

**Facility:** Fermi 2      **Scenario No.** 2      **Op-Test No:** 2018-1

**Examiners:** \_\_\_\_\_ **Operators:** Surr. (CRS), SRO-1 (ATC), RO-1 (BOP)  
 \_\_\_\_\_ Surr. (CRS), SRO-2 (ATC), RO-2 (BOP)

**Initial Conditions:** IC-182, MOC, 94% Rx. Power.

**Turnover:** The plant is operating at 94% following a rod pattern adjustment. Power is being held at 94% pending an evaluation of thermal limits by Reactor Engineering. In the meantime, the plan for the shift is to swap divisions of CCHVAC for work on the Division 1 CCHVAC chiller. The operational checkout, and IV, for the D2 CCHVAC makeup radiation monitor is complete and in the Unit Log.

**Critical Tasks: SC-SCRAM** - With reactor at power and with a primary system discharging into the secondary containment **MANUALLY SCRAM** the reactor before Steam Tunnel Temperature exceeds its Maximum Safe Operating (MSO) value of 210°F; With a primary system discharging into the secondary containment and area radiation/temperature/water levels exceed maximum safe operating levels in more than one area, **INITIATE Emergency Depressurization** by opening the Minimum Number of 5 SRVs Required for Emergency Depressurization (MNSRED) prior to any other Secondary Containment area temperature reaching its Maximum Safe Operating (MSO) value.

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	N (BOP) N (SRO)	BOP shifts from Division 1 to Division 2 CCHVAC.
2	C51MF0006	I (ATC) I (SRO) TS	APRM Flow Unit #2 fails upscale. ATC bypasses APRM #2 and SRO evaluates LCO 3.3.1.1.
3	T41MF0004	C (BOP) C (SRO) TS	Trip of Div 2 CCHVAC Return Air Fan. AOP 20.413.01 entry. BOP starts Div 2 CCHVAC. SRO evaluates LCO 3.7.3 and 3.7.4.
4	BBAZP603_ A153NOISE	C (ATC) C (SRO)	Swap of the running RRMG LO Pump due to noise (field report) and fluctuating amps.
5	N21MF0019	R (ATC) R (SRO)	N. Condenser Pump Trips AOP 20.107.01 entry; ATC lowers power using Recirc. flow to ≤88%.
6	B21MF0103  B21MF0015 B21MF0054 EOPRF0033 EOPRF0036	M (ALL)  C (BOP) C (SRO)	RB Steam Tunnel Leak. MSIVs Fail to Isolate. Crew should attempt to isolate leak when area temp ≥160°F (MNO). <b>IF</b> area temp is ≥200°F and MSIVs are not closed, crew should manually close them. (MSL C MSIVs do not fully close.). Reactor Manual Scram (Mode Switch to Shutdown) before RB Steam Tunnel Area temp reaches Max Safe Operating Temperature (MSO) of 210°F. <b>(CT)</b>

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 \_\_\_\_\_ Surr. (CRS), SRO-2 (ATC), RO-2 (BOP)

**Initial Conditions:** IC-182, MOC, 94% Rx. Power.

**Turnover:** The plant is operating at 94% following a rod pattern adjustment. Power is being held at 94% pending an evaluation of thermal limits by Reactor Engineering. In the meantime, the plan for the shift is to swap divisions of CCHVAC for work on the Division 1 CCHVAC chiller. The operational checkout, and IV, for the D2 CCHVAC makeup radiation monitor is complete and in the Unit Log.

**Critical Tasks: SC-SCRAM** - With reactor at power and with a primary system discharging into the secondary containment **MANUALLY SCRAM** the reactor before Steam Tunnel Temperature exceeds its Maximum Safe Operating (MSO) value of 210°F; With a primary system discharging into the secondary containment and area radiation/temperature/water levels exceed maximum safe operating levels in more than one area, **INITIATE Emergency Depressurization** by opening the Minimum Number of 5 SRVs Required for Emergency Depressurization (MNSRED) prior to any other Secondary Containment area temperature reaching its Maximum Safe Operating (MSO) value.

Event No.	Malf. No.	Event Type*	Event Description
7	C93RF0001	M (ALL)	Seismic Event leading to a HPCI Steam Leak.
	C97MF1087		
	E41MF0007	C (BOP) C (SRO)	HPCI Fails to Isolate.
	EOPRF0022 E41MF0001 E41MF0008		When Area Temperatures are >MSO (210°F) in 2 areas, Emergency Depressurization is directed. CRS directs BOP to open 5 SRVs (ADS preferred). <b>(CT)</b>

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

Op-Test No.: 2018-1Scenario No.: 2Page 1 of 16Event No.: N/AEvent Description: Overview***Initial Conditions:***

IC-182, MOC, 94% Rx. Power

***The objectives of this scenario are to:***

1. Perform shift of CCHVAC divisions.
2. Recognize and respond to an APRM Flow Unit failure.
3. Recognize and respond to Trip of CCHVAC Return Air Fan.
4. Recognize and respond to abnormal RRMG Lube Oil Cooling Pump conditions.
5. Recognize and respond to Condenser Pump Trip.
6. Recognize and respond to Steam Leak in Secondary Containment.
7. Recognize and respond to multiple Secondary Containment Steam Leaks requiring Emergency Depressurization.
8. Execute steps of Secondary Containment Control.
9. Execute steps of RPV Control.
10. Execute steps for Emergency RPV Depressurization.
11. Direct and supervise the Shift team during Normal, Abnormal, and Emergency operations.

***The crew will be required to respond to the following order of events:***

- Shift CCHVAC Divisions.
- APRM flow unit malfunction.
- Trip of CCHVAC Return Fan.
- Swap of RRMG Lube Oil Pumps, due to loud noise.
- N. Condenser Pump Trip.
- Steam Leak into the RB Steam Tunnel / failure of MSIVs to automatically isolate.
- Steam Leak from the HPCI System / failure to isolate.
- Emergency Depressurization due to 2 Secondary Containment areas > MSO for the same parameter.

Op-Test No.: 2018-1Scenario No.: 2Page 2 of 16

Event No.: 1 Event Description: Shift CCHVAC Divisions from Division 1 to Division 2 in service.

Time	Position	Applicant's Actions or Behavior
0 min	SRO	<ul style="list-style-type: none"> <li>Conducts brief on shifting CCHVAC divisions.</li> <li>Directs BOP to shift CCHVAC Divisions from Div 1 to Div 2 IAW 23.413, Section 6.1.</li> </ul>
	ATC	<ul style="list-style-type: none"> <li>Monitors Power, Pressure and Level.</li> <li>May handle radio communications for BOP.</li> <li>Peer checks switch manipulation for CCHVAC.</li> </ul>
	BOP	<ul style="list-style-type: none"> <li>Shifts Divisions of CCHVAC IAW 23.413, Section 6.1: <ul style="list-style-type: none"> <li>Contacts RB rounds and makes Hi-Com announcement.</li> </ul> </li> </ul> <p><b>Role Play:</b> RB rounds: When contacted, report that Div 2 CCHVAC is ready for start. Acknowledge report of shifting divisions of CCHVAC.</p> <p><b>Role Play:</b> RB rounds: When contacted, acknowledge report for shifting divisions of CCHVAC.</p> <ul style="list-style-type: none"> <li>Verifies the Div 2 Mode Select switch is the same as Div 1.</li> <li>Verifies Emergency Air Intake Selector is in Auto.</li> <li>Verifies CMC switches are all in Auto.</li> <li>Places Div 2 Mode Select Switch in ALL AUTO.</li> <li>Verifies Supply Fan and Chilled Water Pump start.</li> </ul> <p><b>Role Play:</b> RB rounds: 30 seconds after start, report good start of Division 2 CCHVAC.</p> <ul style="list-style-type: none"> <li>Places Div 1 Mode Select Switch in All STOP.</li> <li>Verifies Return Air Fan starts.</li> <li>Verifies Chiller starts.</li> <li>Directs RB rounds NO to verify operation by observing normal instrument readings.</li> </ul> <p><b>Role Play:</b> RB rounds: IF asked, report that Div 2 CCHVAC Capacity (Load) Control Auto-Manual Switch is in Auto.</p> <p><b>Role Play:</b> RB rounds NO: Acknowledge report to verify local instrument readings. Wait 3 minutes and report all instrument readings are within the expected ranges (or procedure steps are complete, depending how the direction is given). <b>IF</b> specific numbers are requested, provide the following:</p> <ul style="list-style-type: none"> <li>T41-R046B, Div 2 CCHVAC Chiller Evaporator Press Ind, 25" vac.</li> </ul>

Op-Test No.: 2018-1Scenario No.: 2Page 3 of 16Event No.: 1 Event Description: Shift CCHVAC Divisions from Division 1 to Division 2 in service.

