Facility: Fermi 2 Scenario No.: SCN #1 Op-Test No: ILO-2020-1 Examiners: See Attached Exam Matrix

Operators: See Attached Exam Matrix

Initial Conditions: MODE 2 at ~3-4% CTP. RPV pressure is 350 psig.

Turnover: The plant is in MODE 2 at ~3-4% CTP during a startup. RPV pressure is 350 psig. Plans for the shift are to re-commence power ascension by increasing pressure. The GOP directs the startup of a Reactor Feedwater Pump. Another group of operators is preparing to start the North Reactor Feed Pump. The STA is plotting HUR. The ATC will make all power adjustments with rods and the pressure regulator. The STA has reviewed the steam tables, and the crew can raise reactor pressure to 855# and not violate the 90°F limit. The crew is to FIRST raise Reactor Pressure by closing the bypass valves using the pressure regulator and then recommence control rod withdrawal. A severe wind advisory is in effect for Monroe county.

Critical Tasks: RPV-LOCA(CT1), PC-TWL-ISO(CT2),

Event No.	Malf No.	Event Type*	Event Description
1		R (ATC) R (SRO)	Raise Rx Power per GOP with control rods
		N (BOP) N (SRO)	Raise Rx Pressure per GOP
2	C51MF0010	I (ATC) I (SRO)	IRM B Upscale Failure (value = 130). ATC bypasses IRM B. ATC resets half scram. SRO evaluates LCO 3.3.1.1. (Tracking)
3	C11MF0469	C (ATC) C (SRO) TS	A control rod drift alarm will actuate, and rod 26-31 will drift into the core. The crew will perform the Control Rod Drift AOP and disarm the control rod at position “00” and evaluate Technical Specifications 3.1.3.
4	TA03T4100C005_MTFSHEAR	C (BOP) C (SRO) TS	High winds cause Reactor Building HVAC Center exhaust fan to fail. CRS will evaluate TS.
5	B31MF0066 C97MF1087 C93FR0001	M (All)	A seismic event causes a small LOCA.
6	P603_A048_4	C (ATC) C (SRO)	Mode Sw Fail - Manual Scram Push buttons insert SCRAM
7	N20MF0018 N20MF0019 N20MF0020	C (BOP) C (SRO)	Loss of Condensate - RPV-LOCA(CT1)
8	E11MF0047	M (All)	Torus Leak - on Low Pressure Feed source. Operators Isolate feed source and establish new feed source. PC-TWL-ISO(CT2)
9	G51RF0016	C (BOP) C (SRO)	TWMS Isolation failure.

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

A. NARRATIVE SUMMARY

MODE 2 at ~3-4% CTP. RPV pressure is 350 psig.

The plant is in MODE 2 at ~3-4% CTP during a startup. RPV pressure is 350 psig. Plans for the shift are to recommence power ascension by increasing pressure. The GOP directs the startup of a Reactor Feedwater Pump. Another group of operators is preparing to start the North Reactor Feed Pump.

The STA is plotting HUR. The ATC will make all power adjustments with rods and the pressure regulator. The STA has reviewed the steam tables, and the crew can raise reactor pressure to 855# and not violate the 90°F limit. The crew is to FIRST raise Reactor Pressure by closing the bypass valves using the pressure regulator and then recommence control rod withdrawal.

A severe wind advisory is in effect for Monroe county.

Event: 1

Per GOP 22.000.02, Plant Startup To 25% Power, the crew will use the pressure regulator to increase reactor pressure.

Event: 2

IRM B will fail Upscale, causing half scram. IRM B will be bypassed, and the half scram reset. The CRS will evaluate LCO 3.3.1.1. (Tracking)

Event: 3

A control rod drift alarm will actuate, and rod 26-31 will drift into the core. The rod will stop drifting before full insertion if the crew does not take the required actions to insert the control rod completely. The crew will perform the Control Rod Drift AOP and disarm the control rod at position “00” and evaluate Technical Specifications 3.1.3.

