Run Time:	20 min.

## X. REFERENCES

- A. R-DAD-TQ-011, "Simulator Training".
- B. NRC NUREG 1021 ES-301, Dynamic Simulator Requalification Examination
- C. BWR Owners Group Simulator Scenario Development Guidelines.

# **OPERATIONS SHIFT SUPERINTENDENT RELIEF CHECKSHEET**

**COURSE:** Licensed Operator Simulator

**SCENARIO TITLE:** Trip of Recirc Pumps / Drywell Coolant Leak

**SCENARIO NUMBER:** RBS-1-SIM-HLO-SIS08.02

**SCENARIO DURATION:** 60 Minutes

PREPARED/VERIFIED BY:	<u>M.K. Cantrell</u> Sr. Operations Instructor	DATE <u>8/13/00</u>
REVIEWED BY:	<u>J.A. Clark</u> Operations Department	DATE <u>8/30/00</u>
VALIDATED BY:	<u>M.K. Cantrell</u> Sr. Operations Instructor	DATE <u>8/13/00</u>

## TRAINING MATERIAL CHANGE NOTICE

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❶ Changes Performed By: \_\_\_\_\_ TEAR #: \_\_\_\_\_

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**I. SCENARIO OBJECTIVE:**

To evaluate the crew in the use of AOP-0024, EOP-1, EOP1A, and EOP-2 in response to a trip of both recirculation pumps and a coolant leak in the Drywell.

**II. EVENT OBJECTIVES:**

NOTE: With lead examiner concurrence, events may be deleted if specific exam requirements have been met.

**Event No. 1: LPCS Quarterly Pump and Valve Operability Test and Raise Reactor Power**

- a. Evaluate the crews ability to perform LPCS Pump and Valve Operability Surveillance and raise reactor power.

**Event No. 2: APRM Upscale with a Single Rod Scram.**

- a. Evaluate the crews ability to respond to an APRM upscale trip with a single control rod scram.

**Event No. 3: SJAE Pressure Control Valve Controller Fails Low.**

- a. Evaluate the crews ability to respond to a failure of PCV-144, SJAE Pressure Control Valve Controller.

**Event No. 4: Stuck Open Safety Relief Valve.**

- a. Evaluate the crews ability to respond to indications of a stuck open Safety Relief Valve.

**Event No. 5: High Vibration and subsequent Trip of the "A" Recirculation Pump.**

- a. Evaluate the crews ability to respond to high vibration and subsequent trip of the "A" Recirculation Pump.

**Event No. 6: Recirculation Pump "B" Seizes and Coolant Leak in the Drywell.**

- a. Evaluate the crews ability to respond to a seizure of the "B" Recirculation Pump and coolant leak in the Drywell with a subsequent failure to auto and manual scram (ARI will insert the control rods) and a bus fault on EJS\*SWG2B.

### **III. SCENARIO SUMMARY**

#### **A. Initial Conditions**

1. IC# 166

#### **B. Plant Conditions**

1. Reactor Power 90%
2. MOL equilibrium xenon

#### **C. Out of Service Equipment.**

1. None

#### **D. Evolutions \ Pending Malfunctions**

1. Perform LPCS Pump and Valve Operability Surveillance (STP-205-6301) and raise reactor power.
2. APRM "F" fails upscale and a single control rod scrams. In response to this event the crew will take actions IAW ARPs.
3. The SJAE pressure control valve controller (PCV-144) will fail. In response to this event the crew will take action IAW ARP 870-54-E05, G03, and H03.
4. SRV B21\*F051D inadvertently opens. In response to this event the crew will take actions IAW AOP-0035.
5. High vibration and trip of the "A" Recirculation Pump. In response to this event the crew will take action IAW AOP-0024, GOP-0004, and ARPs.
6. Recirculation Pump "B"seizes and a coolant leak occurs in the Drywell with a subsequent failure to auto and manual scram (ARI will insert the control rods) and a bus fault on EJS\*SWG2B. In response to this event the crew will take actions IAW AOP-0024, EOP-0001, EOP-0001A, and EOP-0002.

#### **E. Termination**

WITH EXAMINER CONCURRENCE when the crew has completed the following:

- AOP-0004, EOP-0001, EOP-0001A, and EOP-0002 have been implemented.
- AOP-0003 has been implemented and verification is in progress or completed.
- RPV and Containment parameters are stable.

#### **IV. CREW TURNOVER**

##### **A. Plant Conditions**(see attached OSS turnover sheet)

1. Reactor Power. 90%
2. MOL equilibrium xenon
3. Equipment status:
  - a. None.
4. Significant LCOs:
  - a. None
5. Evolutions completed, pending or in progress:
  - a. Raise reactor power and perform LPCS surveillance (STP-205-6301) and raise reactor power.

##### **B. Required Documents**

1. Blank Emergency Notification Forms

#### **V. DIRECTIONS TO THE EVALUATOR**

- A. Individual and crew evaluations will be conducted and documented in accordance with R-DAD-TQ-011, "Simulator Training", using the associated Simulator Evaluation Standards.

# VI. CONSOLE INSTRUCTOR DIRECTIONS

Event #	MFS/OR #	Malfunction Description and Information
0  Equipment Setup	<b>FREEZE</b> IC #166	Simulator initialization.
	<b>SET TRIGGERS</b>	<b>TRIG 1 .false.</b> <b>TRIG 17 .false.            TRIG 18 .false.</b> <b>TRIG 19 .false.            TRIG 20 .false.</b> <b>TRIG 14 ANN:8006A(03) .eq. true</b> <b>TRIG 15 RP:S1(1)</b>
	<b>TRIG 14</b> AN:8006A(03)	Event trigger for rod scram. (APRM B/F Upscale Trip Annunciator)
	imf CRD008_3637 T14	Control Rod 36-37 Scrams.  <b>ACTIVATION TYPE <u>TRIG 14</u></b>
	<b>TRIG 15</b> RP:S1(1)	Event trigger for Drywell leak. (Mode Switch in SHUTDOWN.)
	imf RCS007 200 T15 R2:0 0.00	Coolant leak in the Drywell  <b>ACTIVATION TYPE <u>TRIG 15</u></b>
		<b>Take simulator out of FREEZE.</b>  Reduce power to 90%.  Verify P845 & P614 recorders are in "Auto/Jog" Mode.  Acknowledge and reset all annunciators.  Allow plant parameters to stabilize.  <b>Place simulator in FREEZE.</b>