		<ul style="list-style-type: none"><li>○ T41-R047B, Div 2 CCHVAC Chiller Condenser Press Ind, 12" vac.</li><li>○ T41-RA06B, Div 2 CCHVAC Chiller Oil Sump Temp Ind, 140°F.</li><li>○ T41-RA05B, Div 2 CCHVAC Chiller Oil Cooler Temp Ind, 117°F.</li><li>○ T41-R045B, Div 2 CCHVAC Chiller Oil Pressure Ind, 13 psig.</li><li>○ T41-R405B, Div 2 CCHVAC Chilled Water Pump Flow Ind, is 260 gpm.</li><li>○ Verifies damper lineup IAW Enclosure A – Normal Mode.</li><li>○ Verifies Div 2 EECW TCV is in AUTO.</li><li>○ Reports to SRO that Div 2 CCHVAC is in service with Div 1 S/D.</li></ul>
	SRO	<ul style="list-style-type: none"><li>• Acknowledges report of CCHVAC shift.</li></ul>

Op-Test No.: 2018-1Scenario No.: 2Page 4 of 16

Event No.: <u>2</u> Event Description: <u>APRM Flow Unit Failure.</u>		
Time	Position	Applicant's Actions or Behavior
T+ 20 min		<b>ACTION:</b> Trigger <b>Event 2</b> to initiate APRM Flow Unit Failure ( <b>C51MF0006</b> ).
	ATC	<ul style="list-style-type: none"> <li>Responds to ARPs 3D111, RBM Trouble, 3D113, Control Rod Withdrawal Blocked and 3D115, APRM Flow Upscale.</li> <li>Determines that APRM #2 flow is upscale.</li> <li>Reports indications to the SRO.</li> <li>Recommends bypassing the affected APRM per SOP 23.605, APRM System.</li> <li>May report Tech Spec/TRM information from ARP to SRO.</li> <li>May dispatch operator to the Relay Room.</li> </ul> <p><b>Role Play:</b> NO/STA/LNO: If dispatched to the Relay Room to investigate, wait 3 minutes and report that APRM #2 flow is reading 130.0%. All other APRMs indicate normally (~86%).</p>
	BOP	<ul style="list-style-type: none"> <li>May back up ATC's diagnosis of APRM #2 flow unit failure.</li> <li>May handle communications for ATC.</li> <li>May take over monitoring of Power, Pressure and Level.</li> <li>Peer checks ATC when bypassing APRM #2.</li> </ul>
	SRO	<ul style="list-style-type: none"> <li>Acknowledges report of APRM Flow Unit failure.</li> <li>Hi-Coms Shift Manager / STA to come to the MCR.</li> <li>Directs bypassing APRM #2 IAW 23.605.</li> <li>Reviews Technical Specifications / TRM:               <ul style="list-style-type: none"> <li>Determines LCO 3.3.1.1, RPS Instrumentation is MET per Table 3.3.1.1-1, Function 2. Determines that a Tracking LCO is necessary for Condition A.1.</li> <li>Determines TRLCO 3.3.2.1, Control Rod Block Instrumentation is MET per Table TR3.3.2.1-1, Function 3. Determines that a Tracking LCO is necessary for Condition A.1.</li> </ul> </li> </ul> <p><b>Note:</b> These Actions are tracking only since the required number of channels (3) is met in the current MODE.</p>

Op-Test No.: 2018-1Scenario No.: 2Page 5 of 16Event No.: 2 Event Description: APRM Flow Unit Failure.

		<ul style="list-style-type: none"> <li>May review Technical Specifications / TRM: <ul style="list-style-type: none"> <li>TR 3.3.1.1 (Table TR3.3.1.1-1, Function 2) – Determines no actions are necessary.</li> <li>Technical Specifications, Section 3.3.2.1, Control Rod Block Instrumentation – Determines no actions are necessary.</li> </ul> </li> <li>May contact RTC/WWM to write a CARD, commence troubleshooting, protect unaffected APRMs.</li> </ul> <p><b>Role Play:</b> If RTC/WWM contacted, acknowledge report of APRM failure, etc. No follow-up actions are necessary.</p>
	ATC	<ul style="list-style-type: none"> <li>Bypasses APRM #2 IAW 23.605, Section 6.4: <ul style="list-style-type: none"> <li>Verifies no other APRMs are in bypass.</li> <li>Places APRM Bypass Joystick to Position 2.</li> <li>Verifies the APRM indicates bypassed.</li> <li>Directs NO/STA/LNO to verify APRM #2 indicates bypassed in Relay Room.</li> </ul> </li> </ul> <p><b>Role Play:</b> NO/STA/LNO: When directed to the RR, wait 3 minutes (30 seconds if already there) and report that the blue bypassed LED is ON for APRM #2 on each 2/4 Logic Module.</p> <ul style="list-style-type: none"> <li>Reports to SRO that APRM #2 is bypassed.</li> </ul>
	SRO	<ul style="list-style-type: none"> <li>Conducts follow-up brief to discuss APRM failure, impact, Tech Specs and actions going forward.</li> </ul>

Op-Test No.: 2018-1Scenario No.: 2Page 6 of 16Event No.: 3 Event Description: Trip of Div. 2 CCHVAC Return Air Fan.

Time	Position	Applicant's Actions or Behavior
T+35 min		<b>ACTION:</b> Trigger <b>Event 3</b> to initiate trip of Div 2 CCHVAC Return Air Fan ( <b>T41MF0004</b> ).
	BOP	<ul style="list-style-type: none"> <li>Responds to 17D27, Div II Control Room A/C Trouble and 17D72, Motor Tripped.</li> <li>Recognizes and reports trip of Div 2 CCHVAC Return Air Fan.</li> <li>May dispatch NOs: <ul style="list-style-type: none"> <li>Operator to inspect tripped fan and monitor start of Div 1 CCHVAC.</li> <li>Operator to MCC 72F-5A Pos 1B.</li> </ul> </li> </ul> <p><b>Role Play:</b> If dispatched wait 4 minutes and report that the Div 2 CCHVAC Return Air Fan Motor is very hot.</p> <p><b>Role Play:</b> If dispatched wait 3 minutes and report MCC 72F-5A, Pos 1B is tripped locally with no other indications as to why.</p>
	ATC	<ul style="list-style-type: none"> <li>Monitors Power, Pressure and Level.</li> <li>May assist BOP by handling radio communications: <ul style="list-style-type: none"> <li>Operator to inspect tripped fan and monitor start of Div 1 CCHVAC.</li> <li>Operator to MCC 72F-5A Pos 1B.</li> </ul> </li> </ul>
	SRO	<ul style="list-style-type: none"> <li>Acknowledges report of CCHVAC Return Air Fan Trip.</li> <li>Enters AOP 20.413.01, CCHVAC System Failure.</li> <li>Announces event over the Hi-Com.</li> <li>Directs Actions of Condition A to shut down Div 2 and start Div 1 CCHVAC.</li> </ul>
	BOP	<ul style="list-style-type: none"> <li>Places Div 2 CCHVAC Mode Select Switch in ALL STOP.</li> <li>Places Div 1 CCHVAC Mode Select Switch in ALL AUTO.</li> </ul> <p><b>Role Play:</b> RB Rounds NO: If directed, wait 2 minutes and report good start of Div 1 CCHVAC. <b>IF</b> asked to verify local instrument readings, wait 3 minutes and report all instrument readings are within the expected ranges. <b>IF</b> specific numbers are requested, provide the following:</p> <ul style="list-style-type: none"> <li>T41-R046A, Div 1 CCHVAC Chiller Evaporator Press Ind, 24" vac.</li> </ul>



Op-Test No.: 2018-1Scenario No.: 2Page 7 of 16Event No.: 3 Event Description: Trip of Div. 2 CCHVAC Return Air Fan.

