
Scenario Events**Form ES-D-1**

Simulation Facility: Cooper Nuclear Station**Scenario No.:** 1**Examiners:** _____

_____**Applicants:** _____

_____**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. Two SRVs are weeping.

Event No.	Mall. No.	Event Type*	Event Description
1	N/A	N/R	Startup Reactor Feedwater Pump and raise reactor power.
2		I	Radiation Monitor (RMS*RE11A) fails downscale.
3		C	CRD pump trip.
4		C	(MSR Steam Supply Valve) fails closed, causing uneven turbine heating and turbine high vibration.
5		M	Failure to scram (ATWS).
5A		C	4160 VAC Bus Fault, causing a loss of SLC "A" (After EOP entry).

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

Examiner: _____**Chief Examiner:** _____

COURSE: Licensed Operator Simulator

SCENARIO TITLE: Turbine Trip / ATWS

SCENARIO NUMBER: 1

SCENARIO DURATION: 60 Minutes

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I. SCENARIO OBJECTIVE:

To evaluate the crew in the use of EOP-1, EOP-2, EOP-1A, and EOP-4A (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*RE11A Downscale Failure

- a. Evaluate the crews ability to respond to a downscale failure of the Reactor Bldg. Exhaust Rad Monitor (RMS*RE11A).

Event No. 3 CRD Pump Trip

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

Event No. 4: 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. 5: ATWS

- a. Evaluate the crews ability to respond to a failure of the reactor to scram with a subsequent loss of _____ and control RPV and Containment parameters using _____, and the Power/Level Control Contingency of -4A.

III. SCENARIO SUMMARY

A. Initial Conditions

1. IC#
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 and 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- and raise reactor power.
2. Reactor Bldg. Exhaust Rad Monitor (RMS*RE11A) fails downscale. In response to this event the crew will take actions IAW ARPs.
2. Control Rod Drive Pump 1A trips on a ground fault. In response to this event the crew will start CRD Pump 1B.
3. Main Turbine high vibration due to uneven heating of the low pressure turbine. In response to this event the crew will take actions IAW , AOP- , and SOP- .
4. 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, and EOP-4A.

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 and 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

<u>Event #</u>	<u>MFS/OR #</u>	<u>Malfunction Description and Information</u>
0 <u>Equipment Setup</u>	<u>FREEZE</u> <u>IC #</u>	<u>Simulator initialization.</u>
		<u>Event trigger for Turbine Trip.</u> <u>(MODE Switch in Shutdown)</u>
		<u>Event Trigger for bus failure.</u> <u>(SLC A INOP Annunciator)</u>
		<u>Event Trigger for bus failure.</u> <u>(Div. I ADS Logic LPCS/LPCI Opr Permissive [start of RHR A])</u>
		<u>Main Turbine Trip.</u> <u>ACTIVATION TYPE 1</u> <u>ACTIVATION TIME 09:00:00</u>
		<u>4160 VAC ENS*SWG1A Bus Fault</u> <u>ACTIVATION TYPE 2</u> <u>ACTIVATION TIME 09:00:00</u>
		<u>4160 VAC 1A Bus Fault</u> <u>ACTIVATION TYPE 3</u> <u>ACTIVATION TIME 09:00:00</u>

		<u>Failure to Scram (all)</u> <u>ACTIVATION TIME = 00:00:00</u>
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<u>Event #</u>	<u>MFS/OR #</u>	<u>Malfunction Description and Information</u>
		<u>Relief Valve Fails (Leaks)</u> <u>ACTIVATION TIME = 00:00:00</u>
		<u>Relief Valve Fails (Leaks)</u> <u>ACTIVATION TIME = 00:00:00</u>
		<u>Take simulator out of FREEZE.</u> <u>Stop Feedwater Pump 1A.</u> <u>Depress the Lube Oil Start P/B on P680 to start the RFP Lube Oil system.</u> <u>Raise Suppression Pool Temperature to ~86°F by cycling open/closed SRVs F041L and F047D.</u> <u>Acknowledge and reset all annunciators.</u> <u>Allow plant parameters to stabilize.</u> <u>Place simulator in FREEZE.</u>
		<u>Take simulator out of FREEZE.</u>
<u>1</u> <u>Problem</u> <u>Time:</u> <u>N/A</u>		<u>RFP Startup.</u> <u>Raise Reactor Power.</u>

<u>Event #</u>	<u>MFS/OR #</u>	<u>Malfunction Description and Information</u>
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<u>1</u> (cont.)		<p><u>ROLE PLAY:</u></p> <p><u>Respond as Turbine Bldg. Operator that you are standing by to support the starting of Feedwater Pump 1A.</u></p> <p><u>You and System Engineering have completed all pre-startup checks.</u></p> <p><u>After pump startup, report that the pump appears to be operating normally.</u></p>
		<p><u>ROLE PLAY:</u></p> <p><u>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.</u></p>
		<p><u>ROLE PLAY:</u></p> <p><u>Respond as Auxiliary Control Room as necessary.</u></p>

<u>Event #</u>	<u>MFS/OR #</u>	<u>Malfunction Description and Information</u>
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<u>2</u> <u>Problem</u> <u>Time:</u> <u>after RFP</u> <u>started</u> <u>and power</u> <u>raised</u>		<u>RMS*RE11A Fails Downscale</u> <u>ACTIVATION TIME = 00:00:00</u>
		<u>Role Play</u> <u>Respond as Reactor Bldg. Operator to</u> <u>investigate RMS*RE11A failure. Report</u> <u>back that everything looks normal</u> <u>locally.</u> <u>Respond as I&C and System Engineering to</u> <u>investigate RMS*RE11A failure. Report</u> <u>back that there appears to be a bad</u> <u>circuit board and will require further</u> <u>investigation. (Indication: "NO</u> <u>PULSES").</u>
		<u>Role Play</u> <u>Respond as Backpanel to perform a check source on</u> <u>the RM-23, check source completed and appeared to</u> <u>respond normally.</u>

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

<u>Event #</u>	<u>MFS/OR #</u>	<u>Malfunction Description and Information</u>
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<u>3</u> <u>(cont.)</u>		<p style="text-align: center;"><u>NOTE</u></p> <p><u>When CRD pump "A" is reported isolated, remove the following malfunction.</u></p>
	<u>Remove:</u>	<p><u>"CRD PUMP A HIGH SEAL LEAKAGE" annunciator.</u> <u>(Setpoint is 1 psig raising)</u></p>
		<p style="text-align: center;"><u>Role Play</u></p> <p><u>[If requested] Respond as electrical maintenance to check out the breaker for CRD pump "A".</u></p> <p><u>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.</u></p>
		<p style="text-align: center;"><u>Role Play</u></p> <p><u>[If requested] Respond as mechanical maintenance to check out the seal failure for CRD pump "A".</u></p> <p><u>After approximately 10 minutes, inform the control room that the seal will have to be replaced. This will take at least a day.</u></p>

<u>Event #</u>	<u>MFS/OR #</u>	<u>Malfunction Description and Information</u>
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<u>4</u> <u>Problem</u> <u>Time:</u> <u>~ 3 min.</u> <u>after</u> <u>CRD 1A</u> <u>trips</u>		<u>Main Turbine High Vibration</u> <u>(NOTE: It takes ~7 min. until receipt of annunciator.)</u> <u>MSSMOV111 (CLOSE) Steam Supply Shutoff Valve</u> <u>ACTIVATION TIME = 00:00:00</u>
		<u>ROLE PLAY:</u> <u>Respond as the Turbine Bldg. operator and System Engineer to investigate the turbine high vibration.</u> <u>After ~ 5 minutes inform the Control Room that you can feel excessive vibration on TB 123' elevation.</u> <u>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.</u> <u>If necessary, respond as I&C to investigate the cycling of HDL-20A (HDL pump recirc valve). Report valves appears to be operating normally.</u>
	<u>DELETE</u>	<u>Delete MFS when Turbine has tripped.</u>
<u>5</u> <u>Problem</u> <u>Time:</u> <u>N/A</u>		<u>ATWS Event</u>