Event: 4

High winds cause Reactor Building HVAC Center exhaust fan to fail; this will require the crew to trip the center train of RBHVAC and start another train of RBHVAC or SGTS. The CRS will evaluate TS.

Event: 5 to 9

Following an earthquake, a LOCA occurs, requiring placing the MODE S/W in shutdown. The MODE S/W will fail; however, the Manual Scram Pushbuttons will insert a scram. Condensate will then trip and be unavailable to maintain RPV level, and SBFW will not inject. Due to the LOCA pressure will lower in the RPV and the low-pressure system will inject. The operators must control these systems to prevent overfeeding the RPV. Once RPV level is controlled and maintained by a single low-pressure system, a leak from the Torus will occur. A High Torus Room Sump Level causes both sumps pumps to run, which is an EOP entry condition. The High Torus Room Sump Level will generate an isolation signal on the Torus Water Management System (TWMS). However, the TWMS system will fail to isolate, requiring manual operator action. The operators will implement a leak isolation strategy; the leak will isolate when the single low-pressure system that is maintaining RPV level is isolated. The operators will then maintain RPV level using a different low-pressure system.

B. SCENARIO OBJECTIVE

1. Given conditions in the simulator that require entry into 29.100.01 Sheet 5, Secondary Containment Control, control the plant per 29.100.01 Sheet 5, Secondary Containment Control and ODE-10 EOP Expectations.
2. Given conditions in the simulator that require entry into 29.100.01 Sheet 2, PC Control, control the plant per 29.100.01 Sheet 2, PC Control and ODE-10 EOP Expectations.
3. Given conditions in the simulator that require entry into 29.100.01 Sheet 1, RPV Control, control the plant per 29.100.01 Sheet 1, RPV Control and ODE-10 EOP Expectations.
4. Given conditions in the simulator that include and leak from the Torus, control the plant per the required EOP actions and ODE-10 Emergency Operating Procedure Expectations.
5. Given conditions in the simulator that includes a control rod drift, act to control the plant per applicable alarm response procedures and 20.106.07, Control Rod Drift.
6. Given conditions in the simulator that include INOP control rod, implement Technical Specifications per the Fermi 2 Operating License and ODE-12 LCOs.
7. Given conditions in the simulator that include a component failure in RBHVAC, control the plant per applicable alarm response procedures and 23.426, Reactor Building Heating Ventilation And Air Conditioning.
8. Given conditions in the simulator that include a component failure, implement Technical Specifications per the Fermi 2 Operating License and ODE-12 LCOs.
9. Given conditions in the simulator that includes direction to change reactor power during a startup, make adjustments to reactor power per 22.000.02, Plant Startup To 25% Power.

CRITICAL TASKS

RPV-LOCA(CT1) With RPV level lowering and RPV pressure lowering and approaching injection pressure for CS and LPCI pumps, MAINTAIN RPV WATER LEVEL ABOVE TAF, by INJECTING with all available system(s) AND prevent injection from CS and LPCI pumps not required for ACC such that RPV LEVEL DOES NOT REACH 279 INCHES (Main Steam Lines) at any time during the scenario.

NUREG 1021 App D BASIS:

Safety Significance – Controlling RPV level above TAF assures adequate core cooling exists, precluding fuel damage. Controlling level below the main steam lines ensures main steam line piping remains intact, precluding additional coolant inventory loss, and potential release outside primary containment.

Safety significant boundary conditions are defined by BWROG EPG rev 3. Top of active fuel and the main steam lines are bounding levels with significant impact to reactor safety. RPV level dropping below TAF can result in core damage. RPV water level above the main steam lines can result in damage to system piping and subsequent additional loss of coolant, and potential release of radioactive material outside primary containment.

NUREG 1021 App D – D.1.c Failure Criteria reasoning: Candidate will fail if RPV water level drops below TAF or rises above than the main steam lines.