		<ul style="list-style-type: none"> <li>○ T41-R047A, Div 1 CCHVAC Chiller Condenser Press Ind, 10" vac.</li> <li>○ T41-RA06A, Div 1 CCHVAC Chiller Oil Sump Temp Ind, 138°F.</li> <li>○ T41-RA05A, Div 1 CCHVAC Chiller Oil Cooler Temp Ind, 120°F.</li> <li>○ T41-R045A, Div 1 CCHVAC Chiller Oil Pressure Ind, 13 psig.</li> <li>○ T41-R405A, Div 1 CCHVAC Chilled Water Pump Flow Ind, is 265 gpm.</li> </ul>
	SRO	<ul style="list-style-type: none"> <li>• Reviews Technical Specifications:               <ul style="list-style-type: none"> <li>○ Determines that LCO 3.7.4, CCHVAC System is not MET.</li> <li>○ Enters 3.7.4 Condition A and determines that Action A.1 is required to restore Div 2 CCHVAC to OPERABLE within 30 days.</li> <li>○ Determines that LCO 3.7.3, CREF System is not MET.</li> <li>○ Enters 3.7.3, Condition A and determines that Action A.1 is required to restore Div 2 CREF to OPERABLE within 7 days.</li> </ul> </li> <li>• Briefs crew on TS and follow-up actions.</li> <li>• May contact RTC/WWM to write a CARD, investigate/troubleshoot Div 2 CCHVAC, and protect Division 1 CCHVAC.</li> </ul>

Op-Test No.: 2018-1Scenario No.: 2Page 8 of 16Event No.: 4 Event Description: Noise RRMG LO Pump – swap running pumps.

Time	Position	Applicant's Actions or Behavior
T+45 min.		<p><b><u>ACTION:</u></b> Trigger <b>Event 4</b> to initiate noise on S. RRMG Lube Oil Pump B1.</p> <p><b><u>Role Play:</u></b> Wait 30 seconds, then call the MCR (as extra NO walking down building with a trainee) and report that the S. RRMG Lube Oil Pump B1 is making a very loud rattling noise. You recommend swapping S. RRMG Lube Oil Pumps.</p>
	SRO	<ul style="list-style-type: none"> <li>• Acknowledges report and recommendation.</li> <li>• May conduct a brief on switching lube oil pumps.</li> <li>• Directs ATC to shift running S. RRMG Lube Oil Pumps.</li> </ul>
	ATC	<ul style="list-style-type: none"> <li>• Recognizes and reports fluctuating amps on the B1 Pump.</li> <li>• Informs extra NO of pump swap.</li> <li>• Shifts S. RRMG Lube Oil Pumps IAW 23.138.01, Section 4.2: <ul style="list-style-type: none"> <li>○ Places the S. RRMG Lube Oil Pump B2 in RUN.</li> <li>○ Places the S. RRMG Lube Oil Pump B1 in OFF/RESET.</li> <li>○ Verifies the S. RRMG Lube Oil Pump B2 starts.</li> <li>○ Places the S. RRMG Lube Oil Pump B1 in AUTO.</li> </ul> </li> </ul> <p><b>Note:</b> The ATC may recommend leaving the B1 pump in OFF/RESET.</p> <p><b><u>Role Play:</u></b> Extra NO: If called, wait 30 seconds and report good start of S. RRMG Lube Oil Pump B2.</p> <ul style="list-style-type: none"> <li>○ Contacts the Extra NO to Verify Fluid Drive Bearing Oil Supply is 25 to 45 psig as indicated on B31-RA15B South RRMG Set Brg Oil Supply Press Ind (locally at RR MG Set gauge board).</li> </ul> <p><b><u>Role Play:</u></b> Extra NO: If called, report local fluid drive bearing oil supply pressure is 36 psig on B31-RA15B South RRMG Set Brg Oil Supply Press Ind.</p> <ul style="list-style-type: none"> <li>○ Informs SRO that pump shift is complete.</li> </ul>
	BOP	<ul style="list-style-type: none"> <li>• Peer checks ATC for S. RRMG Lube Oil Pump swap.</li> <li>• May handle communications for ATC.</li> <li>• May inform Work Control personnel as directed by SRO.</li> </ul>

Op-Test No.: 2018-1Scenario No.: 2Page 9 of 16Event No.: 4 Event Description: Noise RRMG LO Pump – swap running pumps.

	SRO	<ul style="list-style-type: none"><li>• Acknowledges report.</li><li>• May notify Work Control personnel of abnormal noise from RRMG Set LO Pump, requests a CARD be written, and a review of POD for activities that might affect current plant conditions.</li><li>• May allow the ATC to leave the B1 pump in OFF/RESET rather than placed back in AUTO per the procedure due to the abnormal noise.</li></ul>
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Op-Test No.: 2018-1Scenario No.: 2Page 10 of 16Event No.: 5 Event Description: N. Condenser Pump Trip.

Time	Position	Applicant's Actions or Behavior
T+ 55 min.		<b><u>ACTION:</u></b> Trigger <b>Event 5</b> to initiate trip of the North Condenser Pump ( <b>N20MF0019</b> ).
	BOP	<ul style="list-style-type: none"> <li>• Responds to alarm 5D144, Motor Tripped.</li> <li>• Recognizes and reports trip of the N. Condenser Pump.</li> <li>• May contact rounds NOs to investigate: <ul style="list-style-type: none"> <li>○ Turbine Building to the Pump.</li> <li>○ Another NO/LNO to the pump breaker (Bus 65D-D7).</li> </ul> </li> </ul> <p><b><u>Role Play:</u></b> TB NO: If called to check pump, report that you will coordinate with RP.</p> <p>TB NO: Wait 10 minutes and report that there is an oil puddle on the floor around the N. Condenser Pump and the upper motor bearing is extremely hot. You will coordinate with Deconners to contain the oil</p> <p><b><u>Role Play:</u></b> NO/LNO: If called, wait 5 minutes and report that 65D, Pos D7 (N. Condenser Pump) is open with a 51 device (overcurrent) showing tripped.</p>
	ATC	<ul style="list-style-type: none"> <li>• May contact rounds NOs to investigate: <ul style="list-style-type: none"> <li>○ Turbine Building to the Pump.</li> <li>○ Another NO/LNO to the pump breaker (Bus 65D-D7).</li> </ul> </li> </ul>
	SRO	<ul style="list-style-type: none"> <li>• Acknowledges report of Condenser Pump Trip.</li> <li>• Enters AOP 20.107.01, Loss of Feedwater or Feedwater Control.</li> <li>• Announces event over Hi-Com.</li> <li>• Directs ATC to lower reactor power to &lt;88%, and HFP Suction Pressure &gt;100 psig per Condition B.</li> </ul>
	ATC	<ul style="list-style-type: none"> <li>• Adjusts speeds of RRMG Sets to lower power &lt;88%, IAW 23.138.01: <ul style="list-style-type: none"> <li>○ Adjust North (South) RR MG Set speed using B31-R621A (B), N (S) RR MG Set Speed Controllers, as follows: <ul style="list-style-type: none"> <li>○ Verifies B31-R621A (B), N (S) RR MG Set Speed Controllers, in AUTO, or places N (S) RRMG Set Speed Controllers in MANUAL.</li> </ul> </li> </ul> </li> </ul> <p><b><u>Note:</u></b> If taken to Manual, verify the ATC adjusts Output of the N (S) RRMG Set Speed Controllers to obtain the desired speed.</p>

Op-Test No.: 2018-1Scenario No.: 2Page 11 of 16

Event No.: <u>5</u> Event Description: <u>N. Condenser Pump Trip.</u>		
		<ul style="list-style-type: none"> <li>○ Adjust setpoint (SP), or output if in MANUAL, of B31-R621A (B), N (S) RR MG Set Speed Controllers to desired speed.</li> <li>○ Adjusts RR MG Set speeds, to match Recirculation Loop Jet Pump flows on B21-R611A and B.</li> <li>○ Verifies indicated RR MG Set speeds agree within 3%, as indicated on B31-R621A &amp; B, N and S RR MG Set Speed Controller, process variable (PV) or if available, C32-816, FW &amp; RR Flat Panel Display.</li> <li>○ Informs CRS when power is &lt;88% CTP.</li> <li>○ Verifies position on the P/F map.</li> </ul> <p><b>Note:</b> When &lt;88% Power, RRMG A/B Speeds should be about 62% and HFP Suction Pressure ~124 psig.</p>
	BOP	<ul style="list-style-type: none"> <li>• Monitors HFP suction pressure.</li> <li>• Peer checks power/flow reduction.</li> <li>• May contact the following:               <ul style="list-style-type: none"> <li>○ TB rounds to monitor CFD Flows and D/Ps.</li> <li>○ CSS of power/load reduction.</li> </ul> </li> </ul> <p><b>Role Play:</b> If called as NO, acknowledge direction and report that you will monitor CFDs and balance flows as necessary.</p> <p><b>Role Play:</b> If called as CSS, acknowledge report of load reduction. Ask how long Fermi 2 plans on staying at this reduced power?</p>
	SRO	<ul style="list-style-type: none"> <li>• Monitors Power/Flow reduction.</li> <li>• May notify Work Control personnel of trip of N. Condenser Pump, requests a CARD be written, and a review of POD for activities that might affect current plant conditions.</li> <li>• May conduct follow up brief, review of GOP for current plant conditions.</li> </ul>

Op-Test No.: 2018-1Scenario No.: 2Page 12 of 16Event No.: 6 Event Description: Steam Leak in RB Steam Tunnel w/ MSIVs fail to isolate.

