

Facility: Fermi 2 Nuclear Plant Scenario No.: 1 Op-Test No.: 2021-301

Examiners: \_\_\_\_\_ Operators: \_\_\_\_\_  
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**Initial Conditions:** 100% power, MOL, steady state conditions following a rod pattern adjustment. EDG 11 Diesel is out of service for emergent troubleshooting and repair following a “Start Failure Trip” that occurred during performance of the “Start And Load Test” surveillance run on the previous shift. SR 3.8.1.1 has been completed for Operable Offsite Circuits and a Common Cause Failure investigation is in progress to determine if the cause of inoperability exists on the other EDGs (6 hours into the 24-hour Required Action Time for the determination). One hour ago, the CTG 11-1 “Off Base” cooling water skid was damaged while moving a vehicle in the area. CTG 11-1 is currently unavailable (tagged out, cooling system drained) to repair piping leaks in the “Off Base” cooling water skid. Heavy thunderstorms and lightning are forecasted for the next 12 hours. TWMS is in Bypass Mode.

**Turnover:** Plans for the shift are to maintain 100% power, support EDG-11 troubleshooting / repair activities and Common Cause Failure determination efforts on the operable EDGs. Transfer TWMS from Bypass Mode to Cleanup Mode.

Critical Tasks: **(CT-1)** Manually Start EDG 12 prior to Emergency Depressurization.  
**(CT-2)** Emergency Depressurize prior to -25 inches RPV level.

Event No.	Malf. No.	Event Type*	Event Description
1		N (BOP) N (SRO)	Transfer TWMS from Bypass Mode to Cleanup Mode.
2	C7AEK6CTVSP BADEB21N080CT VSP C7DOALARM_UN IT576228REV	I (ATC) I (SRO) TS	RPV Water Level 3 Instrument Failure (B21-N080C); Results in Downscale Trip on Trip Unit B21-N680C with No RPS (A2) Half Scram Signal.
3	E4BAF1CC	C (BOP) C (SRO) TS	HPCI Logic Bus B Power Failure (Renders HPCI inoperable and unavailable).
4	C11MF1118 C1DHR0D_26_51 MXACCU MRF C11RF0210	C (ATC) C (SRO) TS	CRD Pump East Breaker Fault/Trip; Start CRD Pump West.
5	NM02F607_MTVF A1LSP	C (BOP) C (SRO)	SJAE Trip; Swap SJAEs.
6	NC02N22_LXPN4 29ATVSP	R (ATC) C (SRO)	FWH Level Instrument Failure; Requires Power Reduction Due to Loss of Feedwater Heating.
7	R11MF0159 R14MF0001	M (ALL)	Lightning Strike Causes Loss of Offsite Power.
8	RCBFR30RF0009 TA_SWIT RCBOESBTVSP RCBNESATVSP RCCDAS1TVSP RCBWAS2TVSP RCCEAS2TVSP	C (ATC) C (SRO)	EDG 12 Fails to Auto Start (Recoverable). Start Failure Trips on EDG 13 and 14. <b>(CT-1)</b> ;

	RCBWAS2TVSP RCCDAS1TVSP RCCEAS2TVSP RCCDAS1TVSP RCCEAS2TVSP RCBVAS1TVSP RCBWAS2TVSP		
9	B31MF0067 E502E5150F044_ ATVFAILSP	M (ALL) C (BOP)	SBLOCA (Increase Ramp Over 5 Minutes) with RCIC Trip on Overspeed; Emergency Depressurization, Maximize Injection with EDG 12 Powered Low Pressure ECCS Injection Systems. <b>(CT-2)</b>
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor			

FERMI 2  
D1 Supplement

**SCENARIO SUMMARY**

**Event 1:**

The scenario begins with the Unit at 100% power following a rod pattern adjustment and EDG-11 out of service for emergent troubleshooting and repair following a "Start Failure Trip" (Essential Trip) that occurred during performance of the "Start And Load Test" surveillance run on the previous shift. A Common Cause Failure investigation is in progress to determine if the cause of inoperability exists on the other EDGs. After turnover, the crew will transfer the TWMS from Bypass Mode to Cleanup Mode in accordance with 23.144, "Torus Water Management System."

**Event 2:**

Once the TWMS has been placed in Cleanup Mode, the crew will respond to annunciator 3D79, "Reac Vessel Water Level L3 Channel Trip," and determine that an RPV Water Level 3 instrument failure (B21-N080C) resulted in a downscale trip condition on Trip Unit B21-N680C, with the failure of RPS instrumentation to initiate an A2 trip logic half scram. The SRO will reference SOP 23.601, "Instrument Trip Sheets," and enter Tech Specs 3.3.1.1 (Table 3.3.1.1-1, Function 4) and 3.3.6.1 (Table 3.3.6.1-1, Functions 2.a & 7.a). The RPS failure will require the crew to insert a manual half scram on the "A" Trip System to comply with the Tech Spec Required Action to place the inoperable channel in "Trip."

**Event 3:**

Following insertion of the manual half scram, the crew will respond to annunciator 2D50, "HPCI Logic Bus Power Failure," determine that power is lost to Logic Bus 'B,' and take action to manually isolate HPCI, rendering the system both inoperable and unavailable. The SRO will enter Tech Specs 3.3.5.1 (Table 3.3.5.1-1, Function 3), 3.3.6.1 (Table 3.3.6.1-1, Function 3), 3.5.1, and 3.6.1.3.

**Event 4:**

Once HPCI has been isolated, CRD Pump East will trip on breaker fault. The crew will respond to annunciators 3D5, "CRD Charging H2O Pressure Low," and 3D96, "Motor Tripped," enter AOP 20.106.01, "CRD Hydraulic System Failure," and start standby CRD Pump (West.) The crew will also address annunciator 3D10, "CRD Accumulator Trouble," by dispatching a Field Operator to investigate. The Field Operator will report that accumulator pressure is low (900 psig) on one HCU only. The crew will direct the Field Operator to add nitrogen to the accumulator in accordance with 23.106, "Control Rod Drive Hydraulic System." The SRO will enter Tech Spec 3.1.5.

**Event 5:**

Once standby CRD Pump (West) has been started and the HCU accumulator low pressure condition addressed, the in-service Steam Jet Air Ejector (SJAE) will trip. The crew will enter AOP 20.125.01, "Loss of Condenser Vacuum," and take prompt action to place the standby SJAE in service in accordance with SOP 23.125, "Condenser Vacuum System."

**Event 6:**

Once the standby SJAE has been placed in service and condenser vacuum has

stabilized, a Feed Water Heater (FWH) level transmitter fails high, resulting in a loss of one 3, 4, 5 FWH String and reduction in feedwater heating. The crew will enter AOP 20.107.02, "Loss of Feedwater Heating," and reduce power to  $\leq 85\%$  using reactor recirc flow, while ensuring operation within the Power/Flow Map. The crew, using Enclosure A, "Feedwater Inlet Temperature vs. Reactor Power," will evaluate the feedwater temperature decrease, excluding the temperature decrease due to the power reduction, and determine that they are operating in the Acceptable Area of the "Reduced FW Temperature Region."

### **Events 7 to 9:**

Once the power reduction has been completed, a loss of offsite power occurs due to lightning strike. This immediately results in a Reactor Scram and MSIV closure. EDGs 13 and 14 experience Start Failure Trips (the result of a Common Cause Failure). EDG12 fails to auto start but can be manually started to restore power to 4.16 KV ESS Bus 64C. A Station Blackout Condition will exist until EDG 12 is recovered (**CT-1**). The crew will enter EOP 29.100.01 SH 1, "RPV Control," on RPV Low Level and RPV High Pressure, prioritize Level Control with RCIC (HPCI is unavailable due to the Logic Bus 'B' Power Failure (Event 3)) and Pressure Control with SRVs. RCIC is the only available high pressure injection source. The crew may also enter AOPs 20.300.Offsite, "Loss of Offsite Power," and 20.300.SBO, "Loss of Offsite and Onsite Power." The crew will enter EOP 29.100.01 SH 2, "Primary Containment Control," when Suppression Pool Temperature reaches 95°F due to inability to cool the Torus (EDG 12 is the only available power source).

Shortly after the initial actions to stabilize reactor level and pressure have been completed, a Small Break LOCA occurs. Crew re-enters the RPV Control and Primary Containment Control EOPs on High Drywell Pressure. RCIC subsequently trips on overspeed, leaving no source of high-pressure injection available to maintain level. RHR Pump 'C' and Core Spray Pump 'C' are the only Low Pressure ECCS Systems available for RPV injection. The crew will inhibit ADS at 32 IN and after determining that RPV Level cannot be maintained  $\geq 0$  IN, will exit the RPV Control Pressure Leg, Emergency Depressurize the RPV, and maximize injection using EDG 12 powered Low Pressure ECCS Systems (**CT-2**). The scenario may be terminated when RPV blowdown is in progress and RPV water level can be restored and maintained between 173 IN and 214 IN.

## **Critical Task 1(CT-1): Manually Start EDG 12 prior to Emergency Depressurization.**

### **Initial Conditions:**

A Station Blackout has occurred.  
A Loss of Coolant Accident has occurred.  
Available injection sources CANNOT maintain RPV level.  
EDG 12 is NOT running and can be started manually.

### **Critical Task Statement:**

**CT1:** A Station Blackout and a Loss of Coolant Accident has occurred. EDG 12 can be started manually. **TAKE ACTION** to manually start EDG 12 **BEFORE** RPV Emergency Depressurization so that lower pressure ECCS is powered for level recovery after emergency depressurization.

### **NUREG 1021 App D BASIS:**

*Safety Significance* – Adequate core cooling (ACC) because of submergence exists so long as RPV water level remains above TAF. RPV depressurization is performed to maximize the injection flowrate from operating sources of injection at TAF. Given the initial conditions, EDG 12 can be started to restore power to 1 CS pump and 1 RHR pump for injection.

NUREG 1021 App D – D.1.c Failure Criteria reasoning: *Candidate will fail if EDG 12 is not started manually prior to RPV Emergency Depressurization.*

*Initiating Cue* - A Station Blackout has occurred and EDG 12 is NOT running and can be started manually.

*Measurable Performance Standard* – Manually start EDG 12 and then control RPV level after Emergency Depressurization per 29.100.01 SH 1.

*Performance Feedback* -.RPV level is recovered after Emergency Depressurization to above TAF

*Expected action:* - Manually start EDG 12.

**Critical Task 2(CT-2): Emergency Depressurize prior to -25 inches RPV level.**

**Initial Conditions:**

RPV Level cannot be maintained greater than TAF

**Critical Task Statement:**

**CT2: WHEN** RPV Level cannot be maintained greater than TAF, **INITIATE** Emergency Depressurization, **BEFORE** level reaches Minimum Steam Cooling RPV Water Level (-25 inches).

**NUREG 1021 App D BASIS:**

*Safety Significance* – If the decreasing RPV water trend has not been reversed before RPV water level drops to TAF and if at least one source of injection into the RPV is available, emergency depressurization is performed to maximize the injection flowrate from operating sources of injection. The consequences of not depressurizing the RPV under conditions that require emergency RPV depressurization could include a loss of adequate core cooling or failure of the primary containment.

NUREG 1021 App D – D.1.c Failure Criteria reasoning: Open 5 SRVs prior to -25" RPV level.

*Initiating Cue* RPV water level at TAF.

*Measurable Performance Standard* – Initiate emergency depressurization before level reaches -25".

*Performance Feedback* -.RPV pressure is decreasing.

*Expected action:* - Open 5 SRV.

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Event Description: After turnover, the crew will transfer the TWMS from Bypass Mode to Cleanup Mode in accordance with 23.144, "Torus Water Management System."

Time	Position	Applicant's Actions or Behavior
T+0	SRO	<ul style="list-style-type: none"> <li>▪ Conducts brief for transfer of the Torus Water Management System (TWMS) from Bypass Mode to Cleanup Mode per ODE-3.</li> <li>▪ Direct RO to transfer the TWMS from Bypass Mode to Cleanup Mode per 23.144 Section 6</li> <li>▪ Acknowledge report of TWMS status.</li> </ul>
	ATC	<ul style="list-style-type: none"> <li>▪ May assist with plant announcements and communications.</li> </ul>
	BOP	<ul style="list-style-type: none"> <li>▪ Acknowledge direction to transfer the TWMS from Bypass Mode to Cleanup Mode per 23.144 Section 6</li> <li>▪ Contacts RP and notifies placing TWMS in Cleanup Mode. <b>ROLE PLAY as RP: Acknowledge placing TWMS in Cleanup Mode</b></li> <li>▪ Transfers the TWMS from Bypass Mode to Cleanup Mode per 23.144 Section 6: <ul style="list-style-type: none"> <li>• Depress Open pushbutton for G5100-F033, TWMS to Cndr Iso Vlv.</li> <li>• When TWMS Pumps ammeters indicate approximately 95 amps, depress CLOSE pushbutton for G5100-F609, TWMS Recirc Line Iso Vlv.</li> <li>• Open or verify open G5100-F613, TWMS Sec Cntm Otbd Iso Vlv.</li> <li>• To prevent CRD Pump from tripping on low suction pressure, slowly throttle open G5100-F611, TWMS Cond to Torus Makeup Vlv, until G51 R401, TWMS Return Flow Indicator, indication is approximately equal to G51-R400, TWMS Pumps Disch Flow Ind.</li> <li>• Report TWMS status to CRS</li> </ul> </li> </ul>

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Event Description: RPV Water Level 3 Instrument Failure (B21-N080C); Results in Downscale Trip on Trip Unit B21-N680C with No RPS (A2) Half Scram Signal.