Event #	MFS/OR #	Malfunction Description and Information
		Take simulator out of FREEZE.
<b>1</b>  <b>Problem Time:</b>  N/A		Perform LPCS Pump and Valve Operability Surveillance (STP-205-6301).  Raise reactor power at a rate of 10% per hour
		<b>ROLE PLAY</b>  As Rx. Bldg. Operator and System Engineering support LPCS System Surveillance, as required.  - need system to operate for ~ 5 minutes to obtain required data.  - refer to attached STP Data Sheet for required data values.
<b>2</b>  <b>Problem Time:</b>  after LPCS STP	<b>TRIG 17</b>  imf NMS011F T17	APRM F Fails Upscale.  <b>ACTIVATION TIME = <u>00:00:00</u></b>
	<b>DELETE</b>  dmf CRD008_3637	<b>DELETE</b> when half scram is reset, this will allow rod 36-37 to settle back to position 00.

Event #	MFS/OR #	Malfunction Description and Information
		<p><b>ROLE PLAY:</b></p> <p>As Rx. Engineering inform the CRS that you'll analyze for the change in the control rod pattern; continued plant operations is permitted. Reactor power is fine where it is. RE will develop a Recovery Plan.</p> <p>(When requested) inform crew that other APRMs on backpanels indicate normal consistent with current power.</p>
		<p><b>ROLE PLAY:</b></p> <p>As I&amp;C and System Engineering respond to support APRM failure and CR scram. Report that it initially appears to be a problem with the Div. I fuse for CR 36-37, but will require further investigation.</p>
3	<p><b>TRIG 18</b></p> <p>imf MSS011 T18</p>	<p>SJAE Steam Supply Valve PV144 Fails Closed.</p> <p><b>ACTIVATION TIME: <u>00:00:00</u></b></p>
<p><b>Problem Time:</b></p> <p>after APRM "F" failure</p>		<p><b>ROLE PLAY:</b></p> <p>Respond as Turbine Bldg. Operator and I&amp;C to investigate the failure. Report that the controller does not respond to auto or manual signals. It appears that the controller has a ruptured diaphragm which will have to be replaced. You would estimate taking ~3 hours to complete the required repairs.</p>

Event #	MFS/OR #	Malfunction Description and Information
4  <b>Problem Time:</b>  after SJAE PCV failure	<b>TRIG 19</b>  imf MSS005A T19	B21*F051D fails open  <b>ACTIVATION TIME = <u>00:00:00</u></b>
	irf MSS012 Div II solenoid OFF	<b>ROLE PLAY:</b>  As backpanel operator, take Division II SRV keylock control switch to OFF.
	irf MSS001	<b>ROLE PLAY:</b>  As backpanel operator, pull SRV solenoid fuses.
5  <b>Problem Time:</b>  after SRV is closed  and T.S. reviewed.	<b>TRIG 20</b>  ior -ANN xall680_2a_c_7 ON T20	Vibration Monitor Trouble Annunciation.  <b>ACTIVATION TIME = <u>00:00:00</u></b>
		<b>ROLE PLAY</b>  Report that the "A" Recirculation Pump is reading 11 mils and raising slowly. If necessary report that the readings are slightly higher (ALERT condition color "yellow") until the pump trips. System Eng. will evaluate vibration data.
	imf RCS002A D120 T20	Recirculation Pump "A" Breaker Trip.  <b>ACTIVATION TIME = <u>00:02:00</u></b>



Event #	MFS/OR #	Malfunction Description and Information
		<p><b>ROLE PLAY</b></p> <p>Respond as SNEO, System Eng., EM, and Reactor Eng. to the trip of the "A" Recirculation Pump.</p> <p>Report that the RCP breaker apparently tripped on overcurrent and can not be reset.</p> <p>Respond as I&amp;C to reset APRM SLO setpoints.</p> <p>Respond as Plant management to remain in SLO.</p>
<b>PRIOR TO TRIPPING THE B RECIRC PUMP</b>	imf RPS001B T20  imf RPS001C T20	<p>Failure to scram auto.</p> <p>Failure to scram manual.</p> <p><b>ACTIVATION TIME = <u>00:00:00</u></b></p>
6  after trip of RCP	<p><b>TRIG 1</b></p> imf RCS003B T1	<p>Recirculation Pump "B" Seizes.</p> <p><b>ACTIVATION TIME: <u>00:00:00</u></b></p>
		<p><b>ROLE PLAY</b></p> <p>Respond as SNEO, System Eng., EM, and Reactor Eng. to the trip of the "A" Recirculation Pump.</p> <p>Report that the Recirculation Pump "B" may have seized and you are investigating.</p>

Event #	MFS/OR #	Malfunction Description and Information
6 (cont.)	imp	<p><b>ROLE PLAY:</b></p> <p>Provide the following Leakage Reports as requested:</p> <p>Leakage Report #3     ~28 gpm  Leakage Report #4     ~39 gpm  Leakage Report #5     ~63 gpm  Leakage Report #6     ~90 gpm</p> <p>or report as indicated on monitored parameters</p>
	<p>Use the following RFs to implement EOP Encls.</p> <p>RF, EOP</p> <p>-20</p> <p>-27</p>	<p><b>ROLE PLAY:</b></p> <p>Respond as Operators and Technicians to install EOP Enclosures as requested by the CRS.</p> <p>(20) Drywell Cooling (JUMPERED)</p> <p>(27) Prevent LP ECCS Injection (JUMPERED)</p>
7	<b>FREEZE</b>	<p>WITH EXAMINER CONCURRENCE when:</p> <ul style="list-style-type: none"> <li>• AOP-0004, EOP-0001 and EOP-0002 have been implemented.</li> <li>• AOP-0003 has been implemented and verification is in progress or completed.</li> <li>• RPV and Containment parameters are stable.</li> </ul>

## VII. OPERATOR ACTIONS

### EVENT NUMBER 1

#### Brief Description:

Partial performance of LPCS Pump and Valve Operability Surveillance IAW STP-205-6301 to obtain vibration data and raise reactor power.