Time	Position	Applicant's Actions or Behavior
T+70 min.		<b>ACTION:</b> Trigger <b>Event 6</b> to initiate a steam leak in the RB steam tunnel with MSIV failure to isolate ( <b>B21MF0103, B21MF0015, B21MF0054, EOPRF0033, EOPRF0036</b> ).
	BOP	<ul style="list-style-type: none"> <li>• Responds to alarm 16D7, Aux Bldg 2<sup>nd</sup>/3<sup>rd</sup>/4<sup>th</sup> Floors High Radn.</li> <li>• Reports alarm is from Zone 4, 2<sup>nd</sup> Floor Mezzanine. Reports radiation levels above the alarm setpoint and rising (not EOP entry condition).</li> <li>• Reviews ARP for 16D7.</li> <li>• Recommends entering 20.000.02, Abnormal Release of Radioactive Material AOP.</li> <li>• Reviews IPCS for affected areas.</li> <li>• Recognizes and reports to SRO rising Steam Tunnel Temperature.</li> </ul>
	ATC	<ul style="list-style-type: none"> <li>• Reviews IPCS for affected areas.</li> <li>• May recognize and report rising Steam Tunnel Temperature before 3D34 comes in.</li> <li>• Responds to alarm 3D34, Secondary Containment Temperature High-High, EOP Entry.</li> <li>• Recognizes and reports to SRO rising Steam Tunnel Temperature / EOP Entry condition.</li> </ul>
	SRO	<ul style="list-style-type: none"> <li>• Acknowledges reports.</li> <li>• Enters AOP 20.000.02 and performs the following: <ul style="list-style-type: none"> <li>○ Sounds the Plant Area Alarm.</li> <li>○ Announces the event over the Hi-Com.</li> </ul> </li> <li>• Enters 29.100.01 Sh 5 when EOP entry condition is met.</li> <li>• Announces event over Hi-Com.</li> <li>• Directs starting second Steam Tunnel Cooler.</li> <li>• Briefs crew for reactor scram and loss of heat sink.</li> </ul> <p><b>Note:</b> 200°F Steam Tunnel Temperature is the MSIV Automatic Isolation Setpoint. It is expected that the Mode Switch is taken to Shutdown prior to reaching this setpoint.</p> <ul style="list-style-type: none"> <li>• Directs Mode Switch to S/D prior to 200°F Steam Tunnel Temperature as read on IPCS.</li> </ul>

Op-Test No.: 2018-1Scenario No.: 2Page 13 of 16

Event No.: 6 Event Description: Steam Leak in RB Steam Tunnel w/ MSIVs fail to isolate.

		<ul style="list-style-type: none"> <li>• Directs closing MSIVs.</li> <li>• Directs scram reports.</li> </ul>
	BOP	<ul style="list-style-type: none"> <li>• Starts second Steam Tunnel Cooler.</li> <li>• Monitors RB Steam Tunnel Temperature, as assigned.</li> <li>• Closes MSIVs when directed by SRO.</li> <li>• Provides scram reports when directed.</li> </ul>
	ATC	<ul style="list-style-type: none"> <li>• Monitors RB Steam Tunnel Temperature as assigned.</li> <li>• Places Mode Switch in Shutdown when directed.</li> </ul> <p><b>Critical Task: SC-SCRAM</b> - With reactor at power and with a primary system discharging into the secondary containment, <b>MANUALLY SCRAM</b> the reactor before Steam Tunnel Temperature exceeds its Maximum Safe Operating (MSO) value of 210°F.</p> <ul style="list-style-type: none"> <li>• Provides scram reports when directed.</li> <li>• Inserts SRMs &amp; IRMs (Immediate Action).</li> </ul>

Op-Test No.: 2018-1Scenario No.: 2Page 14 of 16

Event No.: 7 Event Description: Seismic Event / HPCI Steam Leak / failure to isolate / ED when two area temperatures exceed MSO.

Time	Position	Applicant's Actions or Behavior
T+80 min.		<b>NOTE: Event 7</b> automatically triggers to initiate a seismic event, HPCI steam leak and failure to isolate 4 minutes AFTER the Mode Switch is taken to Shutdown ( <b>E41MF0007, EOPRF0022, E41MF0001, E41MF0008</b> ).
	SRO	<ul style="list-style-type: none"> <li>• Directs verification of isolations/ actuations for Level.</li> <li>• Directs RWL band of 173-214”.</li> <li>• Directs RPV pressure band per ODE10 (500-700 psig).</li> <li>• Directs actions of Scram AOP.</li> <li>• Directs monitoring for isolation of steam leak and/or second area temperature rising.</li> </ul>
	BOP	<ul style="list-style-type: none"> <li>• Verifies/closes MSIVs.</li> <li>• Identifies that MSIV line C did not isolate and attempts to isolate.</li> <li>• Reports that MS Line C steam flow still exists and will not isolate.</li> <li>• Recognizes and reports Steam Tunnel Temperature still rising.</li> <li>• May close 3<sup>rd</sup> MSIVs.</li> <li>• Verifies RWL L3 isolations and reports to SRO.</li> <li>• Restores and maintains RWL using hard card for available sources.</li> <li>• Lowers pressure to 500-700 psig band, as directed, using SRVs.</li> </ul>
	ATC/BOP	<ul style="list-style-type: none"> <li>• Identifies 6D69, Seismic Event System Trouble.</li> <li>• Reports indications of a Seismic Event (alarm and earthquake noise/vibration) to the SRO.</li> </ul>
	ATC/BOP	<ul style="list-style-type: none"> <li>• Identifies 3D34, Secondary Containment Temperature High-High EOP Entry or 1D66, Steam Leak Detection Ambient Temperature High</li> <li>• Identifies HPCI area temperatures rising and reports to SRO.</li> <li>• Attempts to isolate HPCI.</li> </ul> <p><b>Role Play:</b> If called as NO, acknowledge direction to inspect 2PB1-11B (E4150-F600 breaker). No actions or report back necessary</p> <ul style="list-style-type: none"> <li>• Recognizes and reports failure of HPCI to isolate.</li> </ul>



Op-Test No.: 2018-1Scenario No.: 2Page 15 of 16

Event No.: 7 Event Description: Seismic Event / HPCI Steam Leak / failure to isolate / ED when two area temperatures exceed MSO.

	SRO	<ul style="list-style-type: none"> <li>• Acknowledges receipt of Seismic Event indications.</li> <li>• May direct monitoring for impact of Seismic Event.</li> </ul> <p><b>Note:</b> Seismic event actions may not be taken due to the importance of actions necessary due to HPCI Steam Leak and ED.</p> <ul style="list-style-type: none"> <li>• Acknowledges report of HPCI Steam Leak.</li> <li>• Directs isolating HPCI, if not already attempted.</li> <li>• Briefs crew on ED when two area temperatures exceed MSO.</li> <li>• Transitions to 29.100.01, Sheet 3 Emergency Depressurization.</li> <li>• Directs opening 5 SRVs, ADS preferred.</li> <li>• Directs Bypassing &amp; Restoring Drywell Pneumatics.</li> </ul>
	BOP	<ul style="list-style-type: none"> <li>• Opens 5 ADS SRVs.</li> </ul> <p><b>Critical Task:</b> <i>With a primary system discharging into the secondary containment and area radiation/temperature/water levels exceed maximum safe operating levels in more than one area, <b>INITIATE Emergency Depressurization</b> by opening the Minimum Number of 5 SRVs Required for Emergency Depressurization (MNSRED) prior to any other Secondary Containment area temperature reaching its Maximum Safe Operating (MSO) value.</i></p> <ul style="list-style-type: none"> <li>• Bypasses and Restores Drywell Pneumatics as directed.</li> <li>• Restores and maintains RPV level 173 – 214”.</li> </ul>
	SRO	<ul style="list-style-type: none"> <li>• Conducts follow-up brief.</li> </ul>
T+90 min.		<p><b>TERMINATION CRITERIA:</b> When ADS Valves are open and Reactor Water Level is being controlled in the specified band either Automatically or in Manual.</p> <p><b>ACTION: FREEZE</b> the Simulator at the direction of the Lead Evaluator.</p>

Op-Test No.: 2018-1Scenario No.: 2Page 16 of 16**CRITICAL TASK EVALUATION CRITERIA:**

**SC-SCRAM** - With reactor at power and with a primary system discharging into the secondary containment **MANUALLY SCRAM** the reactor, before any area exceed the Maximum Safe Operating (MSO) levels.