<u>Event #</u>	<u>MFS/OR #</u>	<u>Malfunction Description and Information</u>
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<u>5</u> <u>(cont.)</u>		<p><u>ROLE PLAY:</u></p> <p><u>Respond as the Control Bldg. operator and Electrical Maintenance to investigate the trip of ENS*SWG1A.</u></p> <p><u>After ~ 5 minutes inform the Control Room that the breaker has tripped and cannot be reset.</u></p>
	<p><u>EOP 11</u></p> <p><u>REMOVE</u></p> <p><u>MFS</u></p>	<p><u>NOTE:</u></p> <p><u>Delay installing Enclosure 14 (Bypassing RC&IS Interlocks) to maintain higher reactor power ensuring suppression pool temperature exceeds 110°F.</u></p> <p><u>NOTE:</u></p> <p><u>WITH EXAMINER CONCURRENCE:</u></p> <p><u>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.</u></p>

<u>Event #</u>	<u>MFS/OR #</u>	<u>Malfunction Description and Information</u>
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	<p><u>Use the following RFs to implement EOP Encls.</u></p> <p><u>RF, EOP</u></p> <p><u>-10</u></p> <p><u>-14</u></p> <p><u>-20</u></p> <p><u>-16</u></p> <p><u>-24</u></p> <p><u>-27</u></p>	<p><u>ROLE PLAY:</u></p> <p><u>Respond as Operators and Technicians to install EOP Enclosures as requested by the CRS.</u></p> <p><u>(10) Scram Solenoids (JUMPERED)</u></p> <p><u>(14) RC&IS Interlocks (JUMPERED)</u></p> <p><u>(20) Defeat DW Clg ISOL (JUMPERED)</u></p> <p><u>(16) Cntmt IAS ISOL (JUMPERED)</u></p> <p><u>(24) MSIV/MSL LVL 1 ISOL (JUMPERED)</u></p> <p><u>(27) Prevent Inj LP ECCS (JUMPERED)</u></p>
<u>6</u>	<u>FREEZE</u>	<p><u>WITH EXAMINER CONCURRENCE when:</u></p> <p><u>Hot Shutdown Boron weight is injected or all Control Rods are inserted.</u></p>

VII. OPERATOR ACTIONS

EVENT NUMBER 1

Brief Description:

Startup Reactor Feedwater Pump, FWS-P1A IAW SOP- and raise reactor power.

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

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

EVENT NUMBER 2**Brief Description:**

The Division I Reactor Building Annulus Ventilation Radiation Monitor (RMS*RE11A) fails downscale.

<u>Position</u>	<u>Operator Actions</u>	<u>S/U</u>	<u>Comments</u>
<u>CRS</u>	<u>Direct crew to determine cause of DIV I Annulus Mixing Sys Inoperative annunciator per ARP-863-72 D02 and DRMS.</u> <u>Refer to TRM 3.3.6.2 (Secondary Containment Isolation Instrumentation) and determine that RMS*RE11A should be declared INOP and placed in a tripped condition within 24 hours.</u>		
<u>ATC</u>	<u>None</u>		
<u>UO</u>	<u>Implement required actions for the downscale failure of RMS*RE11A per ARP-</u> <ul style="list-style-type: none"><u>monitor DRMS Grid 2 or 6 and determine status of monitor 1GP001 (RMS*RE11A).</u><u>inform CRS that RMS*RE11A is indicating "0"</u>		

EVENT NUMBER 3**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.

<u>Position</u>	<u>Operator Actions</u>	<u>S/U</u>	<u>Comments</u>
<u>CRS</u>	<u>Direct and coordinate crew response to CRD Pump High Seal Leakage alarm (ARP-601-22-C01).</u> <u>Direct and coordinate crew and Electrical Maintenance response to the trip of CRD pump 1A.</u> <u>Direct/verify the following:</u> <ul style="list-style-type: none">• <u>start CRD pump 1B per ARP-601-22-A01.</u>• <u>Rx Bldg. Operator check CRD pumps locally.</u> <u>(IF REQUIRED)</u> <u>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 > 600 psig take action IAW B.1 and B.2.1 OR B.2.2.</u>		
<u>ATC</u>	<u>Monitor RC&IS for control rod accumulator faults when CRD pump 1A trips.</u>		

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

EVENT NUMBER 4**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- , AOP- , and SOP- .

<u>Position</u>	<u>Operator Actions</u>	<u>S/U</u>	<u>Comments</u>
<u>CRS</u>	<u>Direct and coordinate crew response to Turbine High vibration due to uneven heating per ARP-870-54A-D08, AOP-0002, and SOP-0080.</u> <u>Direct/verify the following:</u> <ul style="list-style-type: none"><u>• stop reactor power ascension.</u><u>• reduce turbine load by reducing reactor power as necessary.</u><u>• contact the Turb. Bldg. Operator and System Engineering to investigate the high vibration condition.</u>		
<u>ATC</u>	<u>Implement ARP-870-54A-D08, AOP-0002, and SOP-0080:</u> <ul style="list-style-type: none"><u>• stop reactor power ascension.</u><u>• reduce reactor power as necessary to lower turbine loading.</u>		

<u>Position</u>	<u>Operator Actions</u>	<u>S/U</u>	<u>Comments</u>
<u>UO</u>	<p><u>Acknowledge and report high Turbine High Vibration.</u></p> <p><u>Implement ARP-870-54A-D08, AOP-0002, and SOP-0080:</u></p> <ul style="list-style-type: none"> • <u>monitor turbine vibration and determine which bearing(s) caused the alarm.</u> • <u>report to the CRS when turbine vibration limits are exceeded.</u> 		

EVENT NUMBER 5**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, and EOP-4A.

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

<u>Position</u>	<u>Operator Actions</u>	<u>S/U</u>	<u>Comments</u>
<u>CRS</u> <u>(cont.)</u>	<ul style="list-style-type: none"> • <u>trip both recirc pumps</u> • <u>stabilize pressure</u> <u>(< 1060 psig).</u> • <u>install EOP Enclosures as</u> <u>required by EOPs (10,14,16,20,24,27).</u> • <u>direct alternate methods of</u> <u>control rod insertion per EOP-1A.</u> <p><u>Implement EOP-2 due to High Sup.</u> <u>Pool Temp., High Sup. Pool Level.,</u> <u>and High DW Temp. Direct/verify</u> <u>the following:</u></p> <ul style="list-style-type: none"> • <u>place RHR in Sup. Pool</u> <u>Cooling.</u> • <u>reject Sup. Pool to Radwaste.</u> • <u>start all available DW coolers</u> <u>(as required).</u> 		

<u>Position</u>	<u>Operator Actions</u>	<u>S/U</u>	<u>Comments</u>
<u>CRS</u> <u>(cont.)</u>	<p><u>Implement EOP-4A Level/Power Control, if Sup. Pool temp. exceeds 110 degrees F., while power is >5% and a SRV is open. Direct/verify the following:</u></p> <ul style="list-style-type: none"> <u>• terminate and prevent all injection into the RPV except Boron and CRD (including RCIC)</u> <p><u>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.</u></p> <p><u>NOTE: If RPV water level is < -193" Emergency Depressurization is required.</u></p> <p><u>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.</u></p> <p><u>When all control rods are inserted, direct the UO to secure SLC.</u></p> <p><u>Re-enter EOP-1 from EOP-1A.</u></p>		