Position	Operator Actions	S/U	Comments
CRS	Direct and coordinate LPCS Surveillance IAW STP-205-6301.  Direct ATC to raise reactor power.		
ATC	Raise reactor power as directed by CRS.		
UO	Perform LPCS Surveillance IAW STP-205-6301: <ul style="list-style-type: none"><li>• start LPCS pump.</li><li>• check pump motor amps &lt; 157</li><li>• check MOVF011 (Min. Flow Vlv) open.</li><li>• record applicable data.</li><li>• throttle MOVF012 (Test Return Vlv to Sup. Pool) to obtain 5050 gpm.</li><li>• check MOVF011 (Min. Flow Vlv) close.</li><li>• record applicable data.</li></ul>		

Position	Operator Actions	S/U	Comments
UO (cont.)	<ul style="list-style-type: none"> <li>• close MOVF012 (Test Return Vlv) (if required).</li> <li>• check MOVF011 (Min. Flow Vlv) (if required).</li> <li>• stop the LPCS pump (if required).</li> </ul>		

## EVENT NUMBER 2

### Brief Description:

APRM "F" fails upscale and a single control rod scrams. In response to this event the crew will take actions IAW ARPs.

Position	Operator Actions	S/U	Comments
CRS	<p>Coordinate crew response to APRM F failure per ARPs 680-06-A03, 680-06-C01, 680-05-A10, 680-07-B02, and 680-07-C03. Direct/verify the following:</p> <ul style="list-style-type: none"><li>• determine reactor power level.</li><li>• compare power level and flow indication with other channels.</li><li>• check APRM backpanel indications.</li><li>• verify no individual rods scrammed</li><li>• Enter AOP-0061 for CR 36-37 scrammed.</li><li>• bypass APRM F and reset the half scram.</li><li>• contact I&amp;C to investigate problems with APRM F and control rod 36-37.</li><li>• contact Reactor Engineering and have them analyze for changes in the control rod pattern.</li></ul>		

Position	Operator Actions	S/U	Comments
CRS (cont.)	Refer to T.S. 3.3.1.1 and 3.3.2.1: (determine that minimum required operable channels are available for the trip system).		
ATC	<p>Implement ARPs 680-06-A03, 680-06-C01, 680-05-A10, 680-07-B02, and 680-07-C03 and inform the CRS:</p> <ul style="list-style-type: none"> <li>• verify the half scram.</li> <li>• acknowledge Control Rod Drift and Accumulator Fault annunciators.</li> <li>• Enter AOP-0061 for control rod 36-37 scrammed.</li> <li>• verify no additional control rods have scrammed.</li> <li>• verify reactor power is normal and stable for given plant conditions.</li> <li>• bypass APRM F and reset the half scram (when directed).</li> </ul>		
UO	Verify and monitor backpanel indications for APRM F, other power level indications, and trip unit status lights.		

**EVENT NUMBER 3****Brief Description:**

The SJAE pressure control valve controller (PCV-144) will fail. In response to this event the crew will take action IAW ARP 870-54-E05, G03, and H03.

Position	Operator Actions	S/U	Comments
CRS	<p>Direct and coordinate crew response to the SJAE pressure control valve controller IAW ARP 870-54-E05, G03, and H03. Direct/verify the following:</p> <ul style="list-style-type: none"><li>• take manual control of the bypass valve around PCV144 to restore SJAE steam.</li><li>• contact Turbine Bldg. Operator and I&amp;C to investigate failure.</li></ul> <p>Implement required actions of AOP-0005, if necessary.</p>		
ATC	<p>Assist in implementing required actions for the SJAE pressure control valve controller</p> <p>Monitor condenser vacuum and other plant parameters.</p> <p>Reduce reactor power IAW AOP-0005, if necessary.</p>		

Position	Operator Actions	S/U	Comments
UO	<p>Recognize, report, and implement required actions for the SJAE pressure control valve controller failure IAW ARP 870-54-E05, G03, and H03.</p> <ul style="list-style-type: none"> <li>throttle open MSS-MOV106, SJAE PCV Bypass Valve to maintain ~285 psig on MSS-PI102.</li> <li>contact Turbine Bldg. Operator and I&amp;C to investigate failure.</li> </ul> <p>Implement required actions of AOP-0005, if necessary.</p>		



**EVENT NUMBER 4****Brief Description:**

Safety Relief Valve B21\*F051D inadvertently opens. In response to this event the crew will take actions IAW AOP-0035 to close the open SRV.

Position	Operator Actions	S/U	Comments
CRS	<p>Direct and coordinate crew response to SORV per AOP-0035 and Loss of Feedwater Heating per AOP-0007. Direct/verify the following:</p> <ul style="list-style-type: none"><li>• plant announcement, "Safety Relief Valve open, all personnel evacuate Containment".</li><li>• verify reactor power is less than or equal to 90%.</li><li>• when reactor power is less than 90%, direct/verify crew attempts to close the SORV.</li></ul> <p>Implement EOP-2 for High Sup. Pool Level and High Sup. Pool Temperature (as required). Direct/verify the following:</p> <ul style="list-style-type: none"><li>• place RHR in Sup. Pool Cooling.</li><li>• reject Sup. Pool to Radwaste.</li></ul>		

Position	Operator Actions	S/U	Comments
CRS (cont.)	<p>Refer to TRM 3.4.4 (Safety/Relief Valves): (determine that the SRV should be Immediately closed).</p> <p>Refer to the following Tech Specs:</p> <ul style="list-style-type: none"> <li>• T.S. 3.3.3.2</li> <li>• T.S. 3.4.4</li> <li>• T.S. 3.6.1.6</li> <li>• T.S. 3.6.2.1</li> </ul>		14 day LCO
ATC	<p>Implement AOP-0035 and AOP-0007:</p> <ul style="list-style-type: none"> <li>• verify reactor power is less than or equal to 90%.</li> <li>• monitor feedwater temperature.</li> <li>• recognize and report that the SRV has closed.</li> </ul>		
UO	<p>Implement AOP-0035:</p> <ul style="list-style-type: none"> <li>• place the SORV control switch to OPEN.</li> <li>• when reactor power is less than or equal to 90%, attempt to close the SORV.</li> <li>• take the P601 control switch to CLOSE.</li> </ul>		