**BASES:** Safety Significant -Scramming the reactor reduces to decay heat levels the energy that the RPV may be discharging into the secondary containment.

Cue -Primary system discharging into the secondary containment and any area is approaching maximum safe operating levels.

Performance Indicator -Initiate a reactor manual scram prior to exceeding the MSO value in the area.

Feedback -Reactor scram is inserted.

**SC-ED** - With a primary system discharging into the secondary containment and area radiation/temperature/water levels exceed maximum safe operating levels in more than one area, **INITIATE Emergency Depressurization**.

**BASES:** Safety Significant - Should Secondary Containment temperatures exceed their MSO value in more than one area, the RPV must be depressurized to preclude further temperature increases. The basis for performing the ED is because the rise in secondary containment temperature is a wide-spread problem which may pose a direct and immediate threat to secondary containment integrity, equipment located in the secondary containment, and continued safe operation of the plant. Depressurizing the RPV promptly places the primary system in the lowest possible energy state, rejects heat to the suppression pool in preference to outside the containment, and reduces the driving head and flow of primary systems that are not isolated and discharging into the secondary containment.

Cue -Primary system discharging into the secondary containment and area radiation/temperature/water levels exceed maximum safe operating levels in more than one area.

Performance Indicator -Initiate emergency depressurization by opening the Minimum Number of SRVs Required for Emergency Depressurization (MNSRED) prior to any other area reaching its MSO level.

Feedback -Reactor pressure is decreasing.

**Facility:** Fermi 2 **Scenario No.** 3 **Op-Test No:** 2018-1

**Examiners:** \_\_\_\_\_ **Operators:** SRO-1 (CRS), RO-1 (ATC), Surr. (BOP)  
 \_\_\_\_\_ SRO-2 (CRS), RO-2 (ATC), Surr. (BOP)

**Initial Conditions:** IC-183, S/U, Rx Press at 700 psig, pulling control rods to raise RPV Pressure to 944 to 949 psig.

**Turnover:** The plant is in MODE 2 at ~4.5% CTP during a startup. RPV pressure is 700 psig with the N. RFPT feeding via the SULCV, which is ~30% open. The S. RFPT has been warmed and speed brought back down to 1000 rpm.

Plans for the shift are to re-commence power ascension by withdrawing control rods.

**Critical Tasks:** **RPV – Loss of Level – ED** WHEN RPV water level cannot be determined, depressurize the RPV, ignoring cooldown rate by opening the Minimum Number of SRVs Required for Decay Heat Removal (MNSDHR) of 2 SRVs within 6 minutes of recognizing loss of all RPV Level Indication; **RPV – Loss of Level – FLOOD** WHEN RPV water level cannot be determined, inject into the RPV to FLOOD the RPV to the Main Steam Lines prior to diverting water from the RPV to containment cooling/sprays OR prior to core damage.

Event No.	Malf. No.	Event Type*	Event Description
1	NA	R (ATC) R (SRO)	Increase reactor power/pressure using control rods.
2	C51MF0010	I (ATC) I (SRO) TS	IRM B Upscale Failure (value = 130). ATC bypasses IRM B. ATC resets half scram. SRO evaluates LCO 3.3.1.1.
3	D11MF0021	TS	East Fuel Pool Div 1 Rad Monitor downscale failure. SRO evaluates LCOs 3.3.6.2, 3.3.7.1.
4	C11MF1118 C11RF0122	C (ATC) C (SRO)	E. CRD Pump Trip. W. CRD Pump fails to develop discharge pressure on start (closed discharge valve).
5	C11RF0257	C (ATC) C (SRO)	Accumulator Trouble Alarm on a withdrawn Control Rod. Crew to exercise Immediate Action to Scram.
6	B21MF0021	M (All)	Steam Leak in the Drywell.
7	EOPRF0037	C (BOP) C (SRO)	Division 1 EECW fails to initiate on High Drywell Pressure. ATC to initiate manually.
8	C93RF0001 C97MF1087  B21MF0059/ 60/73	M (All)	Seismic Event leading to a Loss of RPV Level Indication / RPV Emergency Depressurization (CT) / RPV Flooding (CT).
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor			

Op-Test No.: 2018-1Scenario No.: 3Page 1 of 15Event No.: N/AEvent Description: Overview

**Initial Conditions:** The plant is in MODE 2 at ~4.5% CTP during a startup. RPV pressure is 700 psig with the N. RFPT feeding via the SULCV, which is ~30% open. The S. RFPT has been warmed and speed brought back down to 1000 rpm.

Plans for the shift are to re-commence power ascension by withdrawing control rods.

***The objectives of this scenario are to:***

1. Raise reactor power with control rods.
2. Recognize and respond to an IRM failure.
3. Recognize and respond to Fuel Pool Radiation Monitor failure.
4. Recognize and respond to a Loss of CRD Hydraulics.
5. Recognize and respond to a Steam Leak in the Drywell.
6. Recognize and respond to failure of EECW to initiate.
7. Execute steps of Primary Containment Control.
8. Execute steps of RPV Control.
9. Execute steps for RPV Flooding.
10. Direct and supervise the Shift team during Normal, Abnormal, and Emergency operations

***The crew will be required to respond to the following order of events:***

- Power increase with Control Rods.
- IRM Failure.
- Fuel Pool Radiation Monitor Failure.
- Loss of CRD Hydraulics.
- Reactor Scram.
- Steam Leak in the Drywell.
- Failure of EECW to automatically initiate.
- Loss of RPV Level Indications.

Op-Test No.: 2018-1Scenario No.: 3Page 2 of 15Event No.: 1 Event Description: Power increase with Control Rods

Time	Position	Applicant's Actions or Behavior
0 min	SRO	<ul style="list-style-type: none"> <li>• Conducts brief for power increase using Control Rods.</li> <li>• Directs ATC to re-commence power increase by pulling Control Rods IAW 23.623.</li> <li>• Directs BOP to monitor Bypass Valve Position and secondary plant parameters.</li> <li>• Directs STA to perform Temperature/Pressure Monitoring IAW 22.000.05.</li> </ul>
	ATC	<ul style="list-style-type: none"> <li>• Coordinates with Rod Movement Verifier and Reactivity Management SRO to pull Control Rods IAW 23.623:               <ul style="list-style-type: none"> <li>○ Places Rod Select Power switch in ON.</li> <li>○ From Rod Pull Sheet, selects rod to be withdrawn.</li> <li>○ Verifies correct rod is selected with Rod Movement Verifier concurrence.</li> <li>○ While monitoring Nuclear Instrumentation, moves selected rod to target position specified on the Rod Pull Sheet.</li> <li>○ Completes required information on Rod Pull Sheet.</li> <li>○ Repeats steps above for each rod movement.</li> <li>○ When rod movements are complete, places Rod Select Power in OFF.</li> </ul> </li> </ul>
	BOP	<ul style="list-style-type: none"> <li>• Monitors secondary plant parameters during power ascension.</li> <li>• Checks/adjusts Bypass Valve Position.</li> </ul>

Op-Test No.: 2018-1Scenario No.: 3Page 3 of 15Event No.: 2 Event Description: IRM B Upscale Failure