Time	Position	Applicant's Actions or Behavior
T+10	BOOTH	<ul style="list-style-type: none"> <li>▪ Trigger step to fail B21-N080C downscale.</li> </ul>
	SRO	<ul style="list-style-type: none"> <li>▪ Acknowledge reports of 3D79 and related plant status.</li> <li>▪ Acknowledge report of B21-N680C status.</li> <li>▪ Reviews 23.601 for RPV Level 3 instruments.</li> <li>▪ May contact SM for concurrence on inserting Half SCRAM.</li> <li>▪ <b>ROLE PLAY as SM: Concur with CRS recommendation.</b></li> <li>▪ May direct inserting Half SCRAM.</li> <li>▪ If Half SCRAM directed, acknowledge reports of Half SCRAM</li> </ul>
	ATC	<ul style="list-style-type: none"> <li>▪ Responds to ARP 3D79 Reac Vessel Water Level L3 Channel Trip.</li> <li>▪ Verifies RPV water level on C32-R606A (B, C, D) and C32-R614</li> <li>▪ Reports status to CRS</li> <li>▪ Reviews ARP 3D79 and notes Auto Action of half scram did not occur. Reports status of RPS to CRS.</li> <li>▪ May review 23.601 for Reactor Vessel Low Water Level - Level 3</li> <li>▪ Directs Operator or testability to investigate.</li> <li>▪ <b>ROLE PLAY as NO: When directed to testability, wait 3 minutes and report B21-N680C is downscale with trip light ON.</b></li> <li>▪ Acknowledge report from testability and report the status of B21-N080C to CRS.</li> <li>▪ Based on ARP 3D79 Auto Actions, 23.601 Reactor Vessel Low Water Level - Level 3, and report of B21-N680C downscale, MAY recommend to CRS depressing C7100-M606A/M603A MANUAL SCRAM TRIP A1/A2 SWITCH to insert manual half scram.</li> <li>▪ If directed to insert manual half scram: <ul style="list-style-type: none"> <li>• Depresses C7100-M603A/M606A MANUAL SCRAM TRIP A1/A2 SWITCH to insert manual half scram.</li> <li>• Responds to 3D73, Trip Actuators A1/A2 Tripped and 3D77, Manual Trip A Sys Trip.</li> <li>• Verifies expected half SCRAM and reports status to CRS.</li> <li>• Reviews ARPs 3D73 and 3D77</li> </ul> </li> </ul>
	BOP	<ul style="list-style-type: none"> <li>▪ May assist with plant announcements and communications.</li> </ul>



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Event Description: RPV Water Level 3 Instrument Failure (B21-N080C); Results in Downscale Trip on Trip Unit B21-N680C with No RPS (A2) Half Scram Signal.

Time	Position	Applicant's Actions or Behavior
	SRO	<ul style="list-style-type: none"> <li data-bbox="561 392 716 420">▪ Enter TS</li> <li data-bbox="618 436 1336 464"><b>3.3.1.1 Reactor Protection System (RPS) Instrumentation</b></li> <li data-bbox="638 483 1409 546"><i>CONDITION A. One or more required channels inoperable (Table 3.3.1.1-1, Function 4.)</i></li> <li data-bbox="638 562 1187 590"><i>REQUIRED ACTION A.1 Place channel in trip.</i></li> <li data-bbox="638 609 1000 636"><i>COMPLETION TIME 12 hours.</i></li> <li data-bbox="618 655 1304 682"><b>3.3.6.1 Primary Containment Isolation Instrumentation</b></li> <li data-bbox="638 701 1330 728"><i>CONDITION A. One or more required channels inoperable.</i></li> <li data-bbox="638 747 1187 774"><i>REQUIRED ACTION A.1 Place channel in trip.</i></li> <li data-bbox="638 793 1000 821"><i>COMPLETION TIME 12 hours.</i></li> <li data-bbox="638 840 1433 903"><i>REQUIRED ACTION A.2 Place associated trip system in trip (Table 3.3.6.1-1, Functions 2.a &amp; 7.a.)</i></li> <li data-bbox="638 921 1000 949"><i>COMPLETION TIME 12 hours.</i></li> <li data-bbox="561 966 911 993">▪ Briefs crew on TS impact.</li> </ul>

Op-Test No.: 2021-301 Scenario No.:1 Event No.:3 Page 1 of 5Event Description: HPCI Logic Bus B Power Failure (Renders HPCI inoperable and unavailable.)

Time	Position	Applicant's Actions or Behavior
T+23	BOOTH	<ul style="list-style-type: none"> <li>▪ Trigger step to fail HPCI Logic Bus B Power.</li> </ul>
	SRO	<ul style="list-style-type: none"> <li>▪ Acknowledge reports of 2D48, 2D50, and related plant status.</li> <li>▪ Acknowledges report of HPCI system status.</li> <li>▪ Directs verification of RCIC standby lineup - TS action.</li> </ul> <p><b>Note: 2D50 directs isolation of the HPCI suction while 2D48 directs realignment of the HPCI suction the Torus. Because of the condition of HPIC, isolation of the HPCI suction is the expected action.</b></p> <ul style="list-style-type: none"> <li>▪ Direct/Concur with actions ARP 2D48 and 2D50. Directs HPCI suction isolation per 2D50 rather than the realignment required by 2D48.</li> </ul>
	ATC	<ul style="list-style-type: none"> <li>▪ Reports Reactor Power Pressure and level status to CRS.</li> <li>▪ May assist with plant announcements and communications.</li> </ul>
	BOP	<ul style="list-style-type: none"> <li>▪ Responds to 2D50, HPCI Logic Bus Power Failure, and 2D58, HPCI/RCIC Suction Trans CST Level Low.</li> <li>▪ Review HPCI system status and reports to CRS.</li> <li>▪ Review ARP 2D48 and 2D50. May recommend actions of ARP to CRS.</li> <li>▪ Verifies RCIC lineup and reports status to CRS.</li> </ul>

Op-Test No.: 2021-301 Scenario No.:1 Event No.:3 Page 2 of 5Event Description: HPCI Logic Bus B Power Failure (Renders HPCI inoperable and unavailable.)

Time	Position	Applicant's Actions or Behavior
	BOP	<ul style="list-style-type: none"> <li>▪ Shutdown HPCI per ARP 2D50: <ul style="list-style-type: none"> <li>• Close E4150-F002, HPCI Stm Sply Inbd Iso Vlv.</li> <li>• Verify Close E4150-F003, HPCI Stm Sply Otbd Iso Vlv.</li> <li>• Close E4150-F004, HPCI CST Suct Iso Vlv.</li> </ul> <p><i>Note the crew may choose to complete the closure of E4150-F042 and E4150-F041 through manual operation in the field – or – by stroking the valve from the control room and then opening the breaker powering the valve when the close contactor for the valve drops out. Separate scripts are provided for each case.</i></p> <p>→ <b>Field only (E4150-F042 and E4150-F041)</b> ←</p> <ul style="list-style-type: none"> <li>• Direct field operator to perform the following: <ul style="list-style-type: none"> <li>○ Open MCC 2PB-1 Pos 10B (AB3-G11). <p><b>ROLE PLAY as NO: When directed to Open MCC 2PB-1 Pos 10B, wait 3 minutes and report on station, trigger step to open 2PB-1 Pos 10B as directed and report status.</b></p> </li> <li>○ Open MCC 2PB-1 Pos 10A (AB3-G11). <p><b>ROLE PLAY as NO: When directed to Open MCC 2PB-1 Pos 10A, wait 3 minutes and report on station, trigger step to open 2PB-1 Pos 10A as directed and report status.</b></p> </li> <li>○ May Manually close E4150-F042, HPCI Torus Suct Inbd Iso Vlv (Torus EI 546' Az 5°) <p><b>Note: E4150-F042 is located in Torus room and will require 2 operators and RP brief.</b></p> <p><b>ROLE PLAY as NO: When directed to close E4150-F042, wait 20 minutes and trigger step to close E4150-F042 and report status when step completes stroking valve closed.</b></p> </li> <li>○ May Manually close E4150-F041, HPCI Torus Suct Otbd Iso Vlv (ABSB-G11) <p><b>ROLE PLAY as NO: When directed to close E4150-F041, wait 5 minutes and trigger step to close E4150-F041 and report status when step completes stroking valve closed.</b></p> </li> </ul> </li> </ul> </li> </ul>

Op-Test No.: 2021-301 Scenario No.:1 Event No.:3 Page 3 of 5Event Description: HPCI Logic Bus B Power Failure (Renders HPCI inoperable and unavailable.)

Time	Position	Applicant's Actions or Behavior
	BOP	<p>→ Field and control room (E4150-F042 and E4150-F041) ←</p> <ul style="list-style-type: none"> <li>• Direct field operator to open MCC 2PB-1 Pos 10B (AB3-G11) for the E4150-F042 when the close contactor drops out at the end of the valve stroke.</li> </ul> <p><b>ROLE PLAY as NO: Acknowledge direction. Trigger Lesson for HPCI Isolation. Report on station and ready to open MCC 2PB-1 Pos 10B. After step triggers for E4150-F042 report MCC 2PB-1 Pos 10B is open.</b></p> <ul style="list-style-type: none"> <li>• Closes E4150-F042, HPCI Torus Suct Inbd Iso Vlv and notes indicating lights turn off at end of valve stroke. Acknowledge field report of MCC 2PB-1 Pos 10B is open.</li> <li>• Direct field operator to open MCC 2PB-1 Pos 10A (AB3-G11) ) for the E4150-F041 when the close contactor drops out at the end of the valve stroke.</li> </ul> <p><b>ROLE PLAY as NO: Acknowledge direction. Report on station and ready to open 2PB-1 Pos 10A. After step triggers for E4150-F041 report MCC 2PB-1 Pos 10A is open.</b></p> <ul style="list-style-type: none"> <li>• Closes E4150-F041, HPCI Torus Suct Otbd Iso Vlv and notes indicating lights turn off at end of valve stroke. Acknowledge field report of MCC 2PB-1 Pos 10A is open.</li> <li>• Close E4150-F079, HPCI Exh Vac Bkr Inbd Iso Vlv.</li> <li>• Close E4150-F075, HPCI Exh Vac Bkr Otbd Iso Vlv.</li> <li>• Close E4150-F600, HPCI Stm Sply Otbd Iso Byp Vlv.</li> </ul>

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 Event Description: HPCI Logic Bus B Power Failure (Renders HPCI inoperable and unavailable.)

Time	Position	Applicant's Actions or Behavior
	SRO	<ul style="list-style-type: none"> <li>▪ Evaluates TS</li> </ul> <p><b>3.3.5.1 Emergency Core Cooling System (ECCS) Instrumentation</b></p> <p><i>CONDITION A. One or more channels inoperable (Table 3.3.5.1-1, Function 3.)</i></p> <p><i>REQUIRED ACTION A Enter the Condition referenced in Table 3.3.5.1-1 for the channel.</i></p> <p><i>COMPLETION TIME Immediately.</i></p> <p><i>CONDITION B. As required by Required Action A.1 and referenced in Table 3.3.5.1-1.</i></p> <p><i>REQUIRED ACTION B.2 Declare High Pressure Coolant Injection (HPCI) System inoperable.</i></p> <p><i>COMPLETION TIME 1 hour from discovery of loss of HPCI initiation capability.</i></p> <p><i>AND</i></p> <p><i>REQUIRED ACTION B.2 Place channel in trip.</i></p> <p><i>COMPLETION TIME 24 hours</i></p> <p><i>AND</i></p> <p><i>CONDITION C. As required by Required Action A.1 and referenced in Table 3.3.5.1-1.</i></p> <p><i>REQUIRED ACTION C.2 Restore channel to OPERABLE status.</i></p> <p><i>COMPLETION TIME 24 hours.</i></p> <p><i>AND</i></p> <p><i>CONDITION D. As required by Required Action A.1 and referenced in Table 3.3.5.1-1.</i></p> <p><i>REQUIRED ACTION D.1 Declare High Pressure Coolant Injection (HPCI) System inoperable.</i></p> <p><i>COMPLETION TIME 1 hour from discovery of loss of HPCI initiation capability.</i></p> <p><i>AND</i></p> <p><i>REQUIRED ACTION D.2.1 Place channel in trip.</i></p> <p><i>COMPLETION TIME 24 hours</i></p> <p><b>3.3.6.1 Primary Containment Isolation Instrumentation</b></p> <p><i>CONDITION A. One or more required channels inoperable (Table 3.3.6.1-1, Function 3.)</i></p> <p><i>REQUIRED ACTION A.1 Place channel in trip.</i></p> <p><i>COMPLETION TIME 24 hours.</i></p>



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 Event Description: HPCI Logic Bus B Power Failure (Renders HPCI inoperable and unavailable.)

Time	Position	Applicant's Actions or Behavior
	SRO	<ul style="list-style-type: none"> <li>▪ Evaluates TS (Continued)</li> </ul> <p><b>3.5.1 ECCS—Operating</b></p> <p><i>CONDITION E. HPCI System inoperable.</i></p> <p><i>REQUIRED ACTION E.1 Verify by administrative means RCIC System is OPERABLE.</i></p> <p><i>COMPLETION TIME Immediately.</i></p> <p><i>AND</i></p> <p><i>REQUIRED ACTION E.2 Restore HPCI System to OPERABLE status.</i></p> <p><i>COMPLETION TIME 14 days.</i></p> <p><b>3.6.1.3 Primary Containment Isolation Valves (PCIVs)</b></p> <p><i>CONDITION A. One or more penetration flow paths with one PCIV inoperable, except due to leakage not within limits.</i></p> <p><i>REQUIRED ACTION A.1 Isolate the affected penetration flow path by use of at least one closed and de-activated automatic valve, blank flange, or check valve with flow through the valve secure</i></p> <p><i>COMPLETION TIME 4 hours.</i></p> <p><i>AND</i></p> <p><i>REQUIRED ACTION A.2 Verify the affected penetration flow path is isolated.</i></p> <p><i>COMPLETION TIME once per 31 days for isolation devices outside primary containment.</i></p> <p><i>AND</i></p> <p><i>Prior to entering MODE 2 or 3 from MODE 4. If primary containment was de-inerted while in MODE 4. If not performed within the previous 92 days. For isolation devices inside primary containment.</i></p> <ul style="list-style-type: none"> <li>• Briefs crew on TS impact.</li> </ul>

Op-Test No.: 2021-301 Scenario No.: 1 Event No.: 4 Page 1 of 4Event Description: CRD Pump East Breaker Fault/Trip; Start CRD Pump West.

Time	Position	Applicant's Actions or Behavior
T+53	BOOTH	<ul style="list-style-type: none"> <li>▪ Booth operator trigger Step to initiate a trip of the East CRD pump.</li> </ul>
	SRO	<ul style="list-style-type: none"> <li>▪ Enters 20.106.01, CRD Hydraulics System Failure.</li> <li>▪ Announces pump trip on Hi-Com.</li> <li>▪ Conducts brief for start of W. CRD Pump IAW ODE-3.</li> <li>▪ Directs P603 to perform Actions of Condition A</li> </ul>
	ATC	<ul style="list-style-type: none"> <li>▪ Responds to alarms 3D5, CRD Charging Header Pressure Low and 3D96 Motor Tripped.</li> <li>▪ Diagnoses alarms and CRD indications and determines the E. CRD Pump has tripped and reports this to the CRS.</li> <li>▪ Directs NO to investigate E. CRD pump and check W. CRD pump ready for start.</li> </ul> <p data-bbox="618 827 1430 947"><b>ROLE PLAY as NO: When dispatched to E CRD Pump to investigate, after about 5 min, pump not running, motor appears warmer than normal. If W CRD has not been started, report Ready to Start. If running, report Good Start.</b></p> <ul style="list-style-type: none"> <li>▪ Directs NO to pump breaker at 64B-B11.</li> </ul> <p data-bbox="618 1010 1414 1094"><b>ROLE PLAY as NO: When dispatched to E. CRD Pump Breaker, wait about 5 min, and report Ground Fault (64 device) flag at 64B-B11.</b></p>
	BOP	<ul style="list-style-type: none"> <li>▪ May assist with plant announcements and communications.</li> </ul>



Op-Test No.: 2021-301 Scenario No.:1 Event No.:4 Page 2 of 4Event Description: CRD Pump East Breaker Fault/Trip; Start CRD Pump West.