Initiating Cue - RPV is lowering and a high drywell pressure ECCS initiation signal exist.
Measurable Performance - RPV level is controlled within the prescribed control band.
Performance Feedback - RPV level indication is within band.
Expected action – Operate available injection systems in accordance with station procedures to control RPV water level within the prescribed band

PC-TWL-ISO(CT2) With suppression pool water level lowering due to an isolable leak from the suppression pool AND a LOCA, isolate the leak before suppression pool water level, reaches -38 inches.

NUREG 1021 App D BASIS:

Safety Significance and Boundary conditions -Per BWROG EPG/SAG App B Vol II, rev 4.6:
"Suppression pool water level must be maintained above the elevation of the Mark I/II downcomer vent openings. If suppression pool water level cannot be maintained above the specified minimum value, steam may not be adequately condensed, and primary containment pressure could exceed allowable limits. "

Therefore, with suppression pool level lowering, and a LOCA not isolating the suppression pool leak before uncovering the downcomer openings will result in a loss of the Pressure Suppression Function of containment and DIRECT pressurization of the air space above the suppression pool.

NUREG 1021 App D – D.1.c Failure Criteria reasoning: Candidate will fail if Torus water level is -38 inches or lower.

Initiating Cue - Suppression pool level is lowering.

Measurable Performance Standard -The Torus Water Level (TWL) is higher than -38 inches.

Performance Feedback - TWL is stable or increasing.

Expected action - Crew will isolate the leak before -38 inches TWL.

Op-Test No.: 2020-1	Scenario No.: SCN #1	Event No.: 1	Page 1 of 2
Event Description: Raise Rx Pressure per GOP			

Time	Position	Applicant's Actions or Behavior
T0+1 min.	BOOTH	**ROLE PLAY as STA: If directed report that the STA will plot the heat up and has reviewed the steam tables for our current pressure and the crew can raise pressure to 855# and not violate the 90°F limit.** **ROLE PLAY as Support Staff: Respond as directed.**
	SRO	☐ Conducts brief for power increase using Control Rods. ☐ Directs re-commence power increase by pulling Control Rods IAW 23.623 and adjusting the Reactor Pressure regulator to maintain bypass valve position between 15-30% open as required by the GOP. ☐ Directs BOP to monitor secondary plant parameters. ☐ Directs STA to perform Temperature/Pressure Monitoring IAW 22.000.05.
	ATC	☐ Acknowledge direction to re-commence power increase by pulling Control Rods IAW 23.623 and/or adjusting the Reactor Pressure regulator as required to maintain bypass valve position between 15-30% open. ☐ Adjusts or peer checks the Reactor Pressure regulator as required to maintain bypass valve position between 15-30% open as required by the GOP. Coordinates with Rod Movement Verifier and Reactivity Management SRO to pull Control Rods IAW 23.623: ☐ Places Rod Select Power switch in ON. ☐ From Rod Pull Sheet, selects rod to be withdrawn. ☐ Verifies the correct rod is selected with Rod Movement Verifier concurrence. ☐ While monitoring Nuclear Instrumentation moves selected rod to target position specified on the Rod Pull Sheet. ☐ Completes required information on Rod Pull Sheet. ☐ Repeats steps above for each rod movement. ☐ When rod movements are complete, places Rod Select Power in OFF.

Op-Test No.: 2020-1	Scenario No.: SCN #1	Event No.: 1	Page 2 of 2
Event Description: Raise Rx Pressure per GOP			

Time	Position	Applicant's Actions or Behavior
	BOOTH	**ROLE PLAY as Support Staff: Respond as directed.**
	BOP	☐ Acknowledge direction to monitor secondary plant parameters and peer check the ATC. ☐ Monitors secondary plant parameters during power ascension. ☐ If directed acknowledges direction to re-commence power increase by adjusting the Reactor Pressure regulator as required to maintain bypass valve position between 15-30% open. ☐ Adjusts or peer checks the Reactor Pressure regulator as required to maintain bypass valve position between 15-30% open as required by the GOP.