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

<u>Position</u>	<u>Operator Actions</u>	<u>S/U</u>	<u>Comments</u>
<u>ATC</u> <u>(cont.)</u>	<u>Implement EOP-1 and EOP-1A as directed by CRS:</u> <ul style="list-style-type: none"> <u>initiate ARI.</u> <u>trip both recirc pumps.</u> <u>lower pressure setpoint to 900 psig.</u> <u>insert control rods.</u> <u>[When directed] terminate and prevent injection into the RPV.</u> <u>[When directed] slowly recommence injection into the RPV with the Condensate/Feedwater System.</u> <u>recognize and report all rods are in after the scram air header is vented (ENCL. 11).</u> <u>Restore and maintain RPV level between 10 and 51 inches.</u>		
<u>UO</u>	<u>Maintain Control Room logs.</u> <u>Implement EOP-1 and EOP-1A as directed by CRS:</u> <ul style="list-style-type: none"> <u>stabilize pressure 930 - 1060 psig using SRVs.</u> <u>trip RCIC</u> 		

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

VIII. QUANTITATIVE SUMMARY

A.	Total Malfunctions:	5
B.	Malf. after EOP entry:	1
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.

IX. REFERENCES

NRC NUREG 1021 ES-604, Dynamic Simulator Requalification Examination

BWR Owners Group Simulator Scenario Development Guidelines.

Scenario Events

Form ES-D-1

Simulation Facility: Cooper Nuclear Station
2

Scenario No.:

Examiners: _____

Applicants: _____

Initial Conditions: Reactor Power: 100%

Turnover: CRD Pump 1B tagged out for coupling alignment. Two SRVs are weeping.

Event No.	Mall. No.	Event Type*	Event Description
1	N/A	N	Turbine Generator Periodic Testing (Turbine Lift Pump Test - Turbine at Speed).
2		I	APRM Upscale Failure with a Single Control Rod Scram.
3		C/R	Stuck Open Safety Relief Valve requiring power to be reduced to <90%.
4		M	Drywell Steam Leak.
4A		C	Failure of the reactor to automatically or manually scram. The reactor can be scrammed by manually initiating Alternate Rod Insertion (ARI).
4B	101	C	Main Turbine Bypass Valves Fail in the Closed Position (after EOP entry).

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

Examiner: _____

Chief Examiner: _____

**SCENARIO TITLE: Stuck Open Safety Relief Valve /
Drywell Steam Leak**

SCENARIO NUMBER: 2

SCENARIO DURATION: 50 Minutes

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I. SCENARIO OBJECTIVE:

To evaluate the crew in the use of AOP-0035, EOP-1, and EOP-2 in response to a failed open SRV followed by 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: Turbine Generator Periodic Testing (Turbine Lift Pump Test - Turbine at Speed)

- a. Evaluate the crews ability to perform Turbine Generator Periodic Testing (Turbine Lift Pump Test - Turbine at Speed).

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: Stuck Open Safety Relief Valve

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

Event No. 4: Drywell Steam Leak

- a. Evaluate the crews ability to respond to a steam leak in the Drywell with a failure of the reactor to automatically and manually scram and a subsequent failure of the Main Turbine Bypass Valves in the closed position. The reactor can be scrammed by manually initiating Alternate Rod Insertion (ARI).

III. SCENARIO SUMMARY

A. Initial Conditions

- 1. IC#**
- 2. MOL equilibrium xenon**

B. Plant Conditions

- 1. Reactor Power 100%**

C. Out of Service Equipment.

- 1. CRD Pump 1B tagged out for pump coupling alignment.**

D. Evolutions \ Pending Malfunctions

- 1. Performance of Turbine Generator Periodic Testing (Turbine Lift Pump Test - Turbine at Speed) IAW OSP-0101, Section 3.11.5. Testing required as part of Bearing Lift Pump 1 (TML-LPM1) pressure switch replacement retest activities.**
- 2. APRM "F" fails upscale and a single control rod scrams. In response to this event the crew will take actions IAW ARPs.**
- 3. SRV B21*F051D inadvertently opens. In response to this event the crew will take actions IAW AOP-0035.**
- 4. The pressure transient associated with closing the SRV causes a steam leak to occur in the drywell with a failure of the reactor to automatically and manually scram and a subsequent failure of the Main Turbine Bypass Valves in the closed position. The reactor can be scrammed by manually initiating Alternate Rod Insertion (ARI). In response to this event the crew will scram the reactor and take action IAW EOP-1 and EOP-2.**

E. Termination

WITH EXAMINER CONCURRENCE when the crew has completed the following:

- EOP-0002 has 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 100%.
2. MOL equilibrium xenon
3. Equipment status:
 - a. CRD Pump 1B tagged out for pump coupling alignment.
4. Significant LCOs:
 - a. None
5. Evolutions completed, pending or in progress:
 - a. Performance of Turbine Generator Periodic Testing (Turbine Lift Pump Test - Turbine at Speed) IAW OSP-0101, Section 3.11.5. Testing required as part of Bearing Lift Pump 1 (TML-LPM1) pressure switch replacement retest activities.

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	FREEZE IC #13	Simulator initialization.
	ET-01 AN:8006A(03)	Event trigger for rod scram. (APRM B/F Upscale Trip Annunciator)
	MFS 15F (CRD008) Comp. 36-37	Control Rod 36-37 Scrams. ACTIVATION TYPE <u>1</u> ACTIVATION TIME <u>09:00:00</u>
	MFS 101 (EHC002B)	Main Turbine Bypass Valves Fail Closed
	OR 601,22C,C11	C11-CRDPB+G (OFF) CRD Pump B LTG C11-CRDPB+W (OFF) CRD Pump W LTG C11-CRDBP+G (OFF) Aux. Oil Pump G LTG
		Take simulator out of FREEZE. Place clearance cover on CRD B pump. Place clearance cover on CRD B Aux. oil pump. Verify P845 & P614 recorders are in "Auto/Jog" Mode. Acknowledge and reset all annunciators. Place simulator in FREEZE.
		Take simulator out of FREEZE.

Event #	MFS/OR #	Malfunction Description and Information
1 Problem Time: N/A		Turbine Generator Periodic Testing (Turbine Lift Pump Test - Turbine at Speed)
		ROLE PLAY As required, support Turbine Generator Periodic Testing (Turbine Lift Pump Test - Turbine at Speed) activities.
2 Problem Time: after OSP-0101	MFS 10 (NMS011F) Comp. F Fail. U	APRM F Fails Upscale. ACTIVATION TIME = <u>00:00:00</u>
	DELETE MFS 15 (CRD008) Comp. 36-37	DELETE when half scram is reset, this will allow rod 36-37 to settle back to position 00.
		ROLE PLAY: 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. (When requested) inform crew that other APRMs on backpanels indicate normal ~98%.

Event #	MFS/OR #	Malfunction Description and Information
2 (cont.)		ROLE PLAY: As I&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.
	MFS 138(A) (RPS001B) MFS 139 (RPS001C)	NOTE: Enter the following MFS after the APRM "F" failure and the half scram has been reset: RPS Fails to Scram Auto. RPS Fails to Scram Manual.
3 Problem Time: after APRM "F" failure	MFS 61(P) (MSS005A)	B21*F051D fails open ACTIVATION TIME = 00:00:00
	MFS 152 601-19-F11	ROLE PLAY: As backpanel operator, take Division II SRV keylock control switch to OFF.
	RF MS 134	ROLE PLAY: As backpanel operator, pull SRV solenoid fuses.