Time	Position	Applicant's Actions or Behavior
T+20 min.		<p><b>NOTE:</b> Trigger the following event at the direction of the Lead Evaluator, after sufficient rod withdrawal has occurred that results in an appreciable power change.</p> <p><b>ACTION:</b> Trigger <b>Event 2</b> to initiate IRM B Upscale Failure (C51MF0010).</p>
	ATC	<ul style="list-style-type: none"> <li>• Responds to alarms 3D60, IRM B/F/D/H Upscale Trip/INOP, 3D74 Trip Actuators B1/B2 tripped.</li> <li>• Stops withdrawing Control Rods.</li> <li>• Recognizes and reports IRM B Upscale, ½ Scram on RPS B.</li> <li>• May attempt to Range IRM B.</li> <li>• Determines IRM B has failed, recommends bypassing IRM B.</li> <li>• ATC may choose to turn Rod Select Power off.</li> </ul>
	SRO	<ul style="list-style-type: none"> <li>• Acknowledge report from ATC.</li> <li>• Conducts brief for IRM B failure actions.</li> <li>• Directs ATC to Bypass IRM B.</li> <li>• Evaluates Technical Specifications for IRM B failure: <ul style="list-style-type: none"> <li>○ Reviews TS LCO 3.3.1.1, Function 1 – IRMs.</li> <li>○ Determines LCO 3.3.1.1 is MET due to meeting the minimum number of Channels (3) per Trip System.</li> <li>○ Determines that a Tracking LCO is necessary for Condition A.</li> <li>○ Reviews TR LCO 3.3.2.1, Rod Block Monitoring Instrumentation Function 2 – IRMs.</li> <li>○ Determines TR LCO 3.3.2.1 is MET due to meeting the minimum number of Channels (6).</li> <li>○ Determines that a Tracking LCO is necessary.</li> </ul> </li> <li>• Directs ATC to Reset ½ Scram on RPS B.</li> </ul>
	BOP	<ul style="list-style-type: none"> <li>• Peer checks ATC for bypassing IRM B.</li> <li>• Peer checks ATC for resetting the ½ scram on RPS B.</li> <li>• May take over monitoring Power, Pressure and Level.</li> <li>• May contact RTC to investigate failure of IRM B.</li> </ul>
	ATC	<ul style="list-style-type: none"> <li>• Bypasses IRM B IAW 23.603, Section 7.0:</li> </ul>

Op-Test No.: 2018-1Scenario No.: 3Page 4 of 15Event No.: 2 Event Description: IRM B Upscale Failure

		<ul style="list-style-type: none"> <li>○ Informs SRO of impacted Tech Specs.</li> <li>○ Positions Joy-stick to bypass IRM B.</li> <li>○ Verifies white Bypass Light is ON for IRM B.</li> <li>• Resets ½ Scram IAW 23.610, Section 6.1: <ul style="list-style-type: none"> <li>○ Cycles C7100-M605 to both GP 1/4 and GP 2/3 positions.</li> <li>○ Verifies Trip System B Blue Pilot Scram Valve Solenoid lights are ON.</li> <li>○ Verifies alarms are reset for RPS B.</li> </ul> </li> </ul>
	SRO	<ul style="list-style-type: none"> <li>• Conducts follow up brief with crew.</li> <li>• May notify Work Control personnel of IRM failure, request a CARD be written, and a review of POD for activities that might affect current plant conditions.</li> <li>• Directs ATC to recommence Control Rod Withdrawal.</li> </ul>
	ATC	<ul style="list-style-type: none"> <li>• Coordinates with Rod Movement Verifier and RMSRO to recommence Control Rod Withdrawal.</li> </ul>

Op-Test No.: 2018-1Scenario No.: 3Page 5 of 15

Event No.: 3 Event Description: East Fuel Pool Division 1 Radiation Monitor downscale failure.

Time	Position	Applicant's Actions or Behavior
T+35 min.		<p><b>NOTE:</b> Trigger the following event at the direction of the Lead Evaluator, after sufficient rod withdrawal has occurred that results in an appreciable power change.</p> <p><b>ACTION:</b> Trigger <b>Event 3</b> to initiate East FP Div 1 Rad Monitor Downscale Failure (<b>D11MF0021</b>).</p>
	ATC/BOP	<ul style="list-style-type: none"> <li>Responds to alarm 3D27, Div I/II FP Vent Exh Rad Monitor Dnscl/Inop.</li> <li>Directs an NO/LNO/RTC to the H11-P606 panel to check Rad Monitors.</li> </ul> <p><b>Role Play:</b> NO/LNO/RTC: If dispatched wait 3 minutes and report that the D11-K609A (Div 1 Fuel Pool East Vent Exh Duct Rad Monitor) is hard downscale (&lt;0.01 mr/hr) with a white downscale light lit. All other Fuel Pool Rad Monitors indicate about 0.1 mr/hr.</p> <p><b>Role Play:</b> NO/LNO/RTC: If asked (per ARP), Mode Switch is in OPERATE.</p> <p><b>Role Play:</b> NO/LNO/RTC: If asked to attempt to clear the alarm (per the ARP), report that you depressed the RESET pushbutton and the indications are the same as before.</p>
	BOP	<ul style="list-style-type: none"> <li>Checks indications on back of P601.</li> <li>Recognizes and reports Div 1 East Fuel Pool Vent Exh Rad Monitor is downscale.</li> </ul>
	SRO	<ul style="list-style-type: none"> <li>Acknowledges reports for Fuel Pool Rad Monitor failure.</li> <li>Reviews 23.601 and Evaluates Technical Specifications: <ul style="list-style-type: none"> <li>Determines TS LCO 3.3.6.2 (Table 3.3.6.2-1, Function 3) Secondary Containment Iso Inst is NOT Met <ul style="list-style-type: none"> <li>Determines Condition A.1 is applicable (24 hours to place the Channel in Trip).</li> </ul> </li> <li>Determines TS LCO 3.3.7.1 (Table 3.3.7.1-1, Function 3) CREF Inst is NOT Met. <ul style="list-style-type: none"> <li>Determines Conditions A.1 (Enter Condition referenced in Table 3.3.7.1-1) and B.2 (24 hours to Trip) are applicable.</li> </ul> </li> </ul> </li> <li>Conducts follow up brief with crew.</li> <li>May notify Work Control personnel of Rad Monitor failure,</li> </ul>



Op-Test No.: 2018-1Scenario No.: 3Page 6 of 15

Event No.: 3 Event Description: East Fuel Pool Division 1 Radiation Monitor downscale failure.

		request a CARD be written, and a review of POD for activities that might affect current plant conditions.
	ATC	<ul style="list-style-type: none"><li>• Directs ATC to recommence Control Rod Withdrawal.</li><li>• Coordinates with Rod Movement Verifier and RMSRO to recommence Control Rod Withdrawal.</li></ul>

Op-Test No.: 2018-1Scenario No.: 3Page 7 of 15

Event No.: 4/5 Event Description: East CRD Pump Trip. West CRD Pump Discharge Valve Closed / Accumulator Trouble Alarm to Scram.

Time	Position	Applicant's Actions or Behavior
T+ 50 min.		<p><b>NOTE:</b> Trigger the following event at the direction of the Lead Evaluator, after sufficient rod withdrawal has occurred that results in an appreciable power change.</p> <p><b>ACTION:</b> Trigger <b>Event 4</b> to initiate East CRD Pump Trip with the West CRD Pump Discharge Valve closed (<b>C11MF1118</b>, <b>C11RF0122</b>).</p>
	ATC	<ul style="list-style-type: none"> <li>Responds to alarms 3D5, CRD Charging H2O Pressure Low and 3D96, Motor Tripped.</li> <li>Recognizes and reports trip of the East CRD Pump.</li> <li>May dispatch Reactor Building NO to investigate East CRD Pump.</li> <li>May dispatch extra NO/LNO or RTC to Pump Breaker 64B-B11.</li> </ul> <p><b>Role Play:</b> RB NO: If dispatched to the East CRD Pump, wait 3 minutes and report East CRD Pump motor casing is extremely hot.</p> <p><b>Role Play:</b> Extra NO/LNO or RTC: If dispatched to 64B-B11, wait 3 minutes and report the breaker is open with a 51 device (overcurrent) flag showing.</p>
	SRO	<ul style="list-style-type: none"> <li>Acknowledges report from ATC.</li> <li>Enters AOP 20.106.01, CRD Hydraulic System Failure.</li> <li>Announces event over Hi-Com.</li> <li>Conducts transient brief for AOP actions.</li> <li>Directs ATC to monitor for Accumulator Trouble Alarm, 3D10 on a withdrawn Control Rod (Immediate Action).</li> <li>Directs ATC to start the Standby CRD Pump IAW Cond A.</li> </ul>
	BOP	<ul style="list-style-type: none"> <li>Supports ATC, peer checks start of West CRD Pump.</li> <li>May make communications for ATC.</li> </ul>
	ATC	<ul style="list-style-type: none"> <li>Starts West CRD Pump, IAW 20.106.01: <ul style="list-style-type: none"> <li>Places CRD Flow Controller in MANUAL.</li> <li>Closes the CRD Flow Control Valve.</li> <li>Closes the CRD Pressure Control Valve.</li> </ul> </li> </ul> <p><b>Role Play:</b> RB NO: IF directed to isolate Reference Leg Backfill, report that Reference Leg Backfill is not yet in service.</p> <ul style="list-style-type: none"> <li>Starts the West CRD Pump.</li> </ul>

Op-Test No.: 2018-1Scenario No.: 3Page 8 of 15

Event No.: 4/5 Event Description: East CRD Pump Trip. West CRD Pump Discharge Valve Closed / Accumulator Trouble Alarm to Scram.