Time	Position	Applicant's Actions or Behavior
	BOOTH	<ul style="list-style-type: none"> <li>▪ Acknowledge report on status of CRD system.</li> <li>▪ Conducts follow up brief per ODE-3.</li> </ul>
	ATC	<ul style="list-style-type: none"> <li>▪ Acknowledge direction to perform 20.106.01, CRD Hydraulics System Failure, Condition A</li> <li>▪ Verifies CRD Flow Controller in MANUAL.</li> <li>▪ Closes CRD Flow Control Valve.</li> <li>▪ Closes CRD Pressure Control Valve.</li> <li>▪ Directs NO to isolate Div. 1 &amp; Div. 2 Backfill Systems.</li> </ul> <p><b>ROLE PLAY as NO: When directed to Isolate Reference Leg Backfill, wait 5 minutes and report valves are closed (report back in the same manner that the valves were relayed from the MCR). No simulator actions are necessary</b></p> <ul style="list-style-type: none"> <li>▪ Starts W. CRD Pump by placing CMC in RUN.</li> </ul> <p><b>ROLE PLAY as NO: Report Good Start of W. CRD Pump</b></p> <ul style="list-style-type: none"> <li>▪ Adjusts CRD flows &amp; pressures back in band.</li> <li>▪ Directs I&amp;C to restore Reference Leg backfill.</li> </ul> <p><b>ROLE PLAY as I&amp;C: If directed to restore reference leg backfill, acknowledge order (no actions necessary).</b></p> <ul style="list-style-type: none"> <li>▪ Dispatches NO to clear 3D13, CRD Hydraulic Temperature High alarm.</li> </ul> <p><b>ROLE PLAY as NO: If dispatched to CRD Temperature Recorder, wait about 5 min and trigger Step to reset alarm. Report CR 30-31 was highest at 305°F. All temperatures are currently lowering</b></p> <ul style="list-style-type: none"> <li>▪ Monitors and informs CRS when accumulator trouble alarms clear.</li> </ul>
	BOP	<ul style="list-style-type: none"> <li>▪ May assist with plant announcements and communications.</li> </ul>

Op-Test No.: 2021-301 Scenario No.:1 Event No.:4 Page 3 of 4Event Description: CRD Pump East Breaker Fault/Trip; Start CRD Pump West.

Time	Position	Applicant's Actions or Behavior
	SRO	<ul style="list-style-type: none"> <li>▪ Acknowledge report of the status of HCU 26-51.</li> </ul>
	ATC	<ul style="list-style-type: none"> <li>▪ On the evaluation of restoration of CRD pump and system notes that 3D10 CRD Accumulator Trouble remains in alarm.</li> <li>▪ May review ARP for 3D10, "CRD Accumulator Trouble."</li> <li>▪ Reviews IPCS and directs the operator to investigate HCU 26-51.</li> <li>▪ <b>ROLEPLAY as NO: when directed wait 3 minutes and report that HCU 26-51 is a low-pressure alarm, pressure is 900 psi and that you will be clearing it per the SOP.</b></li> <li>▪ Acknowledge report by the field operator and report to the CRS that: <ul style="list-style-type: none"> <li>• CRD Accumulator Trouble is a low-pressure alarm and will be cleared using the SOP.</li> <li>• Accumulator pressure is 900 psi for HCU 26-51 Reports status of HCU 26-51 to CRS.</li> </ul> </li> <li>▪ May direct the operator to add nitrogen to accumulator per with 23.106, Control Rod Drive Hydraulic System Section 5.4 Accumulator Recharging. ODE-2 script does not require this direction; it is the expected course of action for the field operator.</li> <li>▪ <b>ROLEPLAY as NO: when directed acknowledge direction to add nitrogen to the accumulator. Wait 2 minutes and report "I am closing the C11-F111A on HCU 26-51" When the report is acknowledged trigger step to recharge the accumulator. When step times out (10 minutes) report completion of nitrogen add to HCU 26-51 and pressure is 1150 psi. Ask if control room alarm is clear, acknowledge control room alarm is clear.</b></li> <li>▪ Acknowledge report by the field operator that C11-F111A on HCU 26-51 is being closed.</li> <li>▪ Monitors for additional CRD Accumulator Trouble.</li> <li>▪ May direct additional field operators to peer check or perform independent verification.</li> </ul>
	BOP	<ul style="list-style-type: none"> <li>▪ May assist with plant announcements and communications.</li> </ul>

Op-Test No.: 2021-301    Scenario No.: 1    Event No.: 4    Page 4 of 4  
 Event Description: CRD Pump East Breaker Fault/Trip; Start CRD Pump West.

Time	Position	Applicant's Actions or Behavior
	SRO	<ul style="list-style-type: none"> <li>▪ Evaluates TS</li> </ul> <p><b>3.1.5 Control Rod Scram Accumulators</b></p> <p><i>CONDITION A. One control rod scram accumulator inoperable with reactor steam dome pressure <math>\geq</math> 900 psig.</i></p> <p><i>CONDITION A.1 Declare the associated control rod scram time "slow."</i></p> <p><i>-OR-</i></p> <p><i>CONDITION A.2 Declare the associated control rod inoperable.</i></p> <p><i>COMPLETION TIME 8 hours.</i></p> <p><i>CONDITION B. Two or more control rod scram accumulators inoperable with reactor steam dome pressure &gt; 900 psig.</i></p> <p><i>CONDITION B.1 Restore charging water header pressure to &gt; 940 psig.</i></p> <p><i>COMPLETION TIME 20 minutes from discovery of Condition B concurrent with charging water header pressure &lt; 940 psig.</i></p> <p><i>-AND-</i></p> <p><i>CONDITION B.2.1 Declare the associated control rod scram time "slow."</i></p> <p><i>COMPLETION TIME 1 hour.</i></p> <p><i>-OR-</i></p> <p><i>CONDITION B.2.1 Declare the associated control rod inoperable.</i></p> <p><i>COMPLETION TIME 1 hour.</i></p>

Op-Test No.: <u>2021-301</u>		Scenario No.: <u>1</u>	Event No.: <u>5</u>	Page <u>1</u> of <u>3</u>
Event Description: <u>SJAE Trip; Swap SJAEs</u>				
Time	Position	Applicant's Actions or Behavior		
T+68	BOOTH	<ul style="list-style-type: none"> <li>▪ Trigger step to initiate SJAE Failure.</li> </ul>		
	SRO	<ul style="list-style-type: none"> <li>▪ Acknowledge report of 6D1 SJAE SYSTEM TROUBLE and status of SJAEs.</li> <li>▪ Announces event over the Hi-Com.</li> <li>▪ Conducts brief per ODE-3.</li> <li>▪ May enter 20.125.01 Loss of Condenser Vacuum and use conditions to direct actions.</li> <li>▪ Directs placing a different (#2 or #4) SJAE in service to meet normal operational requirements of 23.125 or AOP 20.125.01 Condition A.</li> <li>▪ May direct Starting additional OG Ring Water Pump per 23.712 Enclosure B (Hard Card) based on OG conditions.</li> </ul>		
	ATC	<ul style="list-style-type: none"> <li>▪ Reports Reactor Power Pressure and level status to CRS.</li> <li>▪ May assist with field communications.</li> </ul>		
	BOP	<ul style="list-style-type: none"> <li>▪ Responds to 6D1 SJAE SYSTEM TROUBLE</li> <li>▪ Diagnose that #3 SJAE has isolated and reports alarm and status of SJAEs to CRS.</li> <li>▪ May direct investigations by field operator.</li> <li>▪ <b>ROLE PLAY as NO, If dispatched walk down equipment as directed and report nothing abnormal.</b></li> </ul>		

Op-Test No.: 2021-301Scenario No.: 1Event No.: 5Page 2 of 3Event Description: SJAE Trip; Swap SJAEs

Time	Position	Applicant's Actions or Behavior
	BOP	<ul style="list-style-type: none"> <li>▪ Acknowledge direction to place (#2 or #4) SJAE in service.</li> <li>▪ Announces event over the Hi-Com shifting SJAE.</li> <li>▪ Places SJAE in service per 23.125 Section 6.6 Shifting In-Service Steam Air Ejectors: <ul style="list-style-type: none"> <li>• Open the associated 18" Manifold Suction valve for SJAE being started: <ul style="list-style-type: none"> <li>○ SJAE 2: N6200-F606, #2 SJAE Disch To 18" Manifold</li> <li>○ SJAE 4: N6200-F608, #4 SJAE Disch To 18" Manifold</li> </ul> </li> <li>• When associated SJAE 18" Manifold Inlet Valve is full open, verifies the associated SJAE Trip Valve opens <ul style="list-style-type: none"> <li>○ SJAE 2: N6100-F010B, #2 SJAE Main Stm Inlet Valve</li> <li>○ SJAE 4: N6100-F010D, #4 SJAE Main Stm Inlet Valve</li> </ul> </li> <li>• Open associated Steam Supply valve for SJAE being started: <ul style="list-style-type: none"> <li>○ SJAE 2: N6200-F602, #2 SJAE Main Stm Supply Valve</li> <li>○ SJAE 4: N6200-F604, #4 SJAE Main Stm Supply Valve</li> </ul> </li> <li>• Verify the following valves are open for associated SJAE being started:</li> <li>• SJAE 2: <ul style="list-style-type: none"> <li>○ N6200-F046, #2 SJAE Cond Drain Valve</li> <li>○ N6200-F042, 20" Manf Inbd Vlv To #2 SJAE</li> <li>○ N6200-F056, 20" Manf Otbd Vlv To #2 SJAE</li> </ul> </li> <li>• SJAE 4: <ul style="list-style-type: none"> <li>○ N6200-F044, #4 SJAE Cond Drain Valve</li> <li>○ N6200-F040, 20" Manf Inbd Vlv To #4 SJAE</li> <li>○ N6200-F054, 20" Manf Otbd Vlv To #4 SJAE</li> </ul> </li> <li>• Verifies SJAE #3 is shutdown per SOP.</li> <li>• Report status of SJAE to CRS:</li> </ul> </li> </ul>

Op-Test No.: 2021-301 Scenario No.: 1 Event No.: 5 Page 3 of 3Event Description: SJAE Trip; Swap SJAEs

Time	Position	Applicant's Actions or Behavior
	SRO	<ul style="list-style-type: none"> <li>▪ Acknowledge report of OG Ring Water Pump in service.</li> <li>▪ Acknowledge report of status of SJAE.</li> <li>▪ Brief crew on event per ODE-3.</li> </ul>
	BOP	<ul style="list-style-type: none"> <li>▪ If directed acknowledge direction to place additional OG Ring Water Pump in service. <ul style="list-style-type: none"> <li>• Directs field operator to prime OG ring water pump.</li> </ul> <p><b>ROLE PLAY as NO, If dispatched to prime OG ring water pump wait 3 minutes and report that the OG ring water pump is primed. When OG ring water pump is started report good start.</b></p> </li> <li>• Starts additional OG Ring Water Pump per 23.712, Enclosure B (Hard Card): <ul style="list-style-type: none"> <li>○ Place N62-F406B, South Ringwater Vac Pump Recirc Line PCV, in MANUAL and set to 100% open.</li> <li>○ Place N6200-F666, S Ringwater Pump Clg Wtr Vlv, at 10% open.</li> <li>○ Open N6200-F664, S Absolute Filter Inlet Vlv.</li> <li>○ Open N6200-F668, S Buffer Tank Outlet Vlv</li> <li>○ Place N6200-C004. South OG Ring Water Pump CMC in RUN, and verify: <ul style="list-style-type: none"> <li>○ Proper pump operation as indicated by developed flow on N62-R808, NOG Outlet Flow Recorder.</li> <li>○ P4300-F607, TBCCW To South OG Ring Wtr Clr Inlet Iso Vlv, opens (H11-P805).</li> </ul> </li> <li>○ If necessary, adjust N62-F406B, South Ringwater Vac Pump Recirc Line PCV, to a stable pressure of 11 to 12 psia in Offgas 10" Delay Piping.</li> <li>○ Report system status to CRS</li> </ul> </li> </ul>

Op-Test No.: 2021-301 Scenario No.: 1 Event No.: 6 Page 1 of 3

Event Description: FWH Level Instrument Failure; Requires Power Reduction Due to Loss of Feedwater Heating.

Time	Position	Applicant's Actions or Behavior
T+75	BOOTH	<ul style="list-style-type: none"> <li>▪ Trigger step to fail N22-LXP-N429A High.</li> </ul>
	SRO	<ul style="list-style-type: none"> <li>▪ Acknowledge reports of Alarms and Feedwater heating system status.</li> <li>▪ Acknowledge reports of power pressure and level trends.</li> <li>▪ Acknowledges report of lowering Reactor Power using Flow.</li> <li>▪ Enters 20.107.02, Loss of Feedwater Heating and 20.107.01, Loss Of Feedwater Or Feedwater Control.</li> </ul>
	ATC	<ul style="list-style-type: none"> <li>▪ Monitors Reactor Power, Pressure and PRV level and reports status to CRS.</li> <li>▪ Per 20.107.01, Immediate Actions IE. Reactor Power &gt; 85% AND Loss of one or more HDPs pumping forward:               <ul style="list-style-type: none"> <li>• Performs Rapid Power Reduction by depressing and releasing the RECIRC MANUAL RUNBACK pushbutton</li> </ul> </li> <li>▪ Review P/F map and recommends inserting CRAM Array to CRS.</li> </ul>
	BOP	<ul style="list-style-type: none"> <li>▪ Responds to alarms:               <ul style="list-style-type: none"> <li>• 5D073, Feedwater Heater 5N Level High / Low.</li> <li>• 5D052, Feedwater Heater 6N Level High / Low.</li> <li>• 5D085, Loss Of Heater Drains.</li> <li>• 4D027, Mn Turb 5N / S Fd Wtr Htr Ess Check Val Closed.</li> <li>• 5D126, Normal Hotwell Supply Pump Auto Start.</li> <li>• 4D028, Mn Turb 6N / S Fd Wtr Htr Ess Check Val Closed.</li> <li>• 5D118, N Reheater Seal Tank Level High / Low.</li> <li>• 5D090, S Separator Seal Tank Level High / Low.</li> </ul> </li> <li>▪ Reviews Feedwater heating system status and reports to CRS.</li> <li>▪ Notes North Heater Dain Pump is not pumping forward and provides Crew Update.</li> </ul>

Op-Test No.: 2021-301      Scenario No.: 1      Event No.: 6      Page 2 of 3

Event Description: FWH Level Instrument Failure; Requires Power Reduction Due to Loss of Feedwater Heating.