Event #	MFS/OR #	Malfunction Description and Information
4 Problem Time: after SRV is closed and T.S. reviewed.	MFS 97 (MSS001) Sev. 350 Ramp 10:00	Steam Leak in the Drywell. ACTIVATION TIME <u>00:00:00</u>
	RF MISC 146	ROLE PLAY: Respond when asked to remove Operation's Hold Tag for B21*MOV019. Restore indication and remove switch cover if requested. 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).
		ROLE PLAY: 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
	Use the following RFs to implement EOP Encls. RF, EOP -20 -27 (27(ROLE PLAY: Respond as Operators and Technicians to install EOP Enclosures as requested by the CRS. (20) Drywell Cooling (JUMPERED) (27) Prevent LP ECCS Injection (JUMPERED)

Event #	MFS/OR #	Malfunction Description and Information
5	FREEZE	<p>WITH EXAMINER CONCURRENCE when the crew has completed the following:</p> <ul style="list-style-type: none"> · EOP-0002 has 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.

VII. OPERATOR ACTIONS

EVENT NUMBER 1

Brief Description:

Performance of Turbine Generator Periodic Testing (Turbine Lift Pump Test - Turbine at Speed) IAW OSP-0101, Section 3.11.5. Testing required as part of Bearing Lift Pump 1 (TML-LPM1) pressure switch replacement retest activities.

Position	Operator Actions	S/U	Comments
CRS	Direct and coordinate Turbine Generator Periodic Testing (Turbine Lift Pump Test - Turbine at Speed) IAW OSP-0101, Section 3.11.5.		
ATC	<p>Turbine Generator Periodic Testing (Turbine Lift Pump Test - Turbine at Speed) IAW OSP-0101, Section 3.11.5:</p> <ul style="list-style-type: none">· depress the TML-TGOP Turning Gear Oil Pump OFF/RESET pushbutton.· depress the TML-TGOP Turning Gear Oil Pump RUN pushbutton.· check for proper system response.		

Position	Operator Actions	S/U	Comments
ATC (cont.)	<ul style="list-style-type: none"> · depress and hold the TML-LPM1 TEST START pushbutton. · check BRG LIFT PUMP 1 stops and the GREEN low pressure light comes on. · release the TML-LPM1 TEST START pushbutton. · depress the OFF/RESET pushbutton. · depress the AUTO pushbutton. · check for proper system response. · depress the TML-TGOP Turning Gear Oil Pump OFF/RESET pushbutton. · check for proper system response. · depress the TML-TGOP Turning Gear Oil Pump AUTO pushbutton. 		
UO	None		

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.</p> <p>Direct/verify the following:</p> <ul style="list-style-type: none">· determine reactor power level.· compare power level and flow indication with other channels.· check APRM backpanel indications.· verify no individual rods scrammed (recognize CR 36-37 scrammed).· bypass APRM F and reset the half scram.· contact I&C to investigate problems with APRM F and control rod 36-37.· contact Reactor Engineering and have them analyze for changes in the control rod pattern.		

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"> · verify the half scram. · acknowledge Control Rod Drift and Accumulator Fault annunciators. · identify control rod 36-37 scrammed using RC&IS indications. · verify no additional control rods have scrammed. · verify reactor power is normal and stable for given plant conditions. · bypass APRM F and reset the half scram (when directed). 		
UO	Verify and monitor backpanel indications for APRM F, other power level indications, and trip unit status lights.		

EVENT NUMBER 3

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">· plant announcement, "Safety Relief Valve open, all personnel evacuate Containment".· reduce reactor power to less than or equal to 90%.· when reactor power is less than 90%, direct/verify crew attempts to close the SORV. <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">· place RHR in Sup. Pool Cooling.· reject Sup. Pool to Radwaste.		

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"> · T.S. 3.4.1 · T.S. 3.3.3.2 · T.S. 3.6.1.6 · T.S. 3.6.2.1 		
ATC	<p>Implement AOP- and AOP- :</p> <ul style="list-style-type: none"> · reduce reactor power to less than or equal to 90%. · monitor feedwater temperature. · recognize and report that the SRV has closed. 		
UO	<p>Implement AOP- :</p> <ul style="list-style-type: none"> · place the SORV control switch to OPEN. · when reactor power is less than or equal to 90%, attempt to close the SORV. · take the P601 control switch to CLOSE. 		

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

EVENT NUMBER 4

Brief Description:

The pressure transient associated with closing the SRV causes a steam leak to occur in the drywell with a failure of the reactor to automatically and manually scram and a subsequent failure of the Main Turbine Bypass Valves in the closed position. The reactor can be scrammed by manually initiating Alternate Rod Insertion (ARI). In response to this event the crew will scram the reactor and take action IAW EOP-1 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-0005.</p> <p>Direct crew to manually scram the reactor.</p> <p>Implement AOP-0001, AOP-0002, and AOP-0003.</p> <p>Direct crew to manually initiate ARI.</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">· start all available Drywell coolers.· install EOP Enclosures as directed by EOPs (20,27).· terminate injection from HPCS.		

Position	Operator Actions	S/U	Comments
CRS (cont.)	<ul style="list-style-type: none"> depressurize the RPV not to exceed 100°F cooldown rate. <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-0005 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 and AOP-0002:</p> <ul style="list-style-type: none"> arm & depress all four MANUAL SCRAM pushbuttons. place the REACTOR MODE SWITCH to SHUTDOWN. verify all control rods are fully inserted. recognize and report that the reactor failed to scram and manually initiate ARI. Report all control rods are fully inserted. 		

Position	Operator Actions	S/U	Comments
ATC (cont.)	<ul style="list-style-type: none"> · verify feedwater system is operating to restore reactor water level. · verify reactor pressure is being maintained. · recognize and report failure of the Turbine Bypass Valves to open. · verify recirc pumps are running on the LFMG. · trip both recirc pumps. · verify turbine is tripped. <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"> · start all available Drywell coolers. · install EOP Enclosures · terminate injection from HPCS. <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. QUANTITATIVE SUMMARY

A.	Total Malfunctions:	5	
B.	Malf. after EOP entry:	1	
C.	Abnormal Events:	3	
D.	Major Transients:	1	
E.	EOPs entered:		2
F.	EOP Contingency Procedures used:	0	
G.	Simulator Run Time:		50 min.
H.	EOP Run Time:		25 min.

IX. REFERENCES

NRC NUREG 1021 ES-604, Dynamic Simulator Requalification Examination
BWR Owners Group Simulator Scenario Development Guidelines.

Simulation Facility: Cooper Nuclear StationScenario No.: 3Examiners: _____

_____Applicants: _____

_____Initial Conditions: Reactor Power: 100%Turnover: Startup RCIC System IAW SOP, RHR "A" is operating in Sup. Pool Cooling, High Volume
Containment Purge is inservice. APRM "B" is in BYPASS, I&C is investigating. Two SRVs
are weeping.

Event No.	Mall. No.	Event Type*	Event Description
1	N/A	N	Startup RCIC system for testing.
2	51	I	RCIC Turbine Trip.
3	09	I	LPRM Fails Downscale.
4	80	C/R	Lowering condenser Vacuum requiring power to be reduced.
5	44	M	Rupture of the "A" Recirculation Loop (DBA LOCA).
5A	OR	C	Recirc Pump "A" Suction Valve Fails in the Open Position (after EOP entry).