Op-Test No.: 2020-1 Scenario No.: SCN #1 Event No.: 2 Page 1 of 2

Event Description: IRM B Upscale Failure (value = 130). ATC bypasses IRM B. ATC resets half scram. SRO evaluates LCO 3.3.1.1. (Tracking)

Time	Position	Applicant's Actions or Behavior
T0+11 min.	BOOTH	**Trigger Event to initiate IRM B Upscale Failure** Note: Trigger the following event at the direction of the Lead Evaluator, after sufficient rod withdrawal has occurred that results in an appreciable power change.
	SRO	☐ Acknowledge report from ATC. ☐ Conducts brief for IRM B failure actions. ☐ Directs ATC to Bypass IRM B. Evaluates Technical Specifications for IRM B failure: o Reviews TS LCO 3.3.1.1, Function 1 – IRMs. o Determines LCO 3.3.1.1 is MET due to meeting the minimum number of Channels (3) per Trip System. o Determines that a Tracking LCO is necessary for Condition A. o Reviews TR LCO 3.3.2.1, Rod Block Monitoring Instrumentation Function 2 – IRMs. o Determines TR LCO 3.3.2.1 is MET due to meeting the minimum number of Channels (6). o Determines that a Tracking LCO is necessary. ☐ Directs ATC to Reset ½ Scram on RPS B.
	ATC	☐ Responds to alarms 3D60, IRM B/F/D/H Upscale Trip/INOP, 3D74 Trip Actuators B1/B2 tripped. ☐ Stops withdrawing Control Rods. ☐ Recognizes and reports IRM B Upscale, ½ Scram on RPS B. ☐ May attempt to Range IRM B. ☐ Determines IRM B has failed, recommends bypassing IRM B. ☐ ATC may choose to turn Rod Select Power off.
	BOP	☐ Monitors balance of plant. ☐ May peer check 3D60, IRM B/F/D/H Upscale Trip/INOP, 3D74 Trip Actuators B1/B2 tripped.

Op-Test No.: 2020-1 Scenario No.: SCN #1 Event No.: 2 Page 2 of 2

Event Description: IRM B Upscale Failure (value = 130). ATC bypasses IRM B. ATC resets half scram. SRO evaluates LCO 3.3.1.1. (Tracking)

Time	Position	Applicant's Actions or Behavior
	SRO	☐ Conducts follow up brief with crew. ☐ May notify Work Control personnel of IRM failure, request a CARD be written, and a review of POD for activities that might affect current plant conditions. ☐ Directs ATC to recommence Control Rod Withdrawal.
	ATC	Bypasses IRM B IAW 23.603, Section 7.0: ☐ Informs SRO of impacted Tech Specs. ☐ Positions Joy-stick to bypass IRM B. ☐ Verifies white Bypass Light is ON for IRM B. Resets ½ Scram IAW 23.610, Section 6.1: ☐ Cycles C7100-M605 to both GP 1/4 and GP 2/3 positions. ☐ Verifies Trip System B Blue Pilot Scram Valve Solenoid lights are ON. ☐ Verifies alarms are reset for RPS B. ☐ Coordinates with Rod Movement Verifier and RMSRO to recommence Control Rod Withdrawal.
	BOP	☐ Peer checks ATC for bypassing IRM B. ☐ Peer checks ATC for resetting the ½ scram on RPS B. ☐ May take over monitoring Power, Pressure and Level. ☐ May contact RTC to investigate failure of IRM B. **ROLE PLAY: As RTC Acknowledge direction to investigate the failure of IRM B.**

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Event Description: A control rod drift alarm will actuate, and rod 26-31 will drift into the core. The crew will perform the Control Rod Drift AOP and disarm the control rod at position "00" and evaluate Technical Specifications 3.1.3.