Time	Position	Applicant's Actions or Behavior
	SRO	<ul style="list-style-type: none"> <li>▪ Acknowledge report of P/F and recommendation to insert CRAM array.</li> <li>▪ Directs inserting CRAM Array.</li> <li>▪ Directs 20.107.01 Condition L.</li> <li>▪ Directs Monitoring for Neutron Flux Instability using 24.000.01 Attachment 34b.</li> </ul>
	ATC	<ul style="list-style-type: none"> <li>▪ When directed Inserts CRAM Array as directed Per 23.623 Section 9.7               <ul style="list-style-type: none"> <li>• Place or verify Rod Select Power switch in ON.</li> <li>• Select Rods as needed on the rod selection matrix.</li> <li>• Using the Rod Movement Control Switch insert the rods by selecting IN.</li> <li>• Using the Cram Array book, check that all Red Cram rods are fully inserted and continue fully inserting Cram Array control rods using the Cram Array book until the desired power level is achieved.</li> <li>• When Rod movements are completed, place Rod Select Power switch in OFF.</li> </ul> </li> <li>▪ Notifies the Station Nuclear Engineer (SNE) <b>ROLE PLAY as SNE: Acknowledge report.</b></li> <li>▪ Monitor for Neutron Flux Instability using 24.000.01 Attachment 34b:               <ul style="list-style-type: none"> <li>• Place or verify Rod Select Power switch in ON.</li> <li>• Monitor for Neutron Flux Instability using APRMs and LPRM outputs on RBM ODAs by sequentially selecting the following rods: 30-27, 30-43, 42-43, 42-27, 42-15, 30-15, 14-15, 14-27, and 14-43.</li> </ul> </li> <li>▪ Reports status of P/F after CRAM array insertion to CRS.</li> </ul>
	BOP	<ul style="list-style-type: none"> <li>▪ Acknowledge direction to perform 20.107.01 Condition L:</li> <li>▪ Directs Chemistry to perform required sampling for power change. <b>ROLE PLAY as Chemistry: Acknowledge direction.</b></li> <li>▪ Contacts Radiation Protection and reports power change. <b>ROLE PLAY as RP: Acknowledge power change.</b></li> <li>▪ Reports 20.107.01 Condition L complete to CRS</li> </ul>



Op-Test No.: 2021-301      Scenario No.:1      Event No.:6      Page 3 of 3

Event Description: FWH Level Instrument Failure; Requires Power Reduction Due to Loss of Feedwater Heating.

Time	Position	Applicant's Actions or Behavior
	SRO	<ul style="list-style-type: none"> <li>▪ Directs evaluation of heater drains per 20.107.02, Loss of Feedwater Heating.</li> <li>▪ Acknowledge report of Feedwater Heating System status per 20.107.02 Enclosure A.</li> <li>▪ Acknowledge report of status of P/F after CRAM array insertion.</li> <li>▪ Acknowledge report of 20.107.01 Condition L complete</li> <li>▪ Brief crew on event per ODE-3.</li> </ul>
	BOP	<ul style="list-style-type: none"> <li>▪ When directed reviews Feedwater Heating System status per 20.107.02 Enclosure A, "Feedwater Inlet Temperature vs. Reactor Power," will evaluate the feedwater temperature decrease, excluding the temperature decrease due to the power reduction, and determine that feedwater temperature is in the Acceptable Area of the "Reduced FW Temperature Region</li> <li>▪ Reports status of Feedwater Heating System status per 20.107.02 Enclosure A.</li> </ul>

Time	Position	Applicant's Actions or Behavior
Op-Test No.: <u>2021-301</u> Scenario No.: <u>1</u> Event No.: <u>7-9</u> Page <u>1</u> of 4		
Event Description: <u>Lightning Strike Causes Loss of Offsite Power. EDG 12 Fails to Auto Start (Recoverable). Start Failure Trips on EDG 13 and 14. (CT-1) SBLOCA (Increase Ramp Over 5 Minutes) with RCIC Trip on Overspeed; Emergency Depressurization, Maximize Injection with EDG 12 Powered Low Pressure ECCS Injection Systems. (CT-2)</u>		
T+85	BOOTH	Trigger step to initiate Loss of Offsite Power. Trigger step for small break LOCA when SCRAM conditions are stable. (Verify with Lead examiner)
	SRO	<ul style="list-style-type: none"> <li>▪ Acknowledge Turbine Trip and/or Loss of Feedwater, informs CRS and places Mode Switch in Shutdown.</li> <li>▪ Directs SCRAM reports.</li> <li>▪ Acknowledge SCRAM reports</li> <li>▪ Enters 29.100.01 SH 1, RPV Control</li> <li>▪ Directs the following: <ul style="list-style-type: none"> <li>• RPV level band of 173-214 inches.</li> <li>• PRV pressure band 900-1050 psig.</li> <li>• Expanded Band: 500-1050 psig.</li> <li>• Electrical Panel walkdown.</li> </ul> </li> </ul> <p><b>NOTE: If EDG 12 is not manually started during the panel walkdown the AOP entry will be 20.300.SBO. The CRS will direct steps to start EDG 12 and then transition to 20.300.OFFSITE.</b></p> <ul style="list-style-type: none"> <li>▪ Acknowledge report of electrical status</li> <li>▪ Enters 20.300.OFFSITE Loss Of Offsite Power.</li> </ul>
	ATC	<ul style="list-style-type: none"> <li>▪ Recognizes Turbine Trip and/or Loss of Feedwater, informs CRS and places Mode Switch in Shutdown.</li> <li>▪ When directed provides SCRAM report.</li> <li>▪ When directed performs Electrical Panel walkdown.</li> <li>▪ <b><u>Notes EDG 12 did not auto start and manually starts EDG 12 -OR starts EDG 12 when directed by CRS prior to RPV emergency depressurization (CT-1)</u></b></li> <li>▪ Provides CREW UPDATE on Electrical Status.</li> <li>▪ Completes Electrical Panel walkdown and reviews status with CRS.</li> </ul>
	BOP	<ul style="list-style-type: none"> <li>▪ When directed provides SCRAM report.</li> <li>▪ Acknowledges RPV level and pressure band.</li> <li>▪ Injects / Controls level with RCIC.</li> <li>▪ Verifies operation of Low Low Set</li> <li>▪ Reports status of RPV level, pressure and injection to CRS.</li> </ul>

Op-Test No.: 2021-301 Scenario No.:1 Event No.:7-9 Page 2 of 4

Event Description: Lightning Strike Causes Loss of Offsite Power. EDG 12 Fails to Auto Start (Recoverable). Start Failure Trips on EDG 13 and 14. (CT-1) SBLOCA (Increase Ramp Over 5 Minutes) with RCIC Trip on Overspeed; Emergency Depressurization, Maximize Injection with EDG 12 Powered Low Pressure ECCS Injection Systems. (CT-2)

Time	Position	Applicant's Actions or Behavior
	SRO	<ul style="list-style-type: none"> <li>▪ Acknowledge status of RPV level and injection.</li> <li>▪ Directs 20.300.OFFSITE Condition C,D,F</li> <li>▪ Enters 29.100.01 SH 2, Primary Containment Control on High Drywell Temperature.</li> <li>▪ Acknowledge report of Reports RCIC Turbine Trip and unable to maintain RPV level.</li> <li>▪ Acknowledge rising DW pressure.</li> </ul>
	ATC	<ul style="list-style-type: none"> <li>○ Acknowledge direction to perform 20.300.OFFSITE Condition C.</li> <li>○ Contacts Peaker Watch and directs start of designated CTG.</li> <li><b>ROLE PLAY as NO: When directed to start designated CTG acknowledge direction.</b></li> <li>○ Acknowledge direction to perform 20.300.OFFSITE Condition D.</li> <li>○ Place the following in TRIP: <ul style="list-style-type: none"> <li>○ Bus 101 Pos GD.</li> <li>○ Bus 102 Pos GK.</li> <li>○ Bus 102 Pos GM.</li> </ul> </li> <li>▪ Acknowledge direction to perform 20.300.OFFSITE Condition D. <ul style="list-style-type: none"> <li>○ Verifies EDG 12 output beaker closed.</li> <li>○ Verifies Bus 72EB Pos 2D closed</li> <li>○ Verifies Bus 72C Pos 3C closed</li> </ul> </li> </ul>
	BOP	<ul style="list-style-type: none"> <li>▪ May assist with 20.300.OFFSITE Attachment 1</li> <li>▪ Reports RCIC Turbine Trip and unable to maintain RPV level.</li> <li>▪ Reports rising DW pressure.</li> </ul>

Op-Test No.: 2021-301      Scenario No.:1      Event No.:7-9      Page 3 of 4

Event Description: Lightning Strike Causes Loss of Offsite Power. EDG 12 Fails to Auto Start (Recoverable). Start Failure Trips on EDG 13 and 14. (CT-1) SBLOCA (Increase Ramp Over 5 Minutes) with RCIC Trip on Overspeed; Emergency Depressurization, Maximize Injection with EDG 12 Powered Low Pressure ECCS Injection Systems. (CT-2)

Time	Position	Applicant's Actions or Behavior
	SRO	<ul style="list-style-type: none"> <li>▪ Enters 29.100.01 SH 2, Primary Containment Control on High Drywell pressure.</li> <li>▪ May direct confirm initiation of EECW, and isolation to the Drywell. Restore cooling to CRD.</li> <li>▪ Verifies high pressure feed status with CRLNO.</li> <li>▪ Directs 20.300.OFFSITE Condition I,J</li> </ul>
	ATC	<ul style="list-style-type: none"> <li>▪ Acknowledge direction to perform 20.300.OFFSITE Condition G,I,J.</li> <li>▪ Direct field operator to perform 20.307.01, Emergency Diesel Generator Failure for EDG 13 and 14</li> </ul> <p><b>ROLE PLAY as NO: When directed to perform 20.307.01, Emergency Diesel Generator Failure for EDG 13 and 14 acknowledge direction.</b></p>
	BOP	<ul style="list-style-type: none"> <li>▪ If directed acknowledge direction to confirm initiation of EECW, and isolation to the Drywell. Restore cooling to CRD and reports initiation of EECW DIV 1 only (Assuming EDG 12 restored), unable to isolate to the drywell, unable to restore cooling to CRD due to power loss.</li> <li>▪ When directed reports status of high-pressure feed systems to CRS.</li> </ul>

Op-Test No.: 2021-301 Scenario No.:1 Event No.:7-9 Page 4 of 4

Event Description: Lightning Strike Causes Loss of Offsite Power. EDG 12 Fails to Auto Start (Recoverable). Start Failure Trips on EDG 13 and 14. (CT-1) SBLOCA (Increase Ramp Over 5 Minutes) with RCIC Trip on Overspeed; Emergency Depressurization, Maximize Injection with EDG 12 Powered Low Pressure ECCS Injection Systems. (CT-2)

Time	Position	Applicant's Actions or Behavior
	SRO	<ul style="list-style-type: none"> <li>▪ Acknowledge Level 1 report.</li> <li>▪ Directs ADS inhibited.</li> <li>▪ Conducts brief for ED.</li> <li>▪ Marks charts and prepares for ED.</li> <li>▪ Directs monitoring of RPV Level as critical parameter.</li> <li>▪ At TAF and before -25", Direct 5 ADS SRVs opened</li> <li>▪ Provides direction for RWL recovery and directs level band 173-214"</li> </ul>
	ATC	<ul style="list-style-type: none"> <li>▪ Coordinates with CRLNO for level recovery.</li> </ul>
	BOP	<ul style="list-style-type: none"> <li>▪ Provides level 1 report to CRS or as Crew update.</li> <li>▪ When directed Inhibit ADS and reports status to CRS.</li> <li>▪ Monitor RPV level as directed and provide updates.</li> <li>▪ Provide standard report at RPV Level 1.</li> <li>▪ Inform CRS (crew) when RPV Level at TAF.</li> <li>▪ <b><u>Open 5 SRVs as directed prior to RPV Water Level reaching -25 inches (CT-2)</u></b> and reports status to CRS.</li> <li>▪ Report 5 SRVs open.</li> <li>▪ Monitor RPV pressure and provide crew update upon receipt of Reactor Pressure Low using standard communication.</li> <li>▪ Monitor for and report when level &gt;TAF.</li> <li>▪ Restores RPV level to band as directed.</li> </ul>
	EXAMINER	<p><b>The scenario may be terminated when RPV blowdown is in progress and RPV water level can be restored and maintained between 173 IN and 214 IN.</b></p>

Facility: Fermi 2 Nuclear Plant Scenario No.: 3 Op-Test No.: 2021-301

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

**Initial Conditions:** 100% power, MOL, steady state conditions. The Transmission System Operator (TSO) has issued a Maximum Emergency Generation Alert due to grid instabilities.

**Turnover:** Perform 24.106.04, "Scram Discharge Volume Vent and Drain Valve Operability Test," Section 5.3 only. Maintain reactor power at 100% and comply with TSO requests for grid support as necessary.

Critical Tasks: **(CT-1)** Inhibit ADS.