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

Examiner: _____

Chief Examiner: _____

SCENARIO TITLE: Loss of Condenser Vacuum /
DBA LOCA

SCENARIO NUMBER: 3

SCENARIO DURATION: 60 Minutes

Approved: Date:

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I. SCENARIO OBJECTIVE:

To evaluate the crew in the use of AOP-0005, EOP-1, EOP-2, and EOP-4 (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 dynamic signature testing and respond to a 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: Loss of Condenser Vacuum

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

Event No. 4: 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.

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. Drywell unit cooler "A" tagged out for breaker PMs.
2. LPRMs 30-07A, 22-07D, 14-23A, 46-23C bypassed.
3. APRM "B" is 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 upscale. In response to this event the crew will take actions IAW ARPs.
3. Loss of condenser vacuum due to failure of turbine expansion joint. In response to this event the crew will take actions AOP-0005.
4. 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:
 - a. Drywell unit cooler "A" is tagged out for breaker PMs.
 - b. A spurious trip occurred on APRM "B" last shift. APRM "B" is bypassed; I&C is investigating.
4. Significant LCOs:
 - a. None
5. Evolutions completed, pending or in progress:
 - a. Startup RCIC System IAW SOP-0035 to obtain dynamic signature testing data on MOV59.

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	FREEZE IC #	Simulator initialization.
	863-71C-DRS Pg. 1 of 3	DRS-UC1A+G (OFF) DW U/C A Green LTG DRS-UC1A+S (STOP) DW U/C A Control Switch Drywell UC "A" tagged out. ACTUATION TIME <u>00:00:00</u>
	680-15C-CNM	CNM-MOV+G (ON) Vacuum Brkr Green LTG CNM-MOV+R (OFF) Vacuum Brkr Red LTR ACTUATION TIME <u>00:00:00</u>
	680-4C-B33 (pg. 5 of 7)	B33*MOV23A+S (OPEN) Recirc Pump A Suction Valve Switch ACTUATION TIME <u>00:00:00</u>
	, NI 85 86 87 88	LPRMs BYPASS: 30-07A 14-23A 22-07D 46-23C
	ET-1 RP:S1(1)	Event Trigger for Steam Leak. (MODE Switch to Shutdown)

	<div>(MSS001)</div> <div>Sev. 500</div> <div>Ramp 4:0</div>	<div>Steam Leak in the Drywell.</div> <div>ACTIVATION TYPE <u>1</u></div> <div>ACTIVATION TIME <u>09:00:00</u></div>
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Event #	MFS/OR #	Malfunction Description and Information
		<p>Take simulator out of FREEZE.</p> <p>Place APRM B in Bypass.</p> <p>Place RHR A in Sup. Pool Cooling.</p> <p>Place High Volume Containment Purge in service.</p> <p>Place control switch for Drywell unit cooler "A" to stop position and install switch cover.</p> <p>Verify 5 Drywell unit coolers are left running.</p> <p>Start Special Log #4</p> <p>Acknowledge and reset all annunciators.</p> <p>Place simulator in FREEZE.</p>
		<p>Take simulator out of FREEZE.</p>
1		<p>ROLE PLAY</p> <p>As System Engineering and Rx. Bldg. Operator support RCIC System Flow Test, as required. Request flow and pressure to be established to obtain ~ 1000 psig.</p>
Problem Time: after RCIC is running		<p>RCIC Turbine Trip</p> <p>ACTIVATION TIME = <u>00:01:00</u></p>

Event #	MFS/OR #	Malfunction Description and Information
1 (cont.)		ROLE PLAY As System Engineering and Rx. Bldg. Operator investigate the trip of RCIC. Report back that there is no local indication of why RCIC tripped.
		ROLE PLAY As I&C investigate the trip of RCIC. Report back that there appears to be a problem with the speed controller and will require additional troubleshooting.
2 Problem Time: after RCIC Trip	(30-39A)	LPRM 30-39A fails downscale ACTIVATION TIME = <u>00:00:00</u>
		ROLE PLAY As Reactor Engineering respond and investigate the failure of LPRM 30-39A. When requested inform crew that the following LPRMs are out of service and bypassed: 30-07A 14-23A 22-07D 46-23C
		Bypass LPRM 30-39A When requested by the crew.

Event #	MFS/OR #	Malfunction Description and Information
3 Problem Time: after LPRM Failure	Sev: 5% Ramp: 05:00	Main Condenser Air In-Leakage Simulates a loss of condenser vacuum due to a small hole in the Turbine expansion joint. (Eventual rupture) ACTUATION TIME = <u>00:00:00</u>
		ROLE PLAY As Turb. Bldg. Operator investigate the lowering condenser vacuum.
after initial response to loss of Vac. (with exmnr OK)	Sev: 20% Ramp: 05:00	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 NEOs 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).

Event #	MFS/OR #	Malfunction Description and Information
3 (cont.)		<p>Role Play</p> <p>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.</p>
	OR 680-15C-CNM Pg. 1 of 1	<p>NOTE:</p> <p>Input this override 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>ACTUATION TIME = <u>00:00:00</u></p>
		<p>ROLE PLAY:</p> <p>Provide the following Leakage Reports as requested:</p> <p>Leakage Report #5 ~ 63 gpm Leakage Report #6 ~ 90 gpm Leakage Report #7 ~108 gpm Leakage Report #8 ~139 gpm</p>
4 Problem Time: 4 min. after the scram		<p>Recirculation Loop A Rupture</p> <p>ACTUATION TIME = <u>00:00:00</u></p>

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

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">• verify suppression pool cooling and containment purge is inservice.• open F046 (RCIC L/O Clg Wtr Supply Vlv).• start the Gland Seal Compressor (C002C).• open F045 (RCIC Stm Supply Stop Vlv).• verify F019 (RCIC Min Flow to Sup Pool Valve) opens.• open F059 (RCIC Test Return Vlv to CST)		

Position	Operator Actions	S/U	Comments
UO (cont.)	<ul style="list-style-type: none"> open F022 (RCIC Test Bypass Vlv to CST) as required to establish desired discharge pressure. adjust R600 (RCIC Flow Controller) as desired to control system flow. <p>Respond to RCIC Turbine trip:</p> <ul style="list-style-type: none"> contact System Engineering, Rx. Bldg. Operator, and I&C to investigate. <p>Shutdown RCIC IAW SOP- .</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">I&C and Reactor Engineering to investigate problem with LPRM 30-39A. <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 2.6 safety analysis section) and (Declare Div II channel Inoperable and place in a tripped condition within 12 hours).</p>		
ATC	<p>Acknowledge LPRM DOWNSCALE annunciator, inform CRS, and implement ARP-680-06-C04:</p>		

Position	Operator Actions	S/U	Comments
ATC	<p>Identify which LPRM has given the downscale alarm; inform CRS.</p> <ul style="list-style-type: none"> • compare power level indication with other channels. • [When directed] demand an OD-3 report. <p>Insert a half scram on Div II (as 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:

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. Direct/verify the following:</p> <ul style="list-style-type: none">• ATC to monitor main condenser vacuum.• reduction of reactor power to maintain condenser vacuum greater than or equal to 25" Hg. per GOP-0005, Power Maneuvering.• when vacuum cannot be maintained greater than or equal to 25" Hg, then manually scram the reactor. <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"> • reduce reactor power to maintain condenser vacuum greater than or equal to 25" Hg. • when vacuum cannot be maintained greater than or equal to 25" Hg, then manually scram the reactor. <p>Implement AOP-0001 and AOP-0002:</p> <ul style="list-style-type: none"> • arm & depress all four MANUAL SCRAM pushbuttons. • place the REACTOR MODE SWITCH to SHUTDOWN. • verify all control rods are fully inserted. • verify feedwater system is operating to restore reactor water level. • verify reactor pressure is being maintained. 		