Time	Position	Applicant's Actions or Behavior
T0+17 min.	BOOTH	**ACTION Trigger Rod 26-31 Drift in.**
	SRO	☐ Enters Control Rod Drift AOP 20.106.07.(Crew Update). ☐ Conducts AOP Brief. ☐ Directs actions of 20.106.07, Condition C. Designated operator or CRS: ☐ Notifies SNE. **ROLE PLAY as Reactor Engineer (SNE):** **When called, inform crew that it should use the current rod pattern and he will be doing some research to determine the long-range plan.** **If asked All thermal limits satisfactory. (3D Monicore OK)**
	ATC	☐ Responds to alarm Control Rod Drift 3D80 and reports alarm to CRS. ☐ Turn on rod select power and select the drifting rod. ☐ Fully inserts rod 26-31 by holding Rod Out Notch Override Switch in EMER ROD IN.- IMMEDIATE ACTION ☐ Reviews ARP (3D80) and may report status of CRD based on ARP to CRS. ☐ Dispatches operator to HCU 26-31. **ROLE PLAY as NO (Reactor Building Rounds):** **Respond to orders for HCU 26-31. Wait 3 minutes and report on station.** Disarm Control Rod as follows: ☐ Directs field operator to close C11-F103 (HCU 26-31). **ROLE PLAY as NO (Reactor Building Rounds):** **Respond to orders for HCU 26-31 to close C11-F103, F105.** **Execute Step to isolate HCU 26-31. When directed report that C11-F103, F105 are closed** ☐ Directs field operator to close C11-F105 (HCU 26-31). ☐ Release ROD Out Notch Override Switch (H11-P603) and verify rod stays at desired position. ☐ Place ROD DRIFT ALARM switch in RESET and verify alarm clears CONDITION.
	BOP	☐ May Peer check control rod disarm at P603. ☐ May assist with communications.

Op-Test No.: 2020-1 Scenario No.: SCN #1 Event No.: 3 Page 2 of 2

Event Description: A control rod drift alarm will actuate, and rod 26-31 will drift into the core. The crew will perform the Control Rod Drift AOP and disarm the control rod at position "00" and evaluate Technical Specifications.

Time	Position	Applicant's Actions or Behavior
.	SRO	☐ Reviews TS. ☐ Briefs crew on TS. **LCO 3.13 C One or more control rods inoperable for reasons other than Condition A or B.** **REQUIRED ACTION C.1 Fully insert inoperable control rod.** **COMPLETION TIME 3 hours.** **AND** **REQUIRED ACTION C.2 Disarm the associated CRD.** **COMPLETION TIME 4 hours.** **AND** **REQUIRED ACTION D.1 Restore compliance with the prescribed withdrawal sequence.** **COMPLETION TIME 4 hours.** **OR** **REQUIRED ACTION D.2 Restore control rodto OPERABLE status.** **COMPLETION TIME 4 hours.** **LCO 3.3.2.1 C Rod Worth minimizer (RWM) inoperable during reactor startup.** **REQUIRED ACTION C.1 Suspend control rod movement except by SCRAM** **COMPLETION TIME Immediately.** **OR** **REQUIRED ACTION C.2.1.1 Verify > 12 rods withdrawn.** **COMPLETION TIME Immediately.** **OR** **REQUIRED ACTION C.2.1.2 Verify by administrative methods that startup with RWM inoperable has not been performed in the current calendar year.** **COMPLETION TIME Immediately.** **AND** **REQUIRED ACTION C.2.2 Verify movement of control rods is in compliance with the prescribed withdrawal sequence by a second licensed operator or other qualified member of the technical staff.** **COMPLETION TIME During control rod movement.** ☐ Contact WWM to start an investigation, write CARD, troubleshooting, etc.

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Event Description: High winds cause Reactor Building HVAC Center exhaust fan to fail. CRS will evaluate TS.