Position	Operator Actions	S/U	Comments
UO (cont.)	<ul style="list-style-type: none"> <li>• cycle the control switch to OPEN then CLOSE.</li> <li>• take the P631 control switch to OPEN and back to CLOSE.</li> <li>• cycle the control switch to OPEN then CLOSE.</li> <li>• initiate suppression pool cooling.</li> <li>• de-energize the SORV solenoids by pulling the applicable fuses.</li> <li>• recognize and report that the SRV has closed.</li> </ul> <p>Implement AOP-0007:</p> <ul style="list-style-type: none"> <li>• monitor feedwater temperature.</li> <li>• if feedwater temp. is below the 3% loss of feedwater heating line, make the appropriate log entry and initiate a Condition Report.</li> </ul> <p>Implement EOP-2 for High Sup. Pool Level and High Sup. Pool Temperature (as directed):</p> <ul style="list-style-type: none"> <li>• reject Sup. Pool to Radwaste.</li> <li>• initiate suppression pool cooling.</li> </ul>		

**EVENT NUMBER 5****Brief Description:**

High vibration and trip of the "A" Recirculation Pump. In response to this event the crew will take action IAW AOP-0024, GOP-0004, and ARPs.

Position	Operator Actions	S/U	Comments
CRS	<p>Direct and coordinate crew response to high vibration and trip of the "A" Recirculation Pump IAW AOP-0024 and GOP-0004. Direct/verify the following:</p> <ul style="list-style-type: none"><li>• immediate actions to exit region C of the Power-to-Flow map of AOP-0024.</li><li>• SNEO, EM, and Reactor Eng. to investigate the high vibration and trip of the "A" Recirculation Pump.</li><li>• notify I&amp;C to begin their STPs to change the APRM setpoints to single loop values.</li><li>• Refer to Tech. Spec. 3.4.1 and TRM 3.4.1.</li></ul>		
ATC	<p>Implement required actions for a high vibration and trip of the "A" Recirculation Pump IAW AOP-0024:</p> <ul style="list-style-type: none"><li>• recognize and report the trip of Recirculation Pump "A".</li></ul>		

Position	Operator Actions	S/U	Comments
ATC (cont.)	<ul style="list-style-type: none"> <li>• monitor reactor power and water level and other plant parameters.</li> <li>• monitor APRMs for power oscillations,</li> <li>• take immediate actions to exit region B of the Power-to-Flow map of AOP-0024.</li> <li>• implement required actions of GOP-0004.</li> <li>• contact SNEO and EM to investigate high vibration and trip of the "A" Recirc Pump.</li> </ul>		
UO	<p>Assist in implementing required actions in response a high vibration and trip of the "A" Recirculation Pump.</p> <ul style="list-style-type: none"> <li>• assist ATC as directed by CRS.</li> <li>• monitor APRM backpanel indications for power oscillations and LPRM indications.</li> </ul>		

**EVENT NUMBER 6****Brief Description:**

Recirculation Pump "B" seizes and a coolant leak occurs in the Drywell with a subsequent failure to auto and manual scram (ARI will insert the control rods) and a bus fault on EJS\*SWG2B. In response to this event the crew will take actions IAW AOP-0024, EOP-0001, EOP-0001A, and EOP-0002.

Position	Operator Actions	S/U	Comments
CRS	<p>Direct and coordinate crew actions in response to indications of the "B" Recirculation Pump seizure, trip of the "B" Recirculation Pump and a coolant leak in the Drywell.</p> <p>Implement AOP-0001, AOP-0002, AOP-0003, and AOP-0024.</p> <p>Direct crew to manually scram the reactor.</p> <p>Implement EOP-1A to insert control rods.</p> <p>Implement EOP-1 and EOP-2 due to High Drywell d/p, High Drywell Temperature, and high Sup. Pool Level. Direct/verify the following:</p> <ul style="list-style-type: none"><li>• start all available Drywell coolers.</li><li>• install EOP Enclosures as directed by EOPs (20,27).</li><li>• terminate injection from HPCS.</li></ul>		

Position	Operator Actions	S/U	Comments
CRS (cont.)	<ul style="list-style-type: none"> <li>• reject Sup. Pool to radwaste.</li> <li>• depressurize the RPV not to exceed 100°F cooldown rate.</li> <li>• isolate recirc pumps and secure seal purge.</li> </ul> <p>Direct crew to investigate bus fault on EJS*SWG2B.</p> <p>[IF REQUESTED (after scenario)] Declare an ALERT due to reactor coolant leakage in excess of 50 GPM (EAL 2).</p>		

Position	Operator Actions	S/U	Comments
ATC	<p>Implement required actions for indications of the "B" Recirculation Pump seizure, trip of the "B" Recirculation Pump and a coolant leak in the Drywell., as directed by CRS.</p> <p>Implement AOP-0001, AOP-0002, AOP-0003, AOP-0024, and EOP-1A:</p> <ul style="list-style-type: none"> <li>• arm &amp; depress all four MANUAL SCRAM pushbuttons.</li> <li>• place the REACTOR MODE SWITCH to SHUTDOWN.</li> <li>• recognize and report failure of all control rods to insert.</li> <li>• ARI to insert control rods.</li> </ul>		



Position	Operator Actions	S/U	Comments
ATC (cont.)	<ul style="list-style-type: none"> <li>• verify all control rods are fully inserted.</li> <li>• verify reactor pressure is being maintained.</li> <li>• verify turbine is tripped.</li> </ul> <p>Depressurize the RPV not to exceed 100°F cooldown rate, when directed by CRS.</p> <p>Maintain RPV water level 10 - 51 inches.</p>		