**(CT-2)** Control RPV injection per FSL-OR1 of 29.100.01 SH 1A

**(CT-3)** Insert ALL Control Rods  $\leq$  02.

Event No.	Malf. No.	Event Type*	Event Description
1		N (ATC) N SRO)	Perform SDV Vent and Drain Valve Operability Test, Section 5.3 Only.
2**	H_P603_A074_4 H_P603_A074_5 P603_A074_2 P603_A074_1 BBAZP603_A1 50NOISE BCBYALARM_UNIT151623REV BCBYALARM_UNIT149801REV BBBCLGACMO_TOR932567TF SEIZUR	<del>C (ATC)</del> C (SRO) R (ATC)	Degrading Condition on the In Service North RRMG Set Lube Oil Pump (Fluctuating Amps & Intermittent Alarms), with Failure of the Standby Lube Oil Pump to Auto Start.
3**	NG13N3021PS EN246CTFCLOSE	<del>R (ATC)</del> C (ATC) C (BOP) C (SRO)	#3 TCV Unitized Actuator Fault (Oil Pump Degrading Results in Low System Pressure (< 1200 psig)). <del>Reduce Power &lt; 91.5%</del> / Lock Close #3 TCV / Reset Half Scram.
4	G302G33MF 0009TVLEAK G3BBG33R6 16ATVSP G3BBRELAY_D902529TVSP G3BBG33R6 16BTVSP G3BBRELAY_D221958TVSP	C (BOP) C (SRO) TS	RWCU Leak with Auto Isolation Failure (Manual Isolation Successful).
5	N102PXEC7 1N052ATVSP	TS (SRO)	Turbine First Stage Pressure Instrument Failure (C71-N052A); Trip Unit C71-N652A Output Signal Downscale and Auto Bypass of Channel A1.
6**	<del>N22MF0018 P603_A317_1</del>	<del>C (ATC) C (SRO)</del>	<del>South Heater Drain Pump Trip with Failure of Manual Runback Pushbutton to Lower Power.</del>

7	S3RPRESSP ERT C1DKMF367 1TVV	M (ALL)	Neutron Flux Instabilities / Hydraulic ATWS / SLC Common Discharge Header Rupture. <b>(CT-1) (CT-3)</b>
8	NDAFTTR1T VSP N30MF0069 N30MF0071	C (BOP) C (SRO)	Main Turbine Trip / Bypass Valves Trip after the first Lowering of RPV Level. Restore and Maintain RPV injection per 29.100.01 SH 1A. <b>(CT-2)</b>
9	E11MF0046	<del>C (BOP)</del> C (ATC) C (SRO)	RHRSW Pump Trip (C or D). Throttle F068A/B for Single Pump Flow and RHRHX Vibration Limits.
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor			

\*\*ATC applicant actions in response to the Event 2 malfunction, resulted in a trip of the North RRMG Set and subsequent entry into Single Loop Operation, requiring insertion of the CRAM Array to lower Reactor Power < 66.1%. Accordingly, the reactivity manipulation originally scripted for Event 3 was invalidated and the Event 6 malfunction nullified. The ATC applicant was credited with (1) a reactivity manipulation in Event 2 for actions taken in response to the North RRMG Set trip, and (2) a component failure in Event 3 for action taken in response to the #3 TCV unitized actuator fault. ES-301-5 appropriately updated.

FERMI 2  
D1 Supplement

## SCENARIO SUMMARY

### Event 1:

The scenario begins with the Unit at 100% power. The Transmission System Operator (TSO) has issued a Maximum Emergency Generation Alert due to grid instabilities. After turnover, the crew will perform 24.106.04, "Scram Discharge Volume Vent and Drain Valve Operability Test," Section 5.3 only.

### Event 2:\*\*

Once Section 5.3 of surveillance procedure 24.106.04 has been completed, annunciators 3D108, "Recirc Sys A Fluid Drive Lube Oil Press Low," and 3D130, "Recirc Sys A Circ Lube Oil Pump Auto Start," will alarm, alerting the crew to a degrading condition on the in-service North RRMG Set Lube Oil Pump. The Standby Lube Oil Pump fails to auto start. The crew will observe indications of fluctuating amps on the in-service Lube Oil Pump Motor and take timely action to manually start the Standby Lube Oil Pump to restore Recirc System A lube oil pressure prior to trip of the North RRMG Set (30 psig decreasing for 6 seconds). The crew may reference SOP 23.138.01, "Reactor Recirculation System," when performing the pump shift.

### Event 3:\*\*

Once the Standby Lube Oil Pump has been started and Recirc System A lube oil pressure has stabilized, the crew will respond to annunciator 4D2, "Unitized Actuator Throttle Vlv Fault," evaluate indications on the Unitized Actuator (UA) mimic, and determine that the alarm was due to a low pressure condition (< 1200 psig) on the #3 Turbine Control Valve (TCV) UA that was caused by the associated oil pump degrading. The crew, in accordance with SOP 23.109, "Turbine Operating Procedure," will ~~(a) lower power to ≤ 91.5%~~, (b) Lock Close #3 TCV, (c) reset the RPS the Half Scram, and (d) continue operations with three steam lines supplying the turbine.

### Event 4:

Once the RPS Half Scram has been reset, a leak in excess of 55 gpm will occur in the RWCU System. The crew will respond to annunciator 2D115, "RWCU Diff Flow High," and verify that RWCU System Differential Flow Indication is greater than 55 gpm. RWCU will fail to isolate after the 44-second time delay elapses. The crew will diagnose the failure to isolate and take prompt action to manually perform the isolation. The SRO will enter Tech Spec 3.3.6.1 (Table 3.3.6.1-1, Function 5.a). The crew may perform the isolation from memory or using the guidance contained in ARP 2D115, AOP 20.707.01, "Loss of RWCU," or SOP 23.601, "Instrument Trip Sheets."

### Event 5:

Once RWCU has been isolated, the crew will respond to annunciator 3D91, "Turbine Stop/Cont Val Channel Trip By-Passed," and verify that HP Turbine First Stage Pressure is greater than 161.9 psig. The crew will determine that Turbine First Stage Pressure Instrument C71-N052A has failed such that the output from associated Trip Unit C71-N652A is downscale, resulting in a bypass condition on Channel A1. The SRO will reference SOP 23.601, "Instrument Trip Sheets," and enter Tech Spec 3.3.1.1 (Table 3.3.1.1-1, Functions 9 and 10). The instrument failure will require a fuse to be pulled to



place the A1 Channel in a non-bypass condition to comply with the Tech Spec Required Action to place the inoperable channel in "Trip."

**Event 6:\*\***

~~Once the GRS has addressed TS, the South Heater Drain Pump (HDP) will trip, requiring the crew to perform a Rapid Power Reduction to  $\leq 85\%$ . The crew will enter AOP 20.107.01, "Loss of Feedwater or Feedwater Control," and take Immediate Action to lower power using the Recirc Manual Runback Pushbutton. The Recirc Manual Runback Pushbutton will fail, requiring the crew to manually lower recirc flow using the speed controllers. The crew will evaluate the P/F Map and insert the CRAM Array as necessary.~~

**Events 7-9:**

Once the crew has inserted the CRAM Array, Neutron Flux Instabilities (i.e., power-to-flow oscillations) will be observed, prompting the crew to take Immediate Action to manually scram the reactor. Following the manual scram action, a High Power Hydraulic ATWS will occur. The crew will enter EOP 29.100.01 SH 1, "RPV Control," and perform "initial" ATWS actions to (a) Inhibit ADS (**CT-1**), (b) Terminate and Prevent injection (except for SLC, CRD, and RCIC) until RPV water level is lowered less than or equal to 114 inches, and (c) Initiate SLC. Shortly after SLC is initiated, a rupture occurs in the discharge piping common to both pumps, rendering SLC unavailable as a boron injection source. The crew will transition to EOP 29.100.01 SH 1A, "ATWS." The initial RPV level band will be 50 to 100 inches. When RPV level is stable and in band the Main Turbine and Bypass Valves will trip, leaving SRVs as the only means of pressure control, forcing additional steam flow through the SRVs and placing a greater heat load on the Torus. When Torus temperature exceeds 110°F, the crew will execute ATWS EOP override FSL-OR1 to deliberately lower RPV level by controlling injection rate until level reaches 0 inches (one or more SRVs remain open with Rx Power > 3 %) (**CT-2**). When RPV level drops below 0 inches the crew will execute ATWS EOP override FSL-OR1 to inject to the RPV above the Minimum Core Steam Flow Injection Rate of 3120 gpm, but as low as practical to maintain 11.3% Rx power (**CT2**). As power lowers due to the combined effects of the RPV level reduction and control rod insertion, RPV injection will be increased to maintain 11.3 % Rx power, causing RPV level to slowly rise. When 11.3 % Rx power can no longer be maintained, the crew will execute FSL-3 and maintain RPV level between -25 inches and the RPV level where power remains below 11.3 % Rx power.

The crew will determine that the ATWS is due to hydraulic lock conditions within the Scram Discharge Volume (SDV) and that control rods need to be inserted using the "Scram-Reset-Scram" strategy contained in Emergency Support Procedure 29.ESP.03, "Alternate Control Rod Insertion Methods." The crew will achieve success inserting all control rods following the initial attempt (**CT-3**). Due to significant heat addition to the Torus and potential challenges to containment, the crew will enter EOP 29.100.01 SH 2, "Primary Containment Control," and place two loops of Torus Cooling in service. For the first division of Torus Cooling placed in service, one of the RHRSW Pumps (C or D) will trip. The crew will diagnose the failure and throttle E1150-F068A/B, Div 1/2 RHR Hx Serv Wtr Outlet FCV," in the close direction to maintain 5400-6300 gpm to prevent excessive vibration of E1150-F068A/B and runout of the other RHRSW Pump. Throttling E1150-F068A/B in the close direction will test applicant knowledge of RHR HX Service Water Outlet FCV operation, as this valve is only designed to throttle in the open direction. Throttling the valve closed is accomplished by momentarily depressing the

OPEN pushbutton to interrupt valve travel in the closed direction. Guidance for throttling E1150-F068A/B closed and establishing an operational band of 5400-6300 gpm is contained in SOP 23.208, "RHR Complex Service Water Systems." The scenario may be terminated once all rods have been fully inserted, EOP 29.100.01 SH 1A is exited, EOP 29.100.01 SH 1 entered, and RPV water level is in the process of being restored 173 IN and 214 IN.

\*\*ATC applicant actions in response to the Event 2 malfunction, resulted in a trip of the North RRMG Set and subsequent entry into Single Loop Operation, requiring insertion of the CRAM Array to lower Reactor Power < 66.1%. Accordingly, the reactivity manipulation originally scripted for Event 3 was invalidated and the Event 6 malfunction nullified. The ATC applicant was credited with (1) a reactivity manipulation in Event 2 for actions taken in response to the North RRMG Set trip, and (2) a component failure in Event 3 for action taken in response to the #3 TCV unitized actuator fault. ES-301-5 appropriately updated.

## **Critical Task 1(CT-1): Inhibit ADS**

### **Initial Conditions:**

Reactor SCRAM required, reactor not shutdown.

### **Critical Task Statement:**

**CT1: WITH** a reactor scram required, reactor not shutdown, **INHIBIT** ADS to prevent an uncontrolled RPV depressurization.

### **NUREG 1021 App D BASIS:**

Safety Significance - In order to affect a reduction in reactor power, actions may be taken to lower RPV water level to a level below the automatic initiation setpoint of ADS. Actuation of ADS under ATWS conditions could result in core damage, therefore automatic ADS actuation should be prevented.

NUREG 1021 App D – D.1.c Failure Criteria reasoning: Candidate will fail if there is a valid SCRAM signal (automatic or manual) AND the reactor will NOT remain shut down under all conditions without boron AND ADS automatically actuates and causes an RPV depressurization.

Safety significant boundary conditions Actuation of ADS imposes a severe thermal transient on the RPV and complicates the efforts to maintain RPV water level within the ranges specified in the ATWS RPV Control EOP. Further, rapid and uncontrolled injection of large amounts of relatively cold, unborated water from low pressure injection systems may occur as RPV pressure decreases to and below the shutoff heads of these pumps. Such an occurrence would quickly dilute in-core boron concentration and reduce reactor coolant temperature. When the reactor is not shutdown, or when the shutdown margin is small, sufficient positive reactivity might be added in this way to cause a reactor power excursion large enough to severely damage the core.

Initiating Cue – ATWS conditions.

Measurable Performance - Inhibit ADS.

Performance Feedback - ADS inhibited white lights and alarm window.

Expected action - Place both ADS inhibit switches to inhibit.

**Critical Task 2 (CT-2): Control RPV injection per FSL-OR1 of 29.100.01 SH 1A.**

**Initial Conditions (a):**

Rx Power > 3% AND RPV Level > 0 inches AND Torus temp > 110°F AND DW press > 1.68 psig or SRV open

**Required Action (a):**

Lower injection to establish RPV water level at TAF or Rx Power < 3% or all SRV closed.

**Critical Task Statement (a):**

CT2a: During an ATWS with conditions met to deliberately inject to lower RPV water level to TAF, DELIBERATELY LOWER INJECTION to the RPV to lower RPV water level to TAF or Rx Power < 3% or all SRV closed.

**Initial Conditions (b):**

Rx Power > 11.3% AND RPV Level < 0 inches AND DW press > 1.68 psig or SRV open.

**Required Action (b):**

Inject to the RPV above Minimum Core Steam Flow Injection Rate (MCSFIR) of 3120 gpm but as low as practical to maintain Minimum Steam Cooling as indicated by 11.3% Rx power.

**Critical Task Statement(b):**

CT2b: During an ATWS with conditions met to inject to the RPV above Minimum Core Steam Flow Injection Rate, inject to the RPV at > 3120 gpm but as low as practical to maintain 11.3% Rx power.

**Bounding Criteria Basis:**

Given an ATWS condition, exceeding the HCL requires Emergency Depressurization per 29.100.01 SH 2 TWT-5. While the condition present in this scenario can result in exceeding the HCL, operator action in compliance with the EOPs will mitigate this and prevent the need for emergency depressurization. This Bounding Criterion uses the requirements of NUREG 1021 Appendix D Section D. Critical Task Methodology. Operation Management and Nuclear Training has reviewed the conditions in the ATWS scenario and found that a competent crew would not Emergency Depressurize and would mitigate the event by controlling RPV injection and inserting control rod.

Safety Significance and boundary conditions: Per BWROG EPGs/SAGs App B Vol II:

“All RPV injection except from boron injection systems, CRD, RCIC, and HPAC (HPAC is N/A for Fermi) is terminated and prevented to effect an immediate reduction in core inlet subcooling and achieve the target control band in the shortest possible time. Here, RPV water level is lowered to limit suppression pool heat up by reducing reactor power. A more controlled level reduction may be performed to facilitate stabilizing level within the applicable control band and avoid dropping below the MSCRWL.”