		<p><b>Role Play:</b> RB NO: If directed, for initial pump start, wait 2 minutes and report West CRD Pump is running with no obvious problems. State that you will continue to walk down the pump and investigate.</p> <ul style="list-style-type: none"> <li>Recognizes and reports failure of West CRD Pump to develop adequate discharge pressure (low amps, alarm 3D5 does not clear).</li> <li>May dispatch RB NO to investigate West CRD Pump.</li> </ul> <p><b>Role Play:</b> RB NO: If directed, to investigate West CRD Pump, wait 2 minutes and report West CRD Pump is running but discharge pressure is only about 200 psig. State that you will continue to walk down the pump and investigate.</p>
	SRO	<ul style="list-style-type: none"> <li>Directs Condition B of 20.106.01 to include closing the C1100-F034 and attempting to start either CRD Pump using the SOP.</li> </ul> <p><b>NOTE:</b> The next event can be triggered, at direction of Lead Evaluator, to drive to Reactor Scram or allow Accumulator Trouble Alarms to come in about 11 minutes after the pump trip.</p>
		<p><b>ACTION:</b> When directed by Lead Evaluator, <b>trigger Event 5</b> to bring in 3D10 on a withdrawn Control Rod, which will result in a Reactor Scram (Immediate Action) (<b>C11RF0257</b>).</p>
	ATC	<ul style="list-style-type: none"> <li>Responds to alarm 3D10, Accumulator Trouble Alarm.</li> <li>Determines 3D10 is in for Control Rod18-23, determines that 18-23 is withdrawn and reports to SRO.</li> <li>Places Mode Switch in Shutdown (Immediate Action).</li> <li>Reports action taken to SRO.</li> <li>Inserts SRMs (Immediate Action).</li> <li>Provides scram reports as directed.</li> <li>Performs Scram AOP actions as directed.</li> </ul>
	SRO	<ul style="list-style-type: none"> <li>Announces event over Hi-Com</li> <li>Requests Scram Reports</li> <li>Enters and directs action of 20.000.21, Reactor Scram AOP.</li> </ul>

Op-Test No.: 2018-1Scenario No.: 3Page 9 of 15

Event No.: 4/5 Event Description: East CRD Pump Trip. West CRD Pump Discharge Valve Closed / Accumulator Trouble Alarm to Scram.

BOP

- Provides scram reports as directed.
- Performs Scram AOP actions as directed.

**NOTE:** **Event 6** is automatically triggered when Mode Switch is Taken to Shutdown. Steam Leak will cause rising Drywell Pressure in 60 seconds.

Op-Test No.: 2018-1Scenario No.: 3Page 10 of 15

Event No.: 6/7 Event Description: Steam Leak in the Drywell / Division 1 EECW fails to automatically initiate.

Time	Position	Applicant's Actions or Behavior
T+ 60 min.		<b>ACTION:</b> Event 6 is automatically triggered when Mode Switch is Taken to Shutdown ( <b>B21MF0021</b> ). Steam Leak will cause rising Drywell Pressure in 60 seconds.
	BOP/ATC	<ul style="list-style-type: none"> <li>Recognize and report EOP Entry Condition on High Drywell Pressure.</li> </ul>
	SRO	<ul style="list-style-type: none"> <li>Acknowledges report.</li> <li>Enters 29.100.01, Sheet 1 RPV Control and Sheet 2 Primary Containment Control.</li> <li>Directs the following from RPV Control: <ul style="list-style-type: none"> <li>Directs verification of isolations/ actuations for Level.</li> <li>Directs RWL band of 173-214".</li> <li>Directs RPV pressure band (500-700 psig).</li> </ul> </li> </ul>
	BOP	<ul style="list-style-type: none"> <li>Restores and maintains RWL using hard card for available sources.</li> <li>Trends RPV level and pressure and provides input to SRO</li> </ul>
	SRO	<ul style="list-style-type: none"> <li>Directs the following from Primary Containment Control: <ul style="list-style-type: none"> <li>Informs the Shift Manager of EP-101 flag for FA1.1.</li> <li>Directs ATC to confirm EECW initiation, isolation to the Drywell and restore cooling to CRD.</li> <li>Directs shutdown of Reactor Recirculation Pumps.</li> <li>Directs RHR to be placed in Torus Cooling / Torus Spray.</li> </ul> </li> </ul>
	ATC	<ul style="list-style-type: none"> <li>Recognizes failure of Division 1 EECW to initiate.</li> <li>Takes manual action to initiate Div 1 EECW and isolate Div 1 EECW to the Drywell.</li> <li>Confirms initiation of Div 2 EECW, isolation to the Drywell and restores cooling to CRD.</li> <li>Informs SRO of EECW status, including need to manually initiate Division 1 EECW.</li> <li>Shuts down Reactor Recirculation Pumps as directed.</li> </ul>

Op-Test No.: 2018-1Scenario No.: 3Page 11 of 15

Event No.: 8 Event Description: Seismic Event / Loss of RPV Level Indication / RPV Flooding.

Time	Position	Applicant's Actions or Behavior
T+62 min.		<b><u>ACTION:</u></b> Event 8 automatically triggers 60 seconds after CRD cooling is restored. This event will cause a seismic event and loss of all RPV Level Indication ( <b>B21MF0059/B21MF0060/B21MF0073</b> ).
	ATC/BOP	<ul style="list-style-type: none"> <li>Identifies 6D69, Seismic Event System Trouble.</li> <li>Reports indications of a Seismic Event (alarm and earthquake noise/vibration) to the SRO.</li> </ul>
	BOP	<ul style="list-style-type: none"> <li>Acknowledges receipt of Seismic Event indications.</li> <li>May direct monitoring for impact of Seismic Event.</li> </ul> <p><b>Note:</b> Seismic event actions may not be taken due to the Loss of RPV Level Indication.</p> <ul style="list-style-type: none"> <li>Recognizes and reports loss of RPV Level Indication to the SRO.</li> </ul>
	ATC	<ul style="list-style-type: none"> <li>Confirms loss of RPV Level Indication.</li> </ul>
	SRO	<ul style="list-style-type: none"> <li>Acknowledges report of loss of RPV Level Indication.</li> <li>Transitions to 29.100.01, Sheet 3 – RPV Flooding section.</li> <li>Conducts brief of RPV Flooding actions.</li> <li>Directs Opening 5 ADS SRVs</li> <li>Directs Bypass and Restore Drywell Pneumatics.</li> </ul>
	BOP	<ul style="list-style-type: none"> <li>Opens 5 ADS SRVs as directed.</li> </ul> <p><b>Critical Task:</b> <i>RPV – Loss of Level – ED WHEN RPV water level cannot be determined, depressurize the RPV, ignoring cooldown rate by opening the Minimum Number of SRVs Required for Decay Heat Removal (MNSDHR) of 2 SRVs within 6 minutes of recognizing loss of all RPV Level Indication.</i></p> <ul style="list-style-type: none"> <li>Bypasses and restores Drywell Pneumatics as directed.</li> </ul>
	SRO	<ul style="list-style-type: none"> <li>SRO continues EOP SH 3 RPV Flooding:               <ul style="list-style-type: none"> <li>Directs Flooding the RPV with Table 1 or 2 systems to the Main Steam Lines</li> <li>Directs closing MSIVs, Drains, and HPCI/RCIC Steam Supplies when on &gt;2 SRVs open.</li> <li>Directs evaluating for RPV flooded indications.</li> </ul> </li> </ul>

Op-Test No.: 2018-1Scenario No.: 3Page 12 of 15

Event No.: 8 Event Description: Seismic Event / Loss of RPV Level Indication / RPV Flooding.