Position	Operator Actions	S/U	Comments
UO	<p>Maintain Control Room Logs.</p> <p>Implement AOP-0003 to verify applicable isolations.</p> <p>Implement EOP-1 and EOP-2 due to High Drywell d/p and High Drywell Temperature as directed by the CRS:</p> <ul style="list-style-type: none"> <li>• start all available Drywell coolers.</li> <li>• install EOP Enclosures</li> <li>• terminate injection from HPCS &amp; LP ECCS.</li> </ul> <p>Obtain leakage report, when directed by CRS.</p> <p>Depressurize the RPV not to exceed 100°F cooldown rate, as directed by CRS.</p> <p>Investigate bus fault on EJS*SWG2B.</p>		

## VIII. CRITICAL TASKS

1. Restore steam supply to the SJAE to restore and maintain condenser vacuum.
2. Initiate ARI to insert all control rods on a failure to auto and manual scram upon receipt of a scram signal/condition.
3. Take action to mitigate the drywell leak and restore and maintain drywell cooling.

## IX. QUANTITATIVE SUMMARY

A.	Total Malfunctions:	9
B.	Malf. after EOP entry:	2
C.	Abnormal Events:	4
D.	Major Transients:	2
E.	EOPs entered:	3
F.	EOP Contingency Procedures used:	0
G.	Simulator Run Time:	60 min.
H.	EOP Run Time:	20 min.

## X. REFERENCES

- A. R-DAD-TQ-011, "Simulator Training".
- B. NRC NUREG 1021 ES-301, Dynamic Simulator Requalification Examination
- C. BWR Owners Group Simulator Scenario Development Guidelines.

# OPERATIONS SHIFT SUPERINTENDENT RELIEF CHECKSHEET

Offgoing  
Superintendent\_\_\_\_\_

(Print)

Oncoming  
Superintendent\_\_\_\_\_

(Print)

Off-Going Shift

☐ ☐

N D Date \_\_\_\_\_

Part I - To be reviewed prior to assuming the shift

o Unit Status Mode 1 Rx Power 90% Pull Sheet 206

o Evolutions(completed/in progress/planned);  
General Information

Raise reactor power to 100% with recirculation flow  
(rate of 10% per hour). Perform LPCS Surveillance  
(STP-205-6301 complete up to step 7.4.2).

o Significant LCO Status

o Equipment Status

o Night Orders

o Standing Orders

o Board Walkdown

(Signature: Oncoming OSS Review Complete)

**COURSE:** Licensed Operator Simulator

**SCENARIO TITLE:** Plant Startup / Drywell Steam Leak

**SCENARIO NUMBER:** RBS-1-SIM-HLO-SIS10.01

**SCENARIO DURATION:** 60 Minutes

PREPARED/VERIFIED BY: M.K. Cantrell DATE 8/13/00  
Sr. Operations Instructor

REVIEWED BY: J.A. Clark DATE 8/30/00  
Operations Department

VALIDATED BY: M.K. Cantrell DATE 8/13/00  
Sr. Operations Instructor

## TRAINING MATERIAL CHANGE NOTICE

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❶ Changes Performed By: \_\_\_\_\_ TEAR #: \_\_\_\_\_

Change Description: \_\_\_\_\_

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(NOTE: Ensure that reference section is updated as appropriate)

Affected Page(s): \_\_\_\_\_

Approved: \_\_\_\_\_ Date: \_\_\_\_\_

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**I. SCENARIO OBJECTIVE:**

To evaluate the crew in the use of AOP-0010, EOP-1, EOP1A, and EOP-2 in response to a steam leak in the Drywell.

**II. EVENT OBJECTIVES:**

NOTE: With lead examiner concurrence, events may be deleted if specific exam requirements have been met.

**Event No. 1: Plant Startup, Synchronize the Main Generator to the Grid, and Raise Reactor Power by Withdrawing Control Rods.**

- a. Evaluate the crews ability to synchronize the main generator to the grid and raise reactor power by withdrawing control rods.

**Event No. 2: RPV Water Level Transmitter Fails Upscale affecting FWLC.**

- a. Evaluate the crews ability to respond to a RPV water level transmitter failure affecting FWLC System.

**Event No. 3: Gland Seal Pressure Regulator Controller Fails Low.**

- a. Evaluate the crews ability to respond to a failure of TME-PCVSSFV, Gland Seal Regulator Controller.

**Event No. 4: High Vibration on Condensate Pump A.**

- a. Evaluate the crews ability to respond to a High Vibration on Condensate Pump A.



**Event No. 5: Loss of RPS 'A'.**

- a. Evaluate the crews ability to respond to a loss of RPS 'A'.

**Event No. 6: Drywell Steam Leak.**

- a. Evaluate the crews ability to respond to a steam leak in the Drywell with a failure of the Main Turbine Bypass Valves in the closed position and a subsequent failure to auto and manual scram (ARI will insert control rods).

### **III. SCENARIO SUMMARY**

#### **A. Initial Conditions**

1. IC# 9

#### **B. Plant Conditions**

1. Reactor Power 10%

#### **C. Out of Service Equipment.**

1. None

#### **D. Evolutions \ Pending Malfunctions**

1. Plant startup, synchronize the main generator to the grid, and raise reactor power by withdrawing control rods IAW GOP-0001.
2. RPV water level transmitter fails upscale affecting FWLC. In response to this event the crew will take actions IAW ARPs.
3. The gland seal pressure controller (TME-PCVSSFV) will fail high causing a loss of sealing steam. In response to this event the crew will take action IAW ARP 870-54-E05.
4. High vibration on Condensate pump A. In response to this event the crew will take action IAW ARP-680-2-B03 and SOP-0006.
5. A loss of RPS 'A' occurs. In response to this event the crew will take action IAW AOP-0010.
6. A steam leak occurs in the drywell with a failure of the Main Turbine Bypass Valves in the closed position and a subsequent failure to auto and manual scram (ARI will insert control rods). In response to this event the crew will scram the reactor and take action IAW EOP-1, EOP1A, and EOP-2.