“A combination of high reactor power (above the APRM downscale trip setpoint), high suppression pool temperature (above the suppression pool temperature at which reactor scram is required), and an open SRV or high drywell pressure (above the scram setpoint), indicates that heat is being added to the suppression pool faster than it is being removed by suppression pool cooling. The resulting suppression pool heat up could result in loss of NPSH for pumps taking suction from the suppression pool, primary containment over pressurization, and ultimately loss of primary containment integrity. Loss of primary containment integrity, in turn, could lead to a loss of adequate core cooling and uncontrolled release of radioactivity to the environment. Prompt mitigation is required since, as long as the identified conditions exist, suppression pool heat up will continue and emergency RPV depressurization will be required when suppression pool temperature can no longer be maintained below the Heat Capacity Temperature Limit (HCTL).”

“The subsequent RPV water level control band is defined in EPG Step C5/L-3. The high end of the control band is dependent on the circumstances of the level reduction but the low end in all

cases is the Minimum Steam Cooling RPV Water Level (MSCRWL). Lowering RPV water level no farther than TAF provides sufficient margin to readjust injection to maintain level above the MSCRWL.”

NUREG 1021 App D – D.1.c Failure Criteria reasoning: Initial Conditions are met, and the crew exceeds Heat Capacity Temperature Limit as plotted on 29.100.01 SH6 HCL Curve.

Initiating Cue: As listed in INTIAL CONDITIONS.

Measurable Performance: Actions result in lowering RPV water level until level reaches required level and then maintain using available injection sources.

Feedback: RPV water level lowers to required level.

Expected action: Lower RPV level to required band.

### **Critical Task 3(CT-3) Insert ALL Control Rods $\leq$ 02**

#### **Initial Conditions:**

Reactor SCRAM required, reactor not shutdown.

Critical Task Statement:

CT-3: When directed by the EOPs, TAKE ACTION to insert ALL Control Rods  $\leq$  02.

#### **Bounding Criteria Basis:**

Given an ATWS condition, exceeding the HCL requires Emergency Depressurization per 29.100.01 HS 1A FLS-4. While the condition present in this scenario can result in exceeding the HCL, operator action in compliance with the EOPs will mitigate this and prevent emergency depressurization. This Bounding Criterion uses the requirements of NUREG 1021 Appendix D Section D. Critical Task Methodology. Operation Management and Nuclear Training has reviewed the conditions in the ATWS scenario and found that a competent crew would not Emergency Depressurize and would mitigate the event by controlling RPV injection and inserting control rod.

Safety Significance – The challenge to containment becomes the limiting factor that defines the requirement for reactor power reduction in an ATWS condition. Thus, reducing reactor power below 3% can preclude failure of containment or equipment necessary for the safe shutdown of the plant.

NUREG 1021 App D – D.1.c Failure Criteria reasoning: Candidate will fail if reactor power is NOT reduced sufficiently to prevent operation in the “DO NOT OPERATE IN THIS AREA” region of the HCL curve of 29.100.01 sheet 6.

Safety significant boundary conditions are defined by the BWROG EPGs/SAGs, appendix B, rev 3. This document identifies limiting primary containment heatup as the basis for reducing reactor power using boron, control rods, or lowering RPV water level. The scenario validation process provided assurance that the HCL curve will be violated if power is not sufficiently reduced.

Initiating Cue -- Reactor scram required and reactor not shutdown.

Measurable Performance -- Reduce reactor power using control rods.

Performance Feedback – Reactor Power is decreasing until below 3%.

Expected action - Insert control rods; while monitoring reactor power to ensure power is reduced <3%.

Op-Test No.: 2021-301 Scenario No.:3 Event No.:1 Page 1 of 2Event Description: Perform SDV Vent and Drain Valve Operability Test, Section 5.3 Only

Time	Position	Applicant's Actions or Behavior
T+0	SRO	<ul style="list-style-type: none"> <li>▪ Conducts brief for 24.106.04, Scram Discharge Volume Vent and Drain Valve Operability Test, Section 5.3 only</li> <li>▪ Direct RO to perform 24.106.04, Scram Discharge Volume Vent and Drain Valve Operability Test, Section 5.3 only</li> <li>▪ Acknowledge report of 24.106.04, Scram Discharge Volume Vent and Drain Valve Operability Test</li> </ul>
	ATC	<ul style="list-style-type: none"> <li>▪ Acknowledge direction to perform 24.106.04, Scram Discharge Volume Vent and Drain Valve Operability Test, Section 5.3 only</li> <li>▪ Verifies the following valves indicate full open: <ul style="list-style-type: none"> <li>▪ C1100-F010/F180, Scram Disch Vol Vent Vlv's</li> <li>▪ C1100-F011/F181, Scram Disch Vol Drain Vlv's</li> </ul> </li> <li>▪ Directs installation of the following jumpers in RR H11-P622: <ul style="list-style-type: none"> <li>• Terminals CC-66 to CC-87 (5.3.2.1)</li> <li>• Terminals CC-79 to CC-91 (5.3.2.1)</li> </ul> <p><b>ROLE PLAY as NO: When directed, wait 1 minute, trigger step for 5.3.2 and report directed action complete.</b></p> </li> <li>▪ Closes C1100-F180, Scram Disch Vol Vent Vlv, and C1100-F011, Scram Disch Vol Drain Vlv, by placing Scram Discharge Volume Isolation Normal/Test keylock switch in TEST, measure stroke time to nearest 1/10 second, then records time.</li> <li>▪ Returns Scram Discharge Volume Isolation Normal/Test keylock switch to NORMAL, and verify C1100-F180, Scram Disch Vol Vent Vlv, and C1100-F011, Scram Disch Vol Drain Vlv, opened.</li> <li>▪ Directs removal of the following jumpers in RR H11-P622: <ul style="list-style-type: none"> <li>• Terminals CC-66 to CC-87 (5.3.5.1)</li> <li>• Terminals CC-79 to CC-91 (5.3.5.2)</li> </ul> <p><b>ROLE PLAY as NO: When directed, wait 1 minute, trigger step for 5.3.5 and report directed action complete</b></p> </li> <li>▪ Directs installation of the following jumpers in RR H11-P622: <ul style="list-style-type: none"> <li>• Terminals CC-87 to CC-89 (5.3.6.1)</li> <li>• Terminals CC-66 to CC-79 (5.3.6.2)</li> </ul> <p><b>ROLE PLAY as NO: When directed, wait 1 minute, trigger step for 5.3.6 and report directed action complete.</b></p> </li> </ul>
	BOP	<ul style="list-style-type: none"> <li>▪ May assist with plant announcements and communications.</li> </ul>

Op-Test No.: 2021-301 Scenario No.:3 Event No.:1 Page 2 of 2Event Description: Perform SDV Vent and Drain Valve Operability Test, Section 5.3 Only

Time	Position	Applicant's Actions or Behavior
	SRO	<ul style="list-style-type: none"> <li>▪ Acknowledge report of 24.106.04, Scram Discharge Volume Vent and Drain Valve Operability Test</li> </ul>
	ATC	<ul style="list-style-type: none"> <li>▪ Close C1100-F010, Scram Disch Vol Vent Vlv, and C1100-F181, Scram Disch Vol Drain Vlv, by placing Scram Discharge Volume Isolation Normal/Test keylock switch in TEST, measure stroke time to nearest 1/10 second, then records time.</li> <li>▪ Returns Scram Discharge Volume Isolation Normal/Test keylock switch to NORMAL, and verify C1100-F010, Scram Disch Vol Vent Vlv, and C1100-F181, Scram Disch Vol Drain Vlv, opened.</li> <li>▪ Directs removal of the following jumpers in RR H11-P622: <ul style="list-style-type: none"> <li>▪ Terminals CC-87 to CC-89 (5.3.9.1)</li> <li>▪ Terminals CC-66 to CC-79 (5.3.9.2)</li> </ul> </li> <li>▪ <b>ROLE PLAY as NO: When directed, wait 1 minute, trigger step for 5.3.9 and report directed action complete.</b></li> <li>▪ Report status of 24.106.04, Scram Discharge Volume Vent and Drain Valve Operability Test to CRS</li> </ul>
	BOP	<ul style="list-style-type: none"> <li>▪ May assist with plant announcements and communications.</li> </ul>



Op-Test No.: 2021-301 Scenario No.:3 Event No.:2 Page 1 of 1

Event Description: Degrading Condition on the In Service North RRMG Set Lube Oil Pump (Fluctuating Amps & Intermittent Alarms), with Failure of the Standby Lube Oil Pump to Auto Start.

Time	Position	Applicant's Actions or Behavior
T+10	BOOTH	<ul style="list-style-type: none"> <li>▪ Trigger step to initiate noise on N. RRMG Lube Oil Pump A1.</li> <li>▪ Note: with no operator action the N. RRMG set will trip in 4 minutes</li> </ul>
	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 P603 to shift running N. RRMG Lube Oil Pumps.</li> <li>▪ Acknowledges report of pump shift is complete</li> </ul>
	ATC	<ul style="list-style-type: none"> <li>▪ Responds to 3D108, Recirc Sys A Fluid Drive Lube Oil Press Low, and 3D130, Recirc Sys A Circ Lube Oil Pump Auto Start.</li> <li>▪ Reports status of N RRMG LO system. Recommends shifting LO pumps using SOP.</li> <li>▪ May direct operator to N RRMG set to investigate.</li> </ul> <p><b>ROLE PLAY as NO: If called, wait 3 minutes report that the N. RRMG Lube Oil Pump A1 is making a loud rattling noise (if running).</b></p> <ul style="list-style-type: none"> <li>▪ Shifts N. RRMG LO Pumps IAW 23.138.01, Section 4.2:</li> <li>▪ Places the N. RRMG Lube Oil Pump A2 in RUN.</li> <li>▪ Places the N. RRMG Lube Oil Pump A1 in OFF/RESET.</li> <li>▪ Verifies the N. RRMG Lube Oil Pump A2 starts.</li> </ul> <p><b>ROLE PLAY as NO: If called, wait 30 seconds and report the good start of N. RRMG Lube Oil Pump A2.</b></p> <p><b>Note: The ATC may recommend leaving the A1 pump in OFF/RESET.</b></p> <ul style="list-style-type: none"> <li>▪ Places the N. RRMG Lube Oil Pump A1 in AUTO.</li> <li>▪ Contacts the RB Rounds to Verify Fluid Drive Bearing Oil Supply is 25 to 45 psig as indicated on B31-RA15A North RRMG Set Brg Oil Supply Pressure</li> </ul> <p><b>ROLE PLAY as NO: If called, wait 30 seconds and report the good start of N. RRMG Lube Oil Pump B2.</b></p> <p><b>ROLE PLAY as NO: If called, report local fluid drive bearing oil supply pressure is 36 psig on B31-RA15A North RRMG Set Brg Oil Supply Press Ind. (locally at RR MG Set gauge board).</b></p> <ul style="list-style-type: none"> <li>▪ Informs CRS that the pump shift is complete.</li> </ul>
	BOP	<ul style="list-style-type: none"> <li>▪ May assist with plant announcements and communications.</li> </ul>

Op-Test No.: 2021-301 Scenario No.:3 Event No.:3 Page 1 of 2  
 Event Description: #3 TCV Unitized Actuator Fault (Oil Pump Degrading Results in Low System Pressure (< 1200 psig)). ~~Reduce Power < 91.5%~~ / Lock Close #3 TCV / Reset Half Scram.

Time	Position	Applicant's Actions or Behavior
T+17	BOOTH	<ul style="list-style-type: none"> <li>Trigger Step to provide indications for degrading oil pump on #3 HPCV UA.</li> </ul>
	SRO	<ul style="list-style-type: none"> <li>Acknowledges report #3 HPCV Unitized Actuator low oil level</li> <li>Brief Crew per ODE-3</li> <li><del>Directs power reduction to &lt;91.5% per SOP 23.109 for closing #3 HPCV.</del></li> <li><del>Monitors power reduction to &lt;91.5%.</del></li> <li>Plant announcement of power reduction.</li> <li>Directs lockdown of #3 HPCV.</li> </ul>
	ATC	<ul style="list-style-type: none"> <li><del>When directed adjusts speeds of RRMG Sets to lower power &lt;91.5%, IAW 23.138.01:</del></li> <li><del>Adjust North (South) RR MG Set speed using B31-R621A (B), N (S) RR MG Set Speed Controllers, as follows:</del></li> <li><del>Verifies B31-R621A (B), N (S) RR MG Set Speed Controllers, in AUTO.</del></li> <li><del>Adjust setpoint (SP) of B31-R621A (B), N (S) RR MG Set Speed Controllers to desired speed.</del></li> <li><del>Adjusts RR MG Set speeds, to match Recirculation Loop Jet Pump flows on B21-R611A and B.</del></li> <li><del>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.</del></li> <li><del>Informs CRS when power is &lt;91.5%.</del></li> <li><del>Verifies position on the P/F map.</del></li> <li><del>May request rounds operator monitor Recirc oil temperatures.</del></li> <li><b>ROLE PLAY as NO: If directed to check/adjust RRMG oil temps, acknowledge report. If needed adjust RRMG oil temps 110-130F (P42RF0030/31)</b></li> </ul>
	BOP	<ul style="list-style-type: none"> <li>Responds to 4D2, Unitized Actuator Throttle Vlv Fault.</li> <li>Recognizes Low pressure condition from backlight indications.</li> <li>Directs operator to investigate #3 HPCV Unitized Actuator.</li> <li><b>ROLE PLAY as NO: When dispatched to UA, wait ~3 min. Report UA is running but does not sound normal. If asked pressure indication in the cabinet is 1000 psi and slowly lowering.</b></li> <li>Reports indications and ARP actions to CRS.</li> <li>Acknowledges report from field relays information to CRS and recommends closing valve IAW 23.109 (per ARP 4D2).</li> </ul>

Op-Test No.: 2021-301 Scenario No.:3 Event No.:3 Page 2 of 2

Event Description: #3 TCV Unitized Actuator Fault (Oil Pump Degrading Results in Low System Pressure (< 1200 psig)). ~~Reduce Power < 91.5%~~ / Lock Close #3 TCV / Reset Half Scram.