Position	Operator Actions	S/U	Comments
ATC (cont.)	<ul style="list-style-type: none"> • verify recirc pumps are running on the LFMG. • verify turbine is tripped. <p>Perform subsequent actions of AOP- , AOP- and AOP- .</p>		
UO	<p>Respond to lowering Condenser Vacuum per AOP-0005.</p> <p>Coordinate with the NEOs to investigate the lowering condenser vacuum.</p> <p>Implement AOP- , AOP- , and AOP- subsequent actions as directed.</p> <p>Implement AOP- to verify applicable isolations.</p> <p>Place MSIV control switches to the closed position as directed.</p> <p>[If directed] establish RPV pressure control (930 - 1060 psig).</p>		

EVENT NUMBER 4

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. 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- to verify isolations.</p> <p>Implement EOP-1 and EOP-2. Direct/verify the following:</p> <ul style="list-style-type: none">• install EOP Enclosures as directed (19,20).• start all available Drywell coolers. <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">• open 7 ADS/SRVs• verify MSIVs, MSL drain valves, and RCIC isolation valves are closed.		

Position	Operator Actions	S/U	Comments
CRS (cont.)	<p>RPV Flooding:</p> <ul style="list-style-type: none"> • inject into RPV with the following systems to attempt to achieve 51 psig above Containment pressure: <ul style="list-style-type: none"> - HPCS - Feedwater/Condensate - LPCS - LPCI - CRD(maximum flow) <p>Implement EOP-2 Hydrogen Control.</p> <ul style="list-style-type: none"> • determine containment and drywell H2 concentrations • operate all Div I and Div II H2 igniters <p>Attempt to isolate the "A" Recirc Loop.</p> <p>Containment Flooding:</p> <ul style="list-style-type: none"> • lineup and inject with Service Water via RHR crosstie (Encl. 22) <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"> - High Drywell press. - Low RPV level. - RPV depressurized. <p>Attempt to isolate the "A" Recirc Loop as directed by the CRS.</p> <ul style="list-style-type: none"> • recognize and report failure of the "A" Recirc Loop to isolate. <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- and verify applicable isolations.</p> <p>Identify and report ECCS and DG status.</p> <p>Assist the CRS to determine the validity of RPV level indication.</p> <ul style="list-style-type: none"> • recognize that level has decreased below top of active fuel; inform CRS 		

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"> • start all available Drywell coolers • install EOP Enclosures <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. QUANTITATIVE SUMMARY

A.	Total Malfunctions:	5	
B.	Malf. after EOP entry:	1	
C.	Abnormal Events:	2	
D.	Major Transients:	1	
E.	EOPs entered:		2
F.	EOP Contingency Procedures used:	3	
G.	Simulator Run Time:	50	
H.	EOP Run Time:		20

IX. REFERENCES

NRC NUREG 1021 ES-604, Dynamic Simulator Requalification Examination
BWR Owners Group Simulator Scenario Development Guidelines.

OPERATIONS SHIFT SUPERINTENDENT RELIEF CHECKSHEET

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Offgoing Oncoming
Superintendent_____ Superintendent_____
(Print) (Print) 3Off-Going Shift
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3 N D Date _____
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Part I - To be reviewed prior to assuming the shift

o Unit Status Mode 1 Rx Power 100%

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

Startup RCIC (SOP-0035, Section 4.2) for dynamic signature
test on MOV-059.

o Significant LCO Status

None

o Equipment Status

RHR A running in Sup. Pool cooling. High Volume Containment
Purge is inservice. Drywell unit cooler "A" is tagged out
for breaker PMs. A spurious trip occurred on APRM "B" last
shift. APRM "B" is bypassed; I&C is investigating.

o Night Orders

o Standing Orders

o Board Walkdown

(Signature: Oncoming OSS Review Complete)

Facility: Cooper Nuclear Station**Scenario No.:** 4**Examiners:** _____**Operators:** _____

Initial conditions: IC- . Reactor power is at 91% on an end-of-life core.

Turnover: The plant is at 91% rated thermal power and is in the process of being returned to 100% at a rate of 10 MWe/min. You are currently at step of . The plant will be shutting down in 48 days for a refueling outage. The DG-2 Monthly Operability Surveillance, OSP-ELEC- , is in progress and has been completed through step (DG has been running in idle for 10 minutes). SW-P-1B is running to support the DG surveillance. All pre-job briefs are complete.

Event No.	Malf. No.	Event Type*	Event Description
1.		N(BOP)	Parallel DG-2 to the bus.
2.		C(BOP)	DG-2 voltage regulator failure causes MVARs to go upscale requiring the DG to be tripped.
3.		C(BOP)	Hotwell level controller (LIC-2) power supply fails while hotwell level is on an upward trend requiring BOP to transfer control to LIC-1 and manually restore level in hotwell.
4.		R(RO)	Continue power increase with reactor recirc flow.
5.		I(RO)	APRM INOP trip during power increase
6.		I(BOP)	Reactor Building DP controller, REA-DPIC-1B, auto feature fails causing high positive pressure in secondary containment and requiring BOP to take manual control of DP or start SGT to restore negative pressure.
7.		C(RO)	Small earthquake causes a small LOCA and an automatic shutdown of RWCU due to demin blockage. RO will initiate quick restart of RWCU system.
8.		M(ALL)	Large earthquake causes a large LOCA and scram
9.		C(RO/BOP)	Loss of condensate and feedwater system
10.		C(ALL)	SM-3 startup breaker automatic closure fails requiring manual closure by BOP
11.		C(BOP)	HPCS-V-4, HPCS injection valve, fails closed rendering HPCS unusable.

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

Event No. 1

Description: Parallel DG-2 to the bus.

This event is initiated by the turnover sheet.

Time	Position	Applicants Actions or Behavior
	SRO	Directs BOP to continue DG-2 Surveillance
	BOP	Continues DG-2 Surveillance: <ul style="list-style-type: none"> • Directs Ops-2 to place the Engine Speed Selector switch to the RATED position • Verifies voltage and frequency are within spec once steady state conditions are reached. • Places CB-DG2/8 Sync Selector to MAN CHECK • Raises or lowers frequency with DG-2 governor control switch until synchronizing scope is running slow in the fast direction. • Raises or lowers output voltage using DG-2 voltage regulator control switch, until generator Kilovolts is slightly higher than bus Kilovolts • At 5 min. to 12, places and holds CB-DG2/8 control switch in the CLOSE position until breaker closes and then immediately picks up load using the governor control switch. • Reports to CRS that DG-2 is tied to SM-8

COMMENTS:

Event No. 2

Description: DG-2 voltage regulator failure causes MVARs to peg upscale requiring the DG to be tripped.

This event is automatically initiated when the DG output breaker is closed.