#### **E. Termination**

WITH EXAMINER CONCURRENCE when the crew has completed the following:

- AOP-0010, EOP-0001, EOP-0001A, and EOP-0002 have been implemented on high drywell temperature and drywell temperature is stabilized or lowering.
- AOP-0003 has been implemented and verification is in progress or completed.
- RPV and Containment parameters are stable.

#### **IV. CREW TURNOVER**

##### **A. Plant Conditions**(see attached OSS turnover sheet)

1. Reactor Power. 10%
2. MOL equilibrium xenon
3. Equipment status:
  - a. No out of service equipment.
4. Significant LCOs:
  - a. None
5. Evolutions completed, pending or in progress:
  - a. Plant startup, synchronize the main generator to the grid, and raise reactor power by withdrawing control rods IAW GOP-0001.

##### **B. Required Documents**

1. Blank Emergency Notification Forms

#### **V. DIRECTIONS TO THE EVALUATOR**

- A. Individual and crew evaluations will be conducted and documented in accordance with R-DAD-TQ-011, "Simulator Training", using the associated Simulator Evaluation Standards.

# VI. CONSOLE INSTRUCTOR DIRECTIONS

Event #	MFS/OR #	Malfunction Description and Information
0 Equipment Setup	<b>FREEZE</b> IC #9	Simulator initialization.
	<b>SET TRIGGERS</b>	<b>TRIG 1 .false.</b> <b>TRIG 15 RP:S1(1)</b> <b>TRIG 17 .false.            TRIG 18 .false.</b> <b>TRIG 19 .false.            TRIG 20 .false.</b>
	<b>TRIG 15</b>	Event trigger for Turbine Trip. (MODE Switch in Shutdown)
	imf EHC002B	Main Turbine Bypass Valves Fail Closed  <b>ACTIVATION TIME: <u>TRIG 15</u></b>
	irf TGS001 BYPASS	<b>Take simulator out of FREEZE.</b>  Pull sheet step #86. Control Rod 20-53 at position 34.  Pull current group to position 48.  Place A FRV inservice.  Complete Section F, Steps 1 through 7 of GOP-0001.  Complete Section 4.1 through step 4.1.3 of SOP-0010, MSR & FW Heaters.  Complete Section 4.4.8 and 4.5 of SOP-0080, Turbine Generator Op.  Disable Turbine vibration Trip.

Event #	MFS/OR #	Malfunction Description and Information
		Place Offgas in TREAT Mode.  Acknowledge and reset all annunciators.  Allow plant parameters to stabilize.  <b>Place simulator in FREEZE.</b>
		<b>Take simulator out of FREEZE.</b>
<b>1</b>  <b>Problem Time:</b>  N/A		Synchronize the main generator to the grid.  Raise reactor power by pulling control rods.
		<b>ROLE PLAY:</b>  Respond as necessary to support synchronizing the main generator and raising reactor power.  Respond as R.E., recommend banking Group 5.B to position 36.
<b>2</b>  <b>Problem Time:</b>  after MG synch.	<b>TRIG 17</b>  imf B21001B T17	RPV Level Transmitter, N004A, Fails Upscale.  <b>ACTIVATION TIME: <u>00:00:00</u></b>
		<b>ROLE PLAY:</b>  Respond as SNEO, System Eng., and I&C to investigate the failure. Report that there appears to be a problem with the a circuit card associated with level transmitter N004A. Inform the main control room that it will take at least 12 hours to investigate further and make the necessary repairs.

Event #	MFS/OR #	Malfunction Description and Information
3	<b>TRIG 18</b>  imf MSS010 T18  ior -LO TME-MOVS1-G OFF T18  ior -LO TME-MOVS1-R ON T18	GS Reg. Inlet Valve, MOVS1 Fails  TME-MOVS1-G (OFF) SSE Press Reg Isol Vlv LTG  TME-MOVS1-R (ON) SSE Press Reg Isol Vlv LTR  <b>ACTIVATION TIME: <u>00:00:00</u></b>  (870-54C-4)
		<b>ROLE PLAY:</b>  Respond as Turbine Bldg. Operator and I&C to investigate the failure. Report that the controller appears to have failed sending an erroneous close signal to the valve.
4	<b>TRIG 19</b>  ior -ANN xal1680_2a_c_7 ON T19	High Vibration Ann.  <b>ACTIVATION TIME: <u>00:00:00</u></b>
	ior -AO CNM-A07-M 100 R0 141	Condensate pump amps fluctuating. (Meter CNM A CNM07)
		mor -AO CNM-A07-M 200 R0 100  mor -AO CNM-A07-M 50 R0 100  dor -AO CNM-A07-M  ior -AO CNM-A07-M 200 R0 141  mor -AO CNM-A07-M 75 R0 200

Event #	MFS/OR #	Malfunction Description and Information
4 (cont.)	ior -ANN xal1680_2a_B _3 ON D120	Condensate pump 1A pre-trip ANN. <b>ACTIVATION TIME: <u>00:02:00</u></b>
	imf CNM004A	condensate pump a trip.  NOTE: Enter this malfunction if the crew does not secure the condensate pump.
		<b>ROLE PLAY:</b>  Respond a Turbine Bldg. operator, System Eng., and MM to investigate the high vibration on the condensate pump.  Report that the pump is vibrating excessively and needs to be secured.
5  <b>Problem Time:</b>  after CNM Vibration	<b>TRIG 20</b>  imf RPS003A T20	Loss of RPS 'A'
		<b>ROLE PLAY</b>  As an SNEO and EM respond to the request to investigate the loss of RPS 'A'. After ~5 minutes inform the Control Room that the apparent cause was a trip of the A RPS MG output EPA breaker. The EPA breaker is severely damaged and will need to be replaced.
	irf RPS002	Transfer RPS A to ALT.
	irf NIS001	RESET NI Cabinet 20 VDC power supply.