Time	Position	Applicant's Actions or Behavior
	BOP	<ul style="list-style-type: none"> <li>▪ When directed Performs #3 HPCV UA lockdown per 23.109:               <p><b>ROLE PLAY as NO: If directed to check Scram Solenoids with thermal imager wait 5 minutes and report that all Scram Solenoids appear to be energized.</b></p> <ul style="list-style-type: none"> <li>• Directs rounds operator to check pre-charge pressures.</li> <li>• Raise/Verifies Reactor Flow Limiter is set at 115% or greater</li> <li>• Raise Load Demand till it stops rising with Speed/Load raise push-button.</li> <li>• Raise/Verifies Turbine Flow Limit to 100%.</li> <li>• Place Steam Valve On Load Test Mode Select switch to 10%</li> <li>• Depress SELECT Pushbutton for #3 HPCV.</li> <li>• Open N3039-F614, HP Turb Loop C Line Drain Valve.</li> <li>• Depress VALVE TEST pushbutton.</li> <li>• Depress TRIP SOLENOID A and TRIP SOLENOID B pushbuttons.</li> <li>• Depress CANCEL TEST pushbutton</li> </ul> </li> <li>▪ Perform #3 HPCV UA shutdown per 23.110.               <ul style="list-style-type: none"> <li>• Place UA to be shutdown in OFF.</li> </ul> <p><b>ROLE PLAY as NO: If asked report pressure is reading 890 psi for #3 HPCV Unitized Actuator.</b></p> <ul style="list-style-type: none"> <li>• Directs rounds operator to close TBCCW Valve for shutdown UA (P4300-F091G).</li> </ul> <p><b>ROLE PLAY as NO: When directed, wait ~2 min and report TBCCW valve to #3 HPCV Unitized Actuator closed (P4300-F091G).</b></p> <ul style="list-style-type: none"> <li>• Depress Select/locked Closed pushbutton.</li> <li>• Depress VALVE TEST pushbutton.</li> <li>• Depress TRIP RESET pushbutton.</li> </ul> </li> </ul>
	ATC	<ul style="list-style-type: none"> <li>• Reset Half scram by cycling reset</li> </ul>

Time	Position	Applicant's Actions or Behavior
Op-Test No.: <u>2021-301</u> Scenario No.: <u>3</u> Event No.: <u>4</u> Page <u>1</u> of <u>1</u> Event Description: <u>RWCU Leak with Auto Isolation Failure (Manual Isolation Successful).</u>		
T+67	BOOTH	<ul style="list-style-type: none"> <li>▪ Trigger step for RWCU leak.</li> </ul>
	SRO	<ul style="list-style-type: none"> <li>▪ Acknowledges RWCU status.</li> <li>▪ Acknowledges RWCU isolation failure and manual isolation.</li> <li>▪ Enters 20.707.01, Loss Of RWCU</li> <li>▪ Per 20.707.01 Condition E. Direct STA/SNE insert a substitute value of 0 for IPCS Point G33CF6004 [RWCU Inlet Flow (NSSS)].</li> <li>▪ Evaluate TS</li> </ul> <p><b>TS 3.3.6.1 Primary Containment Isolation Instrumentation</b></p> <p><b>CONDITION A.1 Place channel in trip (Table 3.3.6.1-1, Function 5.a)</b></p> <p><b>COMPLETION TIME 24 hours.</b></p>
	ATC	<ul style="list-style-type: none"> <li>▪ May assist with communications.</li> </ul>
	BOP	<ul style="list-style-type: none"> <li>▪ Responds to 2D115, RWCU DIFF Flow High</li> <li>▪ Verify G33-R800, RWCU Sys Diff Flow Ind, is greater than 55 gpm.</li> <li>▪ Reports status to CRS</li> <li>▪ Notes RWCU does not isolate after 44 seconds, an informs CRS</li> <li>▪ Isolates RWCU: <ul style="list-style-type: none"> <li>• Closes G3352-F001, RWCU Supply Inbd Iso Vlv</li> <li>• Closes G3352-F004, RWCU Supply Otbd Iso Vlv, closes.</li> <li>• Closes G3352-F220, RWCU To FW Otbd Cntm Iso Vlv, closes.</li> <li>• Places G3303-C001A/B, North and South RWCU Recirc Pumps A/B to OFF-RESET</li> </ul> </li> <li>▪ May direct field operator to walkdown RWCU filter demineralizer panel and review RWCU room cameras.</li> </ul> <p><b>ROLEPLAY as NO: When directed wait 5 minutes and report RWCU filter demineralizer are in lockout and nothing abnormal on cameras.</b></p> <ul style="list-style-type: none"> <li>▪ May direct field operator to walkdown RWCU temperatures in the Relay Room.</li> </ul> <p><b>ROLEPLAY as NO: When directed wait 5 minutes and report no abnormal temperatures.</b></p>

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Event Description: Turbine First Stage Pressure Instrument Failure (C71-N052A); Trip Unit C71-N652A Output Signal Downscale and Auto Bypass of Channel A1.

Time	Position	Applicant's Actions or Behavior
T+X	BOOTH	<ul style="list-style-type: none"> <li>▪ Trigger step to fail C71-N052A downscale.</li> </ul>
	SRO	<ul style="list-style-type: none"> <li>▪ Acknowledges report of 3D91, Turbine Stop/Cont Val Channel Trip By-Passed.</li> <li>▪ Reviews 23.601, Instrument Trip Sheets.</li> <li>▪ Evaluate TS</li> </ul> <p><b>TS 3.3.1.1 Reactor Protection System (RPS) Instrumentation.</b></p> <p><b>CONDITION A.1 Place channel in trip (Table 3.3.1.1-1, Functions 9 and 10)</b></p> <p><b>COMPLETION TIME 12 hours.</b></p> <p><b>- OR -</b></p> <p><b>CONDITION A.2 Place associate trip system in trip (Table 3.3.1.1-1, Functions 9 and 10)</b></p> <p><b>COMPLETION TIME 12 hours.</b></p>
	ATC	<ul style="list-style-type: none"> <li>▪ Responds to 3D91, Turbine Stop/Cont Val Channel Trip By-Passed and reports to CRS.</li> <li>▪ Direct an operator to investigate the failure at Testability.</li> </ul> <p><b>ROLE PLAY as RO: When directed, wait about 3 minutes, and report that C71-N652A downscale with red trip light on.</b></p> <ul style="list-style-type: none"> <li>▪ Reviews 23.601, Instrument Trip Sheets.</li> <li>▪ Acknowledges report from operator to investigate the failure at Testability and communicates results to CRS.</li> </ul>
	BOP	<ul style="list-style-type: none"> <li>▪ May assist with communications.</li> </ul>

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Event Description: <u>South Heater Drain Pump Trip with Failure of Manual Runback Pushbutton to Lower Power.</u>							
Time	Position	Applicant's Actions or Behavior					
<u>T+65</u>	<u>BOOTH</u>	<ul style="list-style-type: none"> <li>▪— <u>Trigger step to trip S. HDP.</u></li> </ul>					
	<u>SRO</u>	<ul style="list-style-type: none"> <li>▪— <u>Acknowledge report of trip of S. HDP.</u></li> <li>▪— <u>Acknowledge report of failure of RECIRC MANUAL RUNBACK.</u></li> <li>▪— <u>Enters AOP 20.107.01 Loss of Feedwater or Feedwater Control</u></li> </ul>					
	<u>ATC</u>	<ul style="list-style-type: none"> <li>▪— <u>Monitors Reactor Power, Pressure and PRV level and reports status to CRS.</u></li> <li>▪— <u>Per 20.107.01, Immediate Actions IE. Reactor Power &gt; 85% AND Loss of one or more HDPs pumping forward:</u></li> <li>▪— <u>Performs Rapid Power Reduction by depressing and releasing the RECIRC MANUAL RUNBACK pushbutton</u></li> <li>▪— <u>Observes failure of RECIRC MANUAL RUNBACK and reports status to CRS.</u></li> <li>▪— <u>Notifies CRS of lowering flow using SOP.</u></li> </ul>					
	<u>BOP</u>	<ul style="list-style-type: none"> <li>▪— <u>Responds to alarms:</u></li> <li>▪— <u>5D085, Loss Of Heater Drains.</u></li> <li>▪— <u>5D077, Feedwater Heater 5S Level High / Low.</u></li> <li>▪— <u>5D144, Motor Trip</u></li> <li>▪— <u>Identify trip of S. HDP, provided crew update on loss of S. HDP and report status to CRS.</u></li> <li>▪— <u>Directs operator to walkdown S. HDP breaker (64D-6D) and pump in S. HDP room</u></li> </ul>					

Op-Test No.: 2021-301Scenario No.:3Event No.:6Page 2 of 3Event Description: South Heater Drain Pump Trip with Failure of Manual Runback Pushbutton to Lower Power.

Time	Position	Applicant's Actions or Behavior
	SRO	<ul style="list-style-type: none"> <li>▪— Acknowledge report of failure of lowering flow using SOP</li> <li>▪— Acknowledge report of P/F and recommendation to insert CRAM array.</li> <li>▪— Directs inserting CRAM Array.</li> <li>▪— Acknowledge report of P/F and CRAM array.</li> </ul>
	BOP	<ul style="list-style-type: none"> <li>▪— Lowers power using flow per 23.138.01:</li> <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> <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>▪— Monitors P/F map and notes the parameters place the reactor at edge of the Stability Awareness Region/Exit Region and recommends inserting the CRAM Array to CRS.</li> <li>▪— When directed Inserts CRAM Array as directed Per 23.623 Section 9.7 <ul style="list-style-type: none"> <li>•— Place or verify Rod Select Power switch in ON.</li> <li>•— Select Rods as needed on the rod selection matrix.</li> <li>•— Using the Rod Movement Control Switch insert the rods by selecting IN.</li> <li>•— Using the Cram Array book, check that all Red Cram rods are fully inserted and continue fully inserting Cram Array control rods using the Cram Array book until the desired power level is achieved.</li> <li>•— When Rod movements are completed, place Rod Select Power switch in OFF.</li> </ul> </li> <li>▪— Notifies the Station Nuclear Engineer (SNE) <p style="margin-left: 20px;"><b>ROLEPLAY as SNE: Acknowledge report of lowering power and inserting CRAM array as necessary.</b></p> </li> <li>▪— Reports CRAM Array status and P/F status to CRS.</li> </ul>

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Event Description: ~~South Heater Drain Pump Trip with Failure of Manual Runback Pushbutton to Lower Power.~~

Time	Position	Applicant's Actions or Behavior
	SRO	<ul style="list-style-type: none"> <li><del>*—Directs 20.107.01 Condition L.</del></li> <li><del>*—Directs Monitoring for Neutron Flux Instability using 24.000.01 Attachment 34b.</del></li> </ul>
	ATC	<ul style="list-style-type: none"> <li><del>*—Monitor for Neutron Flux Instability using 24.000.01 Attachment 34b:</del></li> <li><del>*—Place or verify Rod Select Power switch in ON.</del></li> <li><del>*—Monitor for Neutron Flux Instability using APRMs and LPRM outputs on RBM ODAs by sequentially selecting the following rods: 30-27, 30-43, 42-43, 42-27, 42-15, 30-15, 14-15, 14-27, and 14-43.</del></li> <li><del>*—Reports status of P/F after CRAM array insertion to CRS.</del></li> </ul>
	BOP	<ul style="list-style-type: none"> <li><del>*—Acknowledge direction to perform 20.107.01 Condition L:</del></li> <li><del>*—Directs Chemistry to perform required sampling for power change.</del></li> <li><del>*—Contacts Radiation Protection and reports power change.</del></li> <li><del>*—Reports 20.107.01 Condition L complete to CRS</del></li> </ul>



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Event Description: Neutron Flux Instabilities / Hydraulic ATWS / SLC Common Discharge Header Rupture. (CT-1) (CT-3) Main Turbine Trip / Bypass Valves Fail Close While Lowering Level. Restore and Maintain RPV Level -OR- RPV injection per FSL-OR1. (CT-2) RHRSW Pump Trip (C or D). Throttle F068A/B for Single Pump Flow and RHRHX Vibration Limits

Time	Position	Applicant's Actions or Behavior
T+0	BOOTH	<ul style="list-style-type: none"> <li>▪ Trigger step to initiate Neutron Flux Instabilities.</li> <li>▪ <b>ROLE PLAY: IF dispatched to install EOP defeats, use the following process: Wait 10 minutes for each ESP, Trigger Step for 29.ESP.XX as requested, THEN call the control room and report, "Defeats for 29ESPxx are installed"</b></li> </ul>
	SRO	<ul style="list-style-type: none"> <li>▪ Acknowledge report of Failure to Scram and Reactor Power.</li> <li>▪ Directs ATWS actions.</li> <li>▪ Announces Failure to Scram over Hi-Com.</li> <li>▪ Enters 29.100.01 SH1, RPV Control on Failure to Scram.</li> </ul>
	ATC	<ul style="list-style-type: none"> <li>▪ Recognizes hydraulic instabilities, informs CRS and places Mode Switch in Shutdown.</li> <li>▪ Recognizes Failure to Scram and attempts manual scram push buttons.</li> <li>▪ Reports Failure to Scram to CRS.</li> <li>▪ Acknowledges ATWS Actions order.</li> <li>▪ Starts SLC Pump.</li> <li>▪ Verify SLC system parameters and determines SLC is not injecting.</li> <li>▪ Start alternate SLC pump.</li> <li>▪ Notes alternate pump not injecting and reports system status to CRS.</li> <li>▪ <b><u>Inhibits ADS prior to ADS actuation (CT-1)</u></b> and reports ADS inhibited to CRS</li> <li>▪ Orders out 29.ESP.11</li> <li>▪ RPV will be below 114 inches at this point so further actions not required.</li> </ul>
	BOP	<ul style="list-style-type: none"> <li>▪ Acknowledges ATWS Actions order.</li> <li>▪ Performs ATWS ACTIONS (Hard Card):</li> <li>▪ <b><u>Places RFP controller in Manual and Lowers RFP Speed to STOP feed flow. (CT-2)</u></b> Note because RPS tripped; set point set down will pulse the RFP to restore feed before 114 inches.</li> <li>▪ WHEN RPV level &lt; 114 inches maintains RPV level in band per CRS using available system.</li> </ul>

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Event Description: Neutron Flux Instabilities / Hydraulic ATWS / SLC Common Discharge Header Rupture. (CT-1) (CT-3) Main Turbine Trip / Bypass Valves Fail Close While Lowering Level. Restore and Maintain RPV Level -OR- RPV injection per FSL-OR1. (CT-2) RHRSW Pump Trip (C or D). Throttle F068A/B for Single Pump Flow and RHRHX Vibration Limits