Time	Position	Applicant's Actions or Behavior
T0+27 min.	BOOTH	**ACTION: Trigger set to cause exhaust fan failure.**
	SRO	☐ Acknowledge report of 8D46 & 17D46 and Reactor building pressure is greater than 0.125 inches. ☐ Acknowledge reports on RB ventilation status. ☐ Directs the start of SGTS. ☐ Directs tripping RBHVAC. (one or both running trains) ☐ May direct the startup of a non-running train of RB HVAC. ☐ Enters EOP 29.100.01 SH 5 when Reactor Build pressure is reported positive. ☐ Evaluates TS. **TS 3.6.4.1 Secondary Containment.** **REQUIRED ACTION B.1 Restore secondary containment to operable status COMPLETION TIME 4 hours.**
	ATC	☐ May assist with communications.
	BOP	☐ Responds to 8D46 & 17D46, Div I/II Reactor Bldg Pressure High/Low and 8D30, Reactor Bldg Exhaust Fan No Air Flow. ☐ Reviews ARP and status of RB HVAC. ☐ Verify T41-R800A, Div 1 CR and RB Diff Press Rec (red pen), is greater than 0.125 inches wc or less than -0.750 inches wc. ☐ Report to CRS the Reactor building pressure is greater than 0.125 inches. ☐ Verify two Reactor Supply Fans and two Reactor Building Exhaust Fans or one Division of SBGT is operating and notes that Center RB HVAC amps is low and fluctuating with a damper out of position and the NO FLOW light ON. ☐ Direct an operator to inspect Reactor Building Supply and Exhaust Fans for fan damper or pressure controller malfunction. **ROLE PLAY as NO: When directed wait 5 minutes and report no problems with Reactor Building Supply and Exhaust dampers or the pressure controller. However, the Center RBHVAC Exhaust fan seems to be vibrating more than usual.**

Op-Test No.: 2020-1 Scenario No.: SCN #1 Event No.: 4 Page 2 of 3

Event Description: High winds cause Reactor Building HVAC Center exhaust fan to fail. CRS will evaluate TS.

Time	Position	Applicant's Actions or Behavior
	SRO	☐ Acknowledge status of SGTS and status of Secondary Containment pressure.
	BOP	☐ If directed trips running RBHVAC exhaust fans(s) to stop train(s) of RBHVAC. When directed starts a division of SGTS using hard card: ☐ If starting Div 1 SGTS, place T4600-C003, Div 1 SGTS Exhaust Fan, in RUN. At H11-P808 verify the following dampers Open: o T4600-F004A, Div 1 SGTS Exh Fan Inlet Iso Damper o T4600-F008A, Div 1 SGTS SC Otbd Iso Dmpr o T4600-F409, Div 1 SGTS SC Inbd Iso Dmpr ☐ Verify T46-R800A, Div 1 SGTS Exh Gas Flow Recorder, indicates between 3879 and 4180 scfm. ☐ If starting Div 2 SGTS, place T4600-C004, Div 2 SGTS Exhaust Fan, in RUN. At H11-P817 verify the following dampers Open: o T4600-F004B, Div 2 SGTS Exh Fan Inlet Iso Damper o T4600-F008B, Div 2 SGTS SC Otbd Iso Dmpr o T4600-F408, Div 2 SGTS SC Inbd Iso Dmpr ☐ Verify T46-R800B, Div 2 SGTS Exh Gas Flow Recorder, indicates between 3879 and 4180 scfm. ☐ As time permits verify proper system response per SOP 23.404 ☐ Report status of SGTS and status of Secondary Containment pressure.

Op-Test No.: 2020-1 Scenario No.: SCN #1 Event No.: 4 Page 3 of 3

Event Description: High winds cause Reactor Building HVAC Center exhaust fan to fail. CRS will evaluate TS.