Event #	MFS/OR #	Malfunction Description and Information
6 after loss of RPS A	<b>TRIG 1</b>  imf RPS001B T1  imf RPS001C T1	Failure to scram auto.  Failure to scram manual.  <b>ACTIVATION TIME = <u>00:00:00</u></b>
		<b>ROLE PLAY</b>  As the outside SNEO notify the control room in an excited voice that you are at the river intake structure and there appears to be a tornado headed toward the plant.
	imf MSS001 450 T1 R5:00	Drywell Steam Leak  <b>ACTIVATION TIME: <u>00:00:00</u></b>
	irf MSC003	<b>ROLE PLAY:</b>  Respond as System Engineering to investigate the failure of the Main Turbine Bypass Valves in the closed position. Inform the Control Room that there is a bad circuit board, and it will need to be replaced (~ 2 hours will be required).
		<b>ROLE PLAY:</b>  Provide the following Leakage Reports as requested:  Leakage Report #3     ~28 gpm Leakage Report #4     ~39 gpm Leakage Report #5     ~63 gpm Leakage Report #6     ~90 gpm



Event #	MFS/OR #	Malfunction Description and Information
	Use the following RFs to implement EOP Encls.  irf EOP -20 -27	<div>ROLE PLAY:</div> Respond as Operators and Technicians to install EOP Enclosures as requested by the CRS.  (20) Defeat DW Clg ISOL (JUMPERED) (27) Prevent LP ECCS Injection (JUMPERED)
7	<b>FREEZE</b>	WITH EXAMINER CONCURRENCE when: <ul style="list-style-type: none"> <li>• AOP-0010, EOP-0001, EOP-0001A, and EOP-0002 have been implemented on high drywell temperature and drywell temperature is stabilized or lowering.</li> <li>• AOP-0003 has been implemented and verification is in progress or completed.</li> <li>• RPV and Containment parameters are stable.</li> </ul>

## VII. OPERATOR ACTIONS

### EVENT NUMBER 1

#### Brief Description:

Plant startup, synchronize the main generator to the grid, and raise reactor power by withdrawing control rods IAW GOP-0001 and SOP-0080.

Position	Operator Actions	S/U	Comments
CRS	<p>Direct and coordinate raising of reactor power and synchronizing the main generator to the grid. Direct/verify the following:</p> <ul style="list-style-type: none"><li>• place the main generator on line IAW SOP-0080, Section 4.6.</li><li>• align MSL drains IAW SOP-0010 and GOP-0001 Step F.13.</li><li>• increase turbine load and withdraw control rods per RE recommendations IAW GOP-0001, Section G.</li></ul>		
ATC	<p>Raising reactor power and synchronize the main generator to the grid:</p> <ul style="list-style-type: none"><li>• place the main generator on line IAW SOP-0080, Section 4.6.</li><li>• increase turbine load and withdraw control rods per RE recommendations IAW GOP-0001, Section G.</li></ul>		

Position	Operator Actions	S/U	Comments
UO	<p>Assist in synchronizing the main generator to the grid IAW GOP-0001.</p> <p>Align MSL drains IAW SOP-0010 and GOP-0001 Step F.13.</p>		

## EVENT NUMBER 2

### Brief Description:

RPV water level transmitter fails upscale affecting FWLC.  
In response to this event the crew will take actions IAW ARPs.

Position	Operator Actions	S/U	Comments
CRS	<p>Direct and coordinate crew response to RPV water level transmitter failure IAW ARP-680-3-A08, B08, C08 and AOP-0006. Direct/verify the following:</p> <ul style="list-style-type: none"><li>• take manual control of FWLC system and control RPV water level manually</li><li>• select the standby instrument channel.</li><li>• contact System Eng. and I&amp;C to investigate RPV water level transmitter failure.</li></ul> <p>If necessary direct crew to reset the FCV runback IAW ARP-P680-4-A03/A09.</p> <p>Refer to T.S. / TRM 3.3.7.3 (Level 8 RFP and Turbine Trip Instrumentation).</p>		

Position	Operator Actions	S/U	Comments
ATC	<p>Recognize, report, and implement required actions for RPV water level transmitter failure IAW ARP-680-3-A08, B08, C08 and AOP-0006:</p> <ul style="list-style-type: none"> <li>• place the Master Level Controller in manual and manually control RPV water.</li> <li>• select the standby instrument channel using the B Select pushbutton.</li> <li>• contact System Eng. and I&amp;C to investigate RPV water level transmitter failure.</li> </ul> <p>If necessary reset the FCV runback IAW ARP-P680-4-A03/A09.</p>		
UO	<p>Assist in implementing required actions for RPV water level transmitter failure as directed by CRS:</p> <ul style="list-style-type: none"> <li>• contact System Eng. and I&amp;C to investigate RPV water level transmitter failure.</li> </ul>		

**EVENT NUMBER 3****Brief Description:**

The gland seal pressure controller (TME-PCVSSFV) will fail high causing a loss of sealing steam. In response to this event the crew will take action IAW ARP 870-54-E05.

Position	Operator Actions	S/U	Comments
CRS	Direct and coordinate crew response to the gland seal pressure controller failure IAW ARP-870-54-E05. Direct/verify the following: <ul style="list-style-type: none"><li>• take manual control of steam seal evaporator pressure regulator bypass valve.</li><li>• contact Turbine Bldg. Operator and I&amp;C to investigate failure.</li></ul>		
ATC	Assist in implementing required actions for the gland seal pressure controller failure.  Monitor condenser vacuum and other plant parameters.		

Position	Operator Actions	S/U	Comments
UO	<p>Recognize, report, and implement required actions for the gland seal pressure controller failure IAW ARP-870-54-E05.</p> <ul style="list-style-type: none"> <li>• throttle open TME-MOVS2, SSE Pressure Regulator Bypass Valve to maintain ~4 psig on TME-PIEPR4.</li> <li>• contact Turbine Bldg. Operator and I&amp;C to investigate failure.</li> </ul>		

**EVENT NUMBER 4****Brief Description:**

High vibration on Condensate pump A. In response to this event the crew will take action IAW ARP-680-2-B03 and SOP-0006

Position	Operator Actions	S/U	Comments
CRS	<p>Direct and coordinate crew response to high vibration on condensate pump 1A IAW ARP-680-2-B03 and SOP-0006. Direct/verify the following:</p> <ul style="list-style-type: none"><li>• determine which component has high vibration.</li><li>• start another condensate pump and secure condensate pump 1A.</li><li>• contact TB operator, EM, and System Eng. to investigate the failure.</li></ul>		
ATC	<p>Implement required actions for high vibration on condensate pump 1A IAW ARP-680-2-B03 and SOP-0006.</p> <ul style="list-style-type: none"><li>• determine which component has high vibration.</li><li>• start another condensate pump and secure condensate pump 1A.</li></ul>		



Position	Operator Actions	S/U	Comments
UO	<p>Assist in implementing required actions for to high vibration on condensate pump 1A.</p> <ul style="list-style-type: none"> <li>• contact TB operator, EM, and System Eng. to investigate the failure.</li> <li>• assist the ATC as directed by CRS.</li> </ul>		

**EVENT NUMBER 5****Brief Description:**

A loss of RPS 'A' occurs. In response to this event the crew will take action IAW AOP-0010.