		<ul style="list-style-type: none"> <li>May conduct brief that includes indications that the RPV has flooded, from ODE-10, such as:               <ul style="list-style-type: none"> <li>RPV pressure rising (after initially lowering due to depressurization).</li> <li>SRVs closing, and subsequently reopening.</li> <li>Torus Water Level stabilizes or increases (if external injection sources are aligned).</li> <li>Tailpipe temperatures of open SRVs lowering to subcooled values (requires support in the Relay Room).</li> </ul> </li> </ul>
	BOP	<ul style="list-style-type: none"> <li>Evaluates, aligns and injects with the following sources, to establish flooded conditions:               <ul style="list-style-type: none"> <li>Division 1 and 2 Core Spray.</li> <li>Division 1 and 2 RHR (LPCI).</li> <li>Condensate and Feedwater.</li> <li>May dispatch an NO/LNO to install 29.ESP.19 to allow SBFW injection.</li> </ul> </li> </ul> <p><b>ROLE PLAY:</b> NO/LNO: If dispatched to install Level 8 defeats for SBFW IAW 29.ESP.19, wait 10 minutes and trigger <b>Lesson Step #8a</b>, then report 29.ESP.19 defeats are installed.</p> <p><b>Critical Task:</b> <i>RPV – Loss of Level – FLOOD WHEN RPV water level cannot be determined, inject into the RPV to FLOOD the RPV to the Main Steam Lines prior to diverting water from the RPV to containment cooling/sprays OR prior to core damage.</i></p> <ul style="list-style-type: none"> <li>Closes MSIVs, Drains, and HPCI/RCIC Steam Supplies.</li> <li>Monitors for RPV flooded indications:               <ul style="list-style-type: none"> <li>RPV pressure rising (after initially lowering due to depressurization).</li> <li>SRVs closing, and subsequently reopening.</li> <li>Torus Water Level stabilizes or increases (if external injection sources are aligned).</li> <li>Tailpipe temperatures of open SRVs lowering to subcooled values (requires support in the Relay Room).</li> </ul> </li> </ul>
	ATC	<ul style="list-style-type: none"> <li>Assists BOP in aligning injection sources, as directed.</li> <li>Assists in monitoring for indications of RPV flooding.</li> <li>May dispatch NO/LNO or RTC to monitor SRV Tailpipe</li> </ul>

Op-Test No.: 2018-1Scenario No.: 3Page 13 of 15

Event No.: 8 Event Description: Seismic Event / Loss of RPV Level Indication / RPV Flooding.

		Temperature in the Relay Room.
	BOP	<ul style="list-style-type: none"> <li>May dispatch NO/LNO or RTC to monitor SRV Tailpipe Temperature in the Relay Room.</li> <li>Recognizes and reports to SRO when the RPV is flooded.</li> </ul>
		<b>ROLE PLAY:</b> Extra NO/LNO or RTC: If dispatched to Relay Room to monitor SRV Tailpipe Temperatures, wait 5 minutes and report actual temperatures from Orchid ME drawing <b>b21_i209501</b> for any of the open SRVs.
	SRO	<ul style="list-style-type: none"> <li>Acknowledges that the RPV has been flooded to the Main Steam Lines.</li> <li>May conduct a brief to discuss the following strategy.</li> <li>Directs controlling injection into the RPV, as low as practical, while keeping the MSLs flooded by directing (C):               <ul style="list-style-type: none"> <li>Closing SRVs</li> <li>Securing injection sources.</li> <li>Monitoring RPV Pressure.</li> <li>Final injection status, per ODE-10, as one of the following:                   <ul style="list-style-type: none"> <li>Two Core Spray Pumps injecting with 1 SRV open.</li> <li>One RHR Pump injecting with 2 SRVs open.</li> </ul> </li> </ul> </li> </ul>
	BOP	<ul style="list-style-type: none"> <li>Closes SRVs as directed.</li> <li>Secures injection sources as directed.</li> <li>Monitors RPV Pressure.</li> <li>Establishes one of the following lineups, per ODE-10:               <ul style="list-style-type: none"> <li>Two Core Spray Pumps injecting with 1 SRV open.</li> <li>One RHR Pump injecting with 2 SRVs open.</li> </ul> </li> <li>Reports to SRO when RHR is available for Containment Control purposes.</li> </ul>
	SRO	<ul style="list-style-type: none"> <li>Directs placing RHR in Torus Cooling and Torus Spray. (May direct E1150-F010 closed).</li> <li>Directs securing Torus Sprays before Torus pressure reaches 0 psig.</li> </ul>



Op-Test No.: 2018-1Scenario No.: 3Page 14 of 15

Event No.: 8 Event Description: Seismic Event / Loss of RPV Level Indication / RPV Flooding.

	ATC	<ul style="list-style-type: none"> <li>Places RHR Div 1or 2 in Torus Cooling and Torus Sprays:               <ul style="list-style-type: none"> <li>Places Containment Spray Mode Select Switch in MANUAL.</li> <li>Unlocks and Opens E1150-F028A or B.</li> <li>Starts 1 RHR Pump.</li> <li>Opens E1150-F024 A or B.</li> <li>Opens E1150-F027 A or B.</li> </ul> </li> <li>Places RHRSW in service:               <ul style="list-style-type: none"> <li>Depresses E1150-F068A(B) OPEN for 5 seconds.</li> <li>Starts an RHRSW Pump.</li> <li>Throttles open E1150-F068A(B) to 5600-6500 gpm.</li> <li>Starts second RHRSW Pump.</li> <li>Fully opens E1150-F068A(B).</li> <li>Secures Torus Sprays before Torus pressure reaches 0 psig.</li> </ul> </li> </ul> <p><b>ROLE PLAY:</b> RB NO: If directed to place RHRSW Radiation Monitor Sample Pump in service, acknowledge direction (no follow-up actions necessary).</p>
	ATC/BOP	<ul style="list-style-type: none"> <li>Recognize and report EOP entry conditions on High/Low TWL, as applicable, High TWT, High DWT.</li> </ul>
	SRO	<ul style="list-style-type: none"> <li>Enters EOPs on High/Low TWL, High TWT, High DWT, as applicable.</li> </ul>
		<p><b>TERMINATION CRITERIA:</b> When indications are met to perform RPV Flooding and RHR has been placed in Torus Cooling / Torus Spray.</p> <p><b>ACTION: FREEZE</b> the Simulator at the direction of the Lead Evaluator.</p>

Op-Test No.: 2018-1Scenario No.: 3Page 15 of 15**CRITICAL TASK EVALUATION CRITERIA:**

***RPV – Loss of Level – ED WHEN RPV water level cannot be determined, depressurize the RPV, ignoring cooldown rate by opening the Minimum Number of SRVs Required for Decay Heat Removal (MNSDHR) of 2 SRVs within 6 minutes of recognizing loss of all RPV Level Indication.***

**BASES:** Safety Significant -If RPV water level cannot be determined, adequate core cooling by submergence cannot be verified. The RPV is therefore depressurized to allow for removing heat energy from the RPV and to allow for lower pressure to permit higher injection flowrates, possibly reducing the time to flood the RPV. The consequences of not depressurizing the RPV under these conditions could include a loss of adequate core cooling that could lead to core damage.

Cue -RPV water level is unknown.

Performance Indicator -Initiate emergency depressurization, when RPV water level cannot be determined, by opening the Minimum Number of SRVs Required for Decay Heat Removal (MNSDHR) within 6 minutes of recognizing loss of all RPV Level Indication.

Feedback - RPV pressure is decreasing.

***RPV – Loss of Level – FLOOD WHEN RPV water level cannot be determined, inject into the RPV to FLOOD the RPV to the Main Steam Lines.***

**BASES:** Safety Significant – When RPV water level cannot be determined, injection into the RPV must be established to achieve indications of core flooding to re-establish core submergence. The RPV is therefore flooded to assure that adequate core cooling is established and maintained. The consequences of not establishing flooded RPV conditions is a loss of adequate core cooling that could lead to core damage.

Cue -RPV water level is unknown and the RPV is being depressurized.

Performance Indicator – Injection into the RPV occurs to establish flooded conditions prior to diverting water for containment cooling/sprays OR receiving indications of core damage. Note: IF RHR is in containment cooling/sprays prior to the loss of RPV level indication, maintaining RHR in containment cooling sprays, while actively pursuing RPV flooded conditions, is acceptable if flooded conditions are established prior to realigning RHR.

Feedback – Indication(s) of RPV Flooding conditions specified in the scenario guide are established.