Time	Position	Applicant's Actions or Behavior
T+0	BOOTH	<p><b>ROLE PLAY: IF dispatched to install EOP defeats, use the following process: Wait 10 minutes for each ESP, Trigger Step for 29.ESP.XX as requested, THEN call the control room and report, "Defeats for 29ESPxx are installed"</b></p>
	SRO	<ul style="list-style-type: none"> <li>▪ Reports EP-101 flag SU6.1 and SU6.2 to SM.</li> <li>▪ Enters 29.100.01 SH 1A. (Crew Update)</li> <li>▪ Directs confirm Isolations and Actuators for Level.</li> <li>▪ Directs pressure band of 900-1050 psig.</li> <li>▪ May direct critical parameter monitoring.</li> <li>▪ Observes conditions met for FSL-OR1 and directs as required:               <ul style="list-style-type: none"> <li>• CONDITION:                   <ul style="list-style-type: none"> <li>○ Reactor power &gt; 3% AND RPV level &gt; 0 inches AND Torus Temp &gt; 110°F AND DW press &gt;1.68 PSIG or SRV open.</li> </ul> </li> <li>• DIRECTS:                   <ul style="list-style-type: none"> <li>○ Deliberately lower RPV water level by controlling injection until: Reactor Power &lt; 3% OR RPV level = 0 IN. OR All SRV remain closed and DW press &lt; 1.68 psig defeat interlocks if necessary.</li> </ul> </li> <li>• CONDITION:                   <ul style="list-style-type: none"> <li>○ Reactor power &gt; 11.3% AND RPV level &lt; 0 inches AND DW pres &gt;1.68 PSIG or SRV open.</li> </ul> </li> <li>• DIRECTS:                   <ul style="list-style-type: none"> <li>○ Restore and maintain RPV injection above MCSFIR but as low as practicable.</li> </ul> </li> </ul> </li> <li>▪ When no override condition of FSL-OR1 are met directs a RPV level band that will maintain desired conditions per FSL-3.               <p><b>Note: the RPV level band can vary. The band will be to maintain RPV level between -25 inches and the RPV level where power remains below 11.3 % Rx power</b></p> </li> <li>▪ May assign critical parameters to panel operators to monitor maintaining PRV and Reactor Power conditions.</li> </ul>
	ATC	<ul style="list-style-type: none"> <li>▪ Provides critical parameter reports as directed.</li> </ul>
	BOP	<ul style="list-style-type: none"> <li>▪ Acknowledges direction to control RPV level as directed by CRS.</li> <li>▪ Provides critical parameter reports as directed.</li> <li>▪ May order out 29.ESP defeats to restore or maintain feed sources.</li> </ul>

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Event Description: Neutron Flux Instabilities / Hydraulic ATWS / SLC Common Discharge Header Rupture. (CT-1) (CT-3) Main Turbine Trip / Bypass Valves Fail Close While Lowering Level. Restore and Maintain RPV Level -OR- RPV injection per FSL-OR1. (CT-2) RHRSW Pump Trip (C or D). Throttle F068A/B for Single Pump Flow and RHRHX Vibration Limits

Time	Position	Applicant's Actions or Behavior
T+0	BOOTH	<p><b>ROLE PLAY: IF dispatched to install EOP defeats, use the following process: Wait 10 minutes for each ESP, Trigger Step for 29.ESP.XX as requested, THEN call the control room and report, "Defeats for 29ESPxx are installed"</b></p>
	SRO	<ul style="list-style-type: none"> <li>▪ Acknowledges reports on RPV level, Reactor Power, Feed Flow and compliance with directed overrides.</li> <li>▪ Acknowledges reports of critical parameters.</li> </ul>
	BOP	<ul style="list-style-type: none"> <li>▪ <b><u>When directed deliberately lower RPV water level by controlling injection until: Reactor Power &lt; 3% OR RPV level = 0 IN. OR All SRV remain closed and DW press &lt; 1.68 psig defeat interlocks if necessary. (CT-2)</u></b></li> <li>▪ <b><u>When directed injections to the RPV above Minimum Steam Cooling Injection Rate, inject to the RPV at &gt; 3120 gpm and as low as practical to maintain 11.3% Rx power. (CT2)</u></b></li> <li>▪ <b><u>As power lowers due to lower RPV water level and control rod insertion, injection to the RPV will be increased to maintain 11.3% Rx power (CT2)</u></b></li> </ul> <p>Note: this will cause RPV level to slowly rise.</p>

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Event Description: Neutron Flux Instabilities / Hydraulic ATWS / SLC Common Discharge Header Rupture. (CT-1) (CT-3) Main Turbine Trip / Bypass Valves Fail Close While Lowering Level. Restore and Maintain RPV Level -OR- RPV injection per FSL-OR1. (CT-2) RHRSW Pump Trip (C or D). Throttle F068A/B for Single Pump Flow and RHRHX Vibration Limits

Time	Position	Applicant's Actions or Behavior
T+0	BOOTH	<b>ROLE PLAY: IF dispatched to install EOP defeats, use the following process: Wait 10 minutes for each ESP, Trigger Step for 29.ESP.XX as requested, THEN call the control room and report, "Defeats for 29ESPxx are installed"</b>
	SRO	<ul style="list-style-type: none"> <li>▪ Direct defeating logic trips (29.ESP.10) and insert rods per 29.ESP.03.</li> </ul>
	ATC	<ul style="list-style-type: none"> <li>▪ When &lt;3% pwr, provide update to CRS and then insert all SRMs and IRMs.</li> <li>▪ Give out the order to defeat logic trips 29.ESP.10, and 29.ESP.09.</li> <li>▪ Insert rods per 29.ESP.03 Section 3 by: (CT) <ul style="list-style-type: none"> <li>• Place C11-K612, CRD Flow Controller, in MANUAL.</li> <li>• Start both CRD pumps by placing CMC in RUN as needed.</li> <li>• As necessary, throttle C1152-F003, CRD Drive/Clg Water PCV, to maintain sufficient drive water D/P for rod motion.</li> <li>• As necessary, adjust C11-K612, CRD Flow Controller, to maintain sufficient drive water D/P for rod motion.</li> <li>• Place the Rod Worth Minimizer keylock switch in BYPASS.</li> </ul> </li> <li>▪ <b><u>Attempt to achieve a checkerboard control rod pattern using EMERGENCY IN as follows: (CT3)</u></b> <ul style="list-style-type: none"> <li>• Select and fully insert control rods in a spiral out from center pattern; other concurrent actions may preclude obtaining an actual checkerboard pattern.</li> <li>• Continue to fully insert all remaining control rods using EMERGENCY IN as follows: <ul style="list-style-type: none"> <li>○ Select and fully insert control rods in a spiral out pattern from the center.</li> </ul> </li> </ul> </li> </ul>

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Event Description: Neutron Flux Instabilities / Hydraulic ATWS / SLC Common Discharge Header Rupture. (CT-1) (CT-3) Main Turbine Trip / Bypass Valves Fail Close While Lowering Level. Restore and Maintain RPV Level -OR- RPV injection per FSL-OR1. (CT-2) RHRSW Pump Trip (C or D). Throttle F068A/B for Single Pump Flow and RHRHX Vibration Limits

Time	Position	Applicant's Actions or Behavior
T+0	BOOTH	<b>ROLE PLAY: IF dispatched to install EOP defeats, use the following process: Wait 10 minutes for each ESP, Trigger Step for 29.ESP.XX as requested, THEN call the control room and report, "Defeats for 29ESPxx are installed"</b>
	SRO	<ul style="list-style-type: none"> <li>▪ Acknowledge status of controls rods</li> </ul>
	ATC	<ul style="list-style-type: none"> <li>▪ When 29 ESP.10 and 29.ESP.09 have been completed:</li> <li>▪ Reset ARI as follows:</li> <li>▪ Depress ATWS ARI/RPT Div I(II) RESET pushbuttons.</li> <li>▪ Verify ARI is reset.</li> <li>▪ Place C7100-M604, Scram Disch Vol Hi H2O Lvl Byp switch, in BYPASS.</li> <li>▪ Cycle C7100-M605, Scram Reset Switch, to both positions (GP 1/4, GP 2/3) and release.</li> <li>▪ Verify Trip System A and B blue Pilot Scram Valve Solenoid lights are ON.</li> <li>▪ Verify the SDV vent and drain valves are open.</li> <li>▪ Allow the scram discharge volume to drain</li> <li>▪ Depress the four manual scram pushbuttons.</li> <li>▪ <b><u>Arm and depress the four ATWS ARI/RPT manual initiation pushbuttons prior to exceeding HCL. (CT-3)</u></b></li> <li>▪ When control rods moved inward, report status to CRS and repeat steps.</li> <li>▪ Note: All rods will insert on first RESET-SCRAM-ARI</li> </ul>

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Event Description: Neutron Flux Instabilities / Hydraulic ATWS / SLC Common Discharge Header Rupture. (CT-1) (CT-3) Main Turbine Trip / Bypass Valves Fail Close While Lowering Level. Restore and Maintain RPV Level -OR- RPV injection per FSL-OR1. (CT-2) RHRSW Pump Trip (C or D). Throttle F068A/B for Single Pump Flow and RHRHX Vibration Limits

Time	Position	Applicant's Actions or Behavior
T+0	SRO	<ul style="list-style-type: none"> <li>▪ Enters 29.100.01, Sheet 2 on High TWT and High TWL. (Crew Update)</li> <li>▪ Enters 29.100.01, Sheet 2 on High DWT. (Crew Update)</li> <li>▪ Directs the following from EOP SH2 PC Control, TWT Leg:               <ul style="list-style-type: none"> <li>• Placing ALL available RHR in Torus Cooling and maximizing cooling.</li> </ul> </li> <li>▪ Directs the following from EOP SH2 PC Control, DWT Leg:               <ul style="list-style-type: none"> <li>• Operate ALL available DW cooling IAW 23.415.</li> </ul> </li> <li>▪ Directs the following from EOP SH2 PC Control, TWL Leg:               <ul style="list-style-type: none"> <li>• Lowering TWL IAW 23.144 and 29.ESP.21.</li> <li>• Terminating injection from outside sources.</li> </ul> </li> </ul>
	ATC	<ul style="list-style-type: none"> <li>▪ Coordinates with CRLNO for level recovery.</li> </ul>
	BOP	<ul style="list-style-type: none"> <li>▪ Recognize and report EOP entry conditions on High TWL and High TWT.</li> <li>▪ Recognize and report EOP entry condition on High DWT.</li> <li>▪ Restart all Drywell Cooling Fans as directed.</li> <li>▪ Monitor and report lowering DWT.</li> <li>▪ Orders out 29.ESP.21</li> <li>▪ Terminates injection from outside sources.</li> </ul>

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Event Description: Neutron Flux Instabilities / Hydraulic ATWS / SLC Common Discharge Header Rupture. (CT-1) (CT-3) Main Turbine Trip / Bypass Valves Fail Close While Lowering Level. Restore and Maintain RPV Level -OR- RPV injection per FSL-OR1. (CT-2) RHRSW Pump Trip (C or D). Throttle F068A/B for Single Pump Flow and RHRHX Vibration Limits

Time	Position	Applicant's Actions or Behavior
T+0	SRO	<ul style="list-style-type: none"> <li>▪ Provides override to secure Torus Sprays when Torus Sprays are in progress.</li> <li>▪ Acknowledge status of RHR.</li> </ul>
	BOP	<ul style="list-style-type: none"> <li>▪ Places Div 1 RHR in Torus Cooling Mode:</li> <li>▪ May contact RB Rounds for pump start and makes Hi-Com announcement.</li> <li>▪ Places E1150-F028A Keylock in OPERATE and opens E1150-F028A.</li> <li>▪ Starts E1102-C002A (C) Div 1 RHR Pump A (C).</li> <li>▪ Opens E1150-F024A.</li> <li>▪ Starts RHRSW:</li> <li>▪ Depresses E1150-F068A OPEN for 5 seconds.</li> <li>▪ Starts an RHRSW Pump.</li> <li>▪ Throttles open E1150-F068A to 5600-6500 gpm.</li> <li>▪ Starts second RHRSW Pump.</li> <li>▪ Fully opens E1150-F068A.</li> <li>▪ If first division used, notes TRIP of RHRSW pump C.</li> <li>▪ Closes and then throttles open E1150-F068A to achieve 5400-6300 gpm</li> <li>▪ Places RHR in Torus Spray Mode:</li> <li>▪ Open E1150-F027A, Div 1 RHR Torus Spray Iso.</li> <li>▪ Acknowledges override to secure Torus Sprays, monitors Torus Pressure.</li> <li>▪ Closes E1150-F048A Div 1 RHR HX Bypass Vlv</li> <li>▪ Report maximized cooling on DIV 1 RHR</li> </ul>

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Event Description: Neutron Flux Instabilities / Hydraulic ATWS / SLC Common Discharge Header Rupture. (CT-1) (CT-3) Main Turbine Trip / Bypass Valves Fail Close While Lowering Level. Restore and Maintain RPV Level -OR- RPV injection per FSL-OR1. (CT-2) RHRSW Pump Trip (C or D). Throttle F068A/B for Single Pump Flow and RHRHX Vibration Limits.

Time	Position	Applicant's Actions or Behavior
T+0	SRO	<ul style="list-style-type: none"> <li>▪ Provides override to secure Torus Sprays when Torus Sprays are in progress.</li> <li>▪ Acknowledge status of RHR.</li> </ul>
	BOP	<ul style="list-style-type: none"> <li>▪ Places Div 2 RHR in Torus Cooling Mode:</li> <li>▪ May contact RB Rounds for pump start and makes Hi-Com announcement.</li> <li>▪ Places E1150-F028B Keylock in OPERATE and opens E1150-F028B.</li> <li>▪ Starts E1102-C002B (D) Div 2 RHR Pump B (D).</li> <li>▪ Opens E1150-F024B.</li> <li>▪ Starts RHRSW:</li> <li>▪ Depresses E1150-F068B OPEN for 5 seconds.</li> <li>▪ Starts an RHRSW Pump.</li> <li>▪ Throttles open E1150-F068B to 5600-6500 gpm.</li> <li>▪ Starts second RHRSW Pump.</li> <li>▪ Fully opens E1150-F068B.</li> <li>▪ If first division used, notes TRIP of RHRSW pump D.</li> <li>▪ Closes and then throttles open E1150-F068B to achieve 5400-6300 gpm</li> <li>▪ Places RHR in Torus Spray Mode:</li> <li>▪ Open E1150-F027B, Div 2 RHR Torus Spray Iso.</li> <li>▪ Acknowledges override to secure Torus Sprays, monitors Torus Pressure.</li> <li>▪ Closes E1150-F048B Div 2 RHR HX Bypass Vlv</li> <li>▪ Report maximized cooling on DIV 2 RHR</li> </ul>
	EXAMINER	<p><b>The scenario may be terminated once all rods have been fully inserted, EOP 29.100.01 SH 1A is exited, EOP 29.100.01 SH 1 entered, and RPV water level is in the process of being restored 173 IN and 214 IN.</b></p>