Position	Operator Actions	S/U	Comments
CRS	Direct and coordinate crew response to a loss of RPS 'A' IAW AOP-0010. Direct/verify the following: <ul style="list-style-type: none"><li>• transfer RPS 'A' to alternate.</li><li>• reset and restore isolations</li><li>• SNEO and EM to investigate the loss of RPS 'A'</li></ul> Refer to T.S. 3.3.8.2.		
ATC	Assist in implementing required actions in response to a loss of RPS 'A' <ul style="list-style-type: none"><li>• assist UO as directed by CRS.</li><li>• monitor RCP temperatures and other plant parameters.</li></ul>		
UO	Implement required actions for a loss of RPS 'A' IAW ARPs and AOP-0010: <ul style="list-style-type: none"><li>• transfer RPS 'A' to alternate.</li><li>• reset and restore isolations.</li><li>• contact SNEO and EM to investigate the loss of RPS 'A'</li></ul>		

**EVENT NUMBER 6****Brief Description:**

A steam leak occurs in the drywell with a failure of the Main Turbine Bypass Valves in the closed position and a subsequent failure to auto and manual scram (ARI will insert control rods). In response to this event the crew will scram the reactor and take action IAW EOP-1, EOP1A, and EOP-2.

Position	Operator Actions	S/U	Comments
CRS	<p>Direct and coordinate crew actions in response to indications of a steam leak in the Drywell.</p> <p>Direct crew to reduce reactor power per GOP-0002.</p> <p>Direct crew to manually scram the reactor.</p> <p>Implement AOP-0001, AOP-0002, AOP-0003, and EOP-1A.</p> <p>Implement EOP-1 and EOP-2 due to High Drywell d/p, High Drywell Temperature, and High Containment Pressure. Direct/verify the following:</p> <ul style="list-style-type: none"><li>• start all available Drywell coolers.</li><li>• install EOP Enclosures as directed by EOPs (20,27).</li><li>• terminate injection from HPCS.</li></ul>		

Position	Operator Actions	S/U	Comments
CRS (cont.)	<ul style="list-style-type: none"> <li>depressurize the RPV not to exceed 100°F cooldown rate.</li> </ul> <p>[IF REQUESTED (after scenario)] Declare an ALERT due to reactor coolant leakage in excess of 50 GPM (EAL 2).</p>		
ATC	<p>Reduce reactor power per GOP-0002 by reducing recirc flow and/or inserting control rods, as directed by CRS.</p> <p>Insert a manual reactor scram, when directed by CRS.</p> <p>Implement AOP-0001, AOP-0002, and EOP-1A:</p> <ul style="list-style-type: none"> <li>arm &amp; depress all four MANUAL SCRAM pushbuttons.</li> <li>place the REACTOR MODE SWITCH to SHUTDOWN.</li> <li>ARI to insert control rods.</li> <li>verify all control rods are fully inserted.</li> </ul>		

Position	Operator Actions	S/U	Comments
ATC (cont.)	<ul style="list-style-type: none"> <li>• verify feedwater system is operating to restore reactor water level.</li> <li>• verify reactor pressure is being maintained.</li> <li>• recognize and report failure of the Turbine Bypass Valves to open.</li> <li>• verify recirc pumps are running on the LFMG.</li> <li>• trip both recirc pumps.</li> <li>• verify turbine is tripped.</li> </ul> <p>Depressurize the RPV not to exceed 100°F cooldown rate, when directed by CRS.</p> <p>Maintain RPV water level 10 - 51 inches.</p>		

Position	Operator Actions	S/U	Comments
UO	<p>Maintain Control Room Logs.</p> <p>Implement AOP-0003 to verify applicable isolations.</p> <p>Implement EOP-1 and EOP-2 due to High Drywell d/p and High Drywell Temperature as directed by the CRS:</p> <ul style="list-style-type: none"> <li>• start all available Drywell coolers.</li> <li>• install EOP Enclosures</li> <li>• terminate injection from HPCS.</li> </ul> <p>Obtain leakage report, when directed by CRS.</p> <p>Depressurize the RPV not to exceed 100°F cooldown rate, as directed by CRS.</p>		

#### **VIII. CRITICAL TASKS**

1. Restore steam supply to the SSE to restore and maintain condenser vacuum.
2. Restore to power and re-open IAS-MOV106 (IAS Isolation Valve) to prevent the MSIVs from closing on a loss of RPS A.
3. Initiate ARI to insert all control rods on a failure to auto and manual scram upon receipt of a scram signal/condition.
4. Reduce RPV pressure to lower steam leak driving head and maximize drywell cooling.

#### **IX. QUANTITATIVE SUMMARY**

A.	Total Malfunctions:	7
B.	Malf. after EOP entry:	2
C.	Abnormal Events:	2
D.	Major Transients:	1
E.	EOPs entered:	3
F.	EOP Contingency Procedures used:	0
G.	Simulator Run Time:	60 min.
H.	EOP Run Time:	20 min.

#### **X. REFERENCES**

- A. R-DAD-TQ-011, "Simulator Training".
- B. NRC NUREG 1021 ES-301, Dynamic Simulator Requalification Examination
- C. BWR Owners Group Simulator Scenario Development Guidelines.

# **OPERATIONS SHIFT SUPERINTENDENT RELIEF CHECKSHEET**