Time	Position	Applicant's Actions or Behavior
	SRO	☐ Acknowledge report of the status of RBHVAC and RB Diff Press. ☐ Exits TS 3.6.4.1 Secondary Containment. ACTION B.1
	BOP	☐ Acknowledge direction to shift operating trains of RBHVAC. ☐ Informs field operator of impending RB HVAC train shift. May require report / walk down of field operator. **ROLE PLAY as NO: When directed report West train of RB HVAC is ready for a start. After full startup of RB HVAC West train wait 1 minute (Supply and Exhaust fans are on different floors) and report good start.** ☐ Makes plant announcement of impending RB HVAC train shift. Using 23.426 Section 6.1, Shifting Fans performs the following: o Shutdown selected T4100-C005 RB Center Exhaust Fan. Verify the following: o Paired supply fan trips. o Exhaust fan dampers close. o Supply fan dampers close. Selects T4100- C006 RB West Exhaust Fan: o Places/verify four-position mode switch in the position corresponding to appropriate T4100-C003 RB West Supply Fan. o Ensure no other switches are selected to that supply fan. o Place switch T4100-C003) RB West) Supply Fan in OFF/RESET. o Place T4100-C003 RB West Supply Fan in AUTO. Start T4100-C006) RB West Exhaust Fan and verify the following: o T4100-C006 RB West Exhaust Fan starts. o West Exhaust Fan Discharge Damper begins to open, after a 20-second time delay. o After approximately five seconds, selected T4100-C003 RB West Supply Fan auto starts. o Twenty seconds after the West Supply Fan starts the West Supply Fan Discharge Damper begins to open. o West Discharge Dampers for the Exhaust and Supply Fan travel to the fully open position. o NO FLOW indicating lights go OFF. o Monitor Reactor Building differential pressure for Division 1 and 2 on T41 R800A (B), Div 1 (2) CR and RB Diff Press Rec. ☐ Report to CRS status of RBHVAC and that Division 1 and 2 on T41 R800A (B), Div 1 (2) CR and RB Diff Press Rec are/have returned to normal values.

Op-Test No.: 2020-1 Scenario No.: SCN #1 Event No.: 5 to 9 Page 1 of 6

Event Description: A seismic event causes a small LOCA. Loss of Condensate

Time	Position	Applicant's Actions or Behavior
When directed by Lead Evaluator	BOOTH	**ACTION: Trigger step to for Seismic / LOCA and subsequent trip of condensate pumps.**
	SRO	☐ Acknowledges High Drywell Pressure report. ☐ Acknowledges Loss of Feed due to Condensate Pump trips report. ☐ Directs panel operators to prepare SCRAM reports. ☐ Asks for and then acknowledges SCRAM reports, ☐ Enters EOP SH 1 RPV Control and directs:(Crew Update) ☐ Confirm isolations and actuations for level as they occur. ☐ RPV level band of 173 to 214 inches. ☐ Enters EOP SH 2 PC Control and directs:(Crew Update) ☐ Informs SM of EP-101 flag for FA1.1. ☐ Confirm EECW initiation and isolation. ☐ Restore Cooling to CRD. ☐ Shutdown running RR Pumps. ☐ Prevent injection from CS and LPCI pumps NOT required for RPV injection. ☐ Directs 29.ESP.08 Drywell Cooling Water Restoration. After all RR pumps are shutdown: ☐ Acknowledges all RR pumps shutdown report. ☐ Directs initiation Torus Cooling and Sprays.
	ATC	☐ Places MODE SW in SHUTDOWN based on High Drywell Pressure. ☐ Recognizes failure of Rx Mode Switch and depresses all four Manual Scram Pushbuttons. ☐ Provides SCRAM report when directed. ☐ Acknowledge direction to shutdown RR pumps. ☐ Verifies conditions per hard card (23.138.01) and trips the RR pumps. ☐ Reports all RR pumps shutdown.
	BOP	☐ Recognizes and reports to CRS Seismic event and increasing Drywell Pressure. ☐ Recognizes and reports to CRS Loss of Feed due to Condensate Pump trips. ☐ Provides SCRAM report when directed. ☐ Controls RPV level in-band using Low-Pressure sources. **CRITICAL TASK:** **RPV-LOCA(CT1) With RPV level lowering and RPV pressure lowering and approaching injection pressure for CS and LPCI pumps, MAINTAIN RPV WATER LEVEL ABOVE TAF, by INJECTING with all available system(s) AND prevent injection from CS and LPCI pumps not required for ACC such that RPV LEVEL DOES NOT REACH 279 INCHES (Main Steam Lines) at any time during the scenario.**