Time	Position	Applicants Actions or Behavior
	BOP	<p>Reports that MVARs pegged upscale after paralleling the DG</p> <p>Emergency trips the DG (based on precaution in the surveillance procedure)</p>
	SRO	<p>Directs DG-2 emergency trip if not already accomplished</p> <p>Directs BOP to back out of surveillance procedure</p> <p>Calls work control for investigation and correction of DG regulator problem</p> <p>Refers to tech spec 3.8.1:</p> <ul style="list-style-type: none"> determines that SR 3.8.1.1 must be performed on OPERABLE offsite circuits within 1 hour and once per 8 hours thereafter determines that no redundant features are inoperable determines that either OPERABLE DGs are not inop due to common cause failure OR performs SR 3.8.1.2 for OPERABLE DGs within 24 hours determines that DG-2 must be restored to OPERABLE status within 72 hours <p>Calls plant management to inform them of DG-2 problem</p> <p><i>CUE: As plant management, direct the SRO to back out of the surveillance procedure and restore the electric plant to a normal lineup</i></p>
	BOP	<p>Backs out of surveillance procedure</p> <p>Restores to :</p> <ul style="list-style-type: none"> Ensures that the white LOCKOUT CKT AVAIL light and green tripped light are illuminated. Ensures the green position flag is being displayed in the CB-N1/3 control switch window. Ensures the CB-S3 whit LOCKOUT CIRCUIT AVAIL light and red closed light are illuminated

		<ul style="list-style-type: none">• Places the CB-N1/3 Sync Selector switch is in the MANUAL position• Checks voltage present on both incoming and running buses (not required to be matched)• Places the CB-N1/3 control switch to the CLOSE position• Ensures CB-N1/3 closes.• Ensures CB-S3 auto trips at time of breaker CB-N1/3 closure. Manually trips CB-S3 if it does not auto trip.• Places the CB-S3 control switch to the TRIP position and ensures a green flag is displayed in the CB-S3 control switch window.• Places the CB-N1/3 Sync Selector switch in the OFF position.
COMMENTS:		

Event No. 3

Description: Hotwell level controller (LIC-2) power supply fails while hotwell level is on an upward trend requiring BOP to transfer control to LIC-1 and manually restore level in hotwell.

*This event is initiated with **TRIGGER 3** while the electric plant is being restored to normal.*

Time	Position	Applicants Actions or Behavior
	BOP	<p>Reports Main Condenser Hotwell Level Hi annunciator</p> <p>Reports that LIC-2 has no power</p> <p>Refers to for high hotwell level</p>
	SRO	Directs actions of , Main Condenser High Water Level
	BOP	<p>Performs actions of</p> <ul style="list-style-type: none"> • sends OPS3 to check positions of LCVs 1A, 1B, and 1C <p><i>CUE: If requested as OPS3 to verify valve positions, wait 3 minutes and report that COND-LCV-1B and 1C are closed and that COND-LCV-1A is not opening</i></p> <ul style="list-style-type: none"> • verifies that COND –V-17 is open on P840 • shifts hotwell control to LIC-1 • verifies, via equipment operator, that LCVs are responding to LIC-1 <p><i>CUE: If requested as OPS3 to verify valve positions again, report that COND-LCV-1B and 1C are closed and that COND-LCV-1A is opening now.</i></p>

COMMENTS:

This event takes approximately 5 minutes from the initiation point to annunciation of the problem. During that time, the hotwell level controller display flickers off and on several times to give the appearance of probable instrument/power supply problems

Event No. 4

Description: Continue power increase with reactor recirc flow.

This event is initiated by the turnover sheet and can be carried out anytime that the RO's attention is not elsewhere.

Time	Position	Applicants Actions or Behavior
	SRO	Directs RO to continue power increase with recirc flow.
	RO	Increases recirc flow IAW while monitoring reactor power: <ul style="list-style-type: none">• using master flow controller, increases recirc flow at a rate not to exceed 1000 gpm increase/minute• monitors RPV level and feed system operation Inform SRO when plant is at 100% RTP
COMMENTS:		

Event No. 5

Description: APRM 'B' INOP trip during power increase

*This event is initiated with **TRIGGER 5** when power is approximately 95% or when directed by the lead examiner.*

Time	Position	Applicants Actions or Behavior
	RO	Observes/reports that APRM 'B' has failed INOP and resulted in a half scram Refers to ARP Checks full core display for individual control rods that may have scrammed during the half scram transient.
	SRO	Directs RO to bypass the failed APRM and reset the half scram per ARP Refers to Tech. Spec. 3.3.1.1 <ul style="list-style-type: none"> no action required – still have required number of channels Refers to LCS 1.3.2.1 & 1.3.3.1 <ul style="list-style-type: none"> no action required – still have required number of channels
	RO	Bypasses APRM and resets the half scram as directed Verifies that scram group solenoid lights are energized Verifies that backup scram lights have extinguished
COMMENTS:		

Event No. 6

Description: Reactor Building DP controller, REA-DPIC-1A, auto feature fails causing high positive pressure in secondary containment and requiring BOP to take manual control of DP or start SGT to restore negative pressure.

*This event is initiated with **TRIGGER 6** after the half scram has been reset or when directed by the lead examiner.*

Time	Position	Applicants Actions or Behavior
	RO/BOP	Reports Secondary Containment Pressure ΔP annunciator Refers to
	BOP	Goes to panel 812 to determine RB HVAC problem Reports failure of REA-DPIC-1A controller Refers to PPM <ul style="list-style-type: none"> • checks DP on REA-DPR-1B • if RB DP is at or above 0.0" H₂O, reports entry condition for PPM • checks RB fan ROA-FN-1A(1B) running • checks RB exh fan REA-FN-1A(1B) running • refers to ABN-HVAC <ul style="list-style-type: none"> • *starts SGT to maintain negative pressure in RB • closes ROA-V-1&2, REA-V-1&2 • if REA fans are running, secures them • restores RB HVAC to service as soon as possible <p>May take manual control of faulty DPIC by allowance of PPM vice starting SGT.</p> <p style="text-align: right;">*CRITICAL TASK</p>
	SRO	Enters due to high reactor building pressure References ABN-HVAC and determines that ARP actions preclude entry into ABN-HVAC

COMMENTS:

Event No. 7

Description: Small earthquake causes a small LOCA and an automatic shutdown of RWCU due to demin blockage. RO will initiate quick restart of RWCU system.

*This event is initiated with **TRIGGER 7** after reactor building negative pressure has been restored*

Time	Position	Applicants Actions or Behavior
SEISMIC SIM: Preset Seismic CD player on track 4 with a volume level of -10. Start CD player approx. 3 seconds before initiating TRIGGER 7. Allow CD to play approx. 20 seconds before securing.		
CUE: As OPS1, report that you felt seismic activity in the turbine building		
	SRO/RO/BO P	<p>Recognize/report "Minimum Seismic Earthquake Exceeded" alarm</p> <p>Directs/Performs actions of ARP:</p> <ul style="list-style-type: none"> • Checks the seismic response lights on board L and reports that some amber lights and no red lights are illuminated • Monitors control room instrumentation for evidence of increases in: <ul style="list-style-type: none"> • Drywell leakage • Drywell pressure • Drywell gaseous or particulate activity • Leak detection temperature changes • Announces seismic activity detected • Directs a walk-down of the plant by equipment operators to determine damage caused by the seismic activity.
	RO/BOP	Monitors control room instrumentation for evidence of system leakage
	RO	<p>Reports shutdown of running RWCU pump</p> <p>Refers to</p> <ul style="list-style-type: none"> • monitors pump suction flow • monitors filter demin flow <p>CUE: Call as the Radwaste Control Room Operator and inform the control room that both RWCU demins isolated on high DP following the earthquake.</p>
	SRO	<p>CUE: This component failure is assigned to the RO. You may need to cue the SRO to direct the quick restart to the RO position.</p> <p>Directs the quick restart of the RWCU pump</p>

	RO	<p>Restarts the RWCU pump in accordance with :</p> <ul style="list-style-type: none"> • opens RWCU-V-1 & 4 • ensures RWCU-V-104 is closed <p>Note: the next two steps must be done simultaneously</p> <ul style="list-style-type: none"> • place the control switch for RWCU-P-1B in START and hold it in this position • open RWCU-V-44 until the reactor water cleanup pump flow low alarm clears (approx. 70 gpm) • let the RWCU-P-1B control switch spring return to AUTO position • contacts the Radwaste control room and requests that they call the control room when demins are ready to be place back in service.
	RO/BOP	<p>Reports Leak Detection drywell floor drain flow high annunciator</p> <p>Checks floor drain flow on P632</p> <p>Reports floor drain flow is ~5 gpm and rising slowly</p> <p>Refers to ARP</p>
	SRO	<p>References/directs actions of ABN-LEAKAGE:</p> <ul style="list-style-type: none"> • Directs the start of a temporary log for Rx Bldg floor drain sump flow integrator • Directs the monitoring of containment rad monitors at RAD board 22 and 23 • Directs the monitoring of drywell temp and press • Refers to Tech Spec 3.4.5 • Directs chemistry to perform an isotopic analysis of the drywell atmosphere for radioactivity.
	RO/BOP	<p>Reports rising trend in drywell pressure and temperature</p> <p>Reports rising trend on containment rad monitors</p>
	SRO	<p>Briefs crew on pending scram due to rising DW pressure</p> <p>*Gives direction as to what pressure the crew will initiate a manual scram</p> <p style="text-align: right;">*CRITICAL TASK</p>
	RO	<p>Initiates a manual scram at the pre-described DW pressure or as directed by the SRO.</p> <p style="text-align: right;">CRITICAL TASK</p>

COMMENTS:

NOTE: A very small drywell leak develops and begins to propagate 5 minutes into this event. This allows time for the RO to take action with the RWCU pump. Actual annunciation of the leakage problem occurs approximately 14 minutes into this event.

Event No. 8

Description: Large earthquake causes a LOCA and scram

*This event is initiated by **TRIGGER 8** when SRO gives direction to manual scram the reactor based on increasing DW pressure.*

Time	Position	Applicants Actions or Behavior
<p>SEISMIC SIM: Preset Seismic CD player on track 4 with a volume level of 0. Start CD player approx. 3 seconds before initiating TRIGGER 8. Allow CD to play approx. 40 seconds before securing. After securing, set volume level to -10 and randomly run 10-15 second aftershocks over the remainder of the scenario.</p> <p>CUE: As OPS1, report that you felt seismic activity in the radwaste building; much worse than the last tremor. There is a lot of dust in the air.</p>		
	SRO/RO/BO P	<p>Recognize/report "Operating Basis Earthquake Exceeded" alarm</p> <p>Directs/performs actions of ARP:</p> <ul style="list-style-type: none"> • verifies alarm on Board L, numerous red indicators are illuminated • initiates a reactor shutdown • announces OBE • Monitors control room instrumentation for evidence of increases in: <ul style="list-style-type: none"> • Drywell leakage • Drywell pressure • Drywell gaseous or particulate activity • Leak detection temperature changes • Directs a walk-down of the plant by equipment operators to determine damage caused by the seismic activity.
	RO	<p>Initiates manual reactor scram (if auto scram has not already occurred)</p> <p>Performs immediate scram actions</p> <ul style="list-style-type: none"> • Places mode switch to shutdown • Reports power/pressure/level • Reports all rods in

		<ul style="list-style-type: none"> • Inserts SRMs/IRMs <p>Lines up the feedwater system for RFW-V-10 valve control with the 10 valve controller in automatic</p>
<i>CUE: As Radwaste Control Room Operator, when RPV level drops below –50”, report that the condensate filter demineralizers are all isolating on high DP. (event 9)</i>		
	SRO	<p>Enters on low RPV level and on high DW pressure:</p> <ul style="list-style-type: none"> • Directs RO/BOP to verify isolation, initiations, and DG starts • *Directs RO to maintain RPV level between –161” and +54” (will give a band within these limits) with Table 1 systems. • *Directs RO/BOP spray of WW before reaching 12 psig in the WW • Directs RO/BOP to confirm RRC pumps are stopped and stop DW cooling fans in prep for DW spray • *Directs RO/BOP to spray DW when WW press exceeds 12 psig and within DSIL • *Directs the securing of containment sprays when pressure drops LE 1.68 psig in respective area. • At –50” RPV level, directs verification of expected isolations and initiations • *At –129”, if ADS timer has started, direct inhibition of ADS • *At TAF, determines that LP ECCS is available and that current trend will drop level below –192”; determines Emergency RPV depressurization is required; enters , Emerg. RPV Depress. • *Directs RO/BOP to open 7 SRVs, ADS preferred. <p style="text-align: right;">*CRITICAL TASK</p>
	RO/BOP	<p>Reports that expected initiations, isolations, and DG starts have occurred except that HPCS-V-4 has failed closed (see event 11).</p> <p>*Uses RCIC and FW systems to maintain RPV level</p> <p>*Sprays the WW when directed</p> <p>Confirms that RCC pumps and DW fans have been secured</p> <p>*Sprays the DW when directed</p> <p>*Secures WW/DW sprays when if or when LT 1.68 psig in each area</p> <p>*Opens 7 SRVs (ADS preferred) to emergency depressurize the RPV.</p> <p style="text-align: right;">*CRITICAL TASK</p>
	SRO	Directs restoration of RPV level to band of +13” to +54”

	RO/BOP	Controls injection systems to restore RPV level to new band.
COMMENTS: Terminate the scenario after the RPV has been depressurized and water level is in the +13" to +54" band.		

Event No. 9

Description: Loss of condensate and feedwater system

This event is automatically initiated after the reactor scram. Each of the condensate filter demineralizers isolate on a time line (due to large crud bursts caused by earthquake) to give a gradual loss of feedwater. This event occurs within event 8 and should be completed prior to scenario termination.

Time	Position	Applicants Actions or Behavior
	RO	Reports that even though the FW system is aligned for 10 valve control, there is no flow from the feedwater system Recognizes/reports that the condensate booster pumps have all tripped.
COMMENTS:		

Event No. 10

Description: SM-3 startup breaker automatic closure fails requiring manual closure by BOP

This event is initiated at the beginning of the scenario but is not evident until the auto transfer of power supplies for occurs following the main turbine trip. This event occurs within event 8 and should be completed prior to scenario termination.

Time	Position	Applicants Actions or Behavior
	BOP	Reports that breaker did not auto-close on auto-transfer following turbine trip Closes CB- <ul style="list-style-type: none"> ensures that CB-N1/3 is open and switch is green flagged takes CB-S3 synch selector switch to MAN CHECK takes CB-S3 control switch to CLOSE verifies breaker closure
	SRO	If BOP does not close CB-S3 after report, direct closure of CB-S3
COMMENTS: This event occurs within Event 9		

Event No. 11

Description: HPCS-V-4, HPCS injection valve, fails closed rendering HPCS unusable.

This event is initiated at the beginning of the scenario but is not evident until HPCS is initiated. This event occurs within event 8 and should be completed prior to scenario termination.

Time	Position	Applicants Actions or Behavior
	RO	Reports that HPCS-V-4 did not open upon system initiation Attempts to open HPCS-V-4 (does not open) Reports that HPCS is unavailable
COMMENTS: This event occurs within Event 9.		

SRO TURNOVER INFORMATION

The plant is at 91% rated thermal power and is in the process of being returned to 100% at a rate of 10 MWe/min.

You are currently at step of

The plant will be shutting down in 48 days for a refueling outage.

The DG-2 Monthly Operability Surveillance, OSP-ELEC , is in progress and has been completed through step (DG has been running in idle for 10 minutes).

SW-P-1B is running to support the DG surveillance.

All pre-job briefs are complete.