Op-Test No.: 2020-1 Scenario No.: SCN #1 Event No.: 5 to 9 Page 2 of 6

Event Description: A seismic event causes a torus leak and small LOCA.

Time	Position	Applicant's Actions or Behavior
	SRO	☐ Acknowledges reports of directed EOP steps completed. ☐ Directs override to secure Torus Sprays before 0 psig is reached.
	ATC	☐ Confirms EECW initiation and isolation to the Drywell. ☐ Restores Cooling to CRD When directed Place RHR in Torus Cooling Mode per 23.205 hard card: ☐ Contacts RB Rounds for pump start and makes Hi-Com announcement. ☐ Places E1150-F028A(B) Keylock in OPERATE. ☐ Opens E1150-F028A(B). ☐ Starts E1102-C002A (B) Div 1 RHR Pump A(B). ☐ Opens E1150-F024A(B). Starts RHRSW: NOTE: • RHRSW Flow may be delayed until after Torus Spray is established. ☐ Depresses E1150-F068A(B) OPEN for 5 seconds. ☐ Starts an RHRSW Pump. ☐ Throttles open E1150-F068A(B) to 5600-6500 gpm. ☐ Starts second RHRSW Pump. ☐ Fully opens E1150-F068A(B). ☐ May direct field operator to place RHRSW Radiation Monitor Sample Pump in service. **ROLE PLAY as NO: If dispatched, after 5 min report, report D1(D2) Radiation Monitor Sample Pump in service.** Places RHR in Torus Spray Mode: ☐ Open E1150-F027A (B), Div 1 (2) RHR Torus Spray Iso. ☐ Acknowledges override to secure Torus Sprays, monitors Torus Pressure.

Op-Test No.: 2020-1 Scenario No.: SCN #1 Event No.: 5 to 9 Page 3 of 6

Event Description: TWMS Isolation failure. Torus Leak - on Low Pressure Feed source. Operators Isolate feed source and establish new feed source.

Time	Position	Applicant's Actions or Behavior
.	BOOTH	**ACTION: Trigger step to initiate a Torus Leak when RPV level is being controlled by a division of core spray or RHR.**
	SRO	☐ Enters 29.100.01, Sheet 5 Secondary Containment Control. ☐ Enters 29.100.01, Sheet 2 Primary Containment Control. ☐ Announces event over the Hi-Com. ☐ Directs 29.ESP.27, Torus Leak Isolation.
	BOP	☐ Responds to alarms 2D82, Reac Bldg Torus Sumps Level Hi-Hi/Lo-Lo and 2D83, Reac Bldg Leakage to Torus Sump High. ☐ Recognizes both Torus Room Sump Pumps running and reports to CRS as an EOP entry condition. ☐ Identifies and reports indications of a Torus leak. ☐ Identifies TWMS Isolation failure (group 12) and verifies close or closes the following valves as required per 2D82: ☐ G5100-F604, TWMS Rtrn To RHR Inbd Iso Vlv. ☐ G5100-F606, TWMS Rtrn To CS Inbd Iso Vlv. ☐ G5100-F602, N TWMS Pump Inbd Suct Iso Vlv. ☐ G5100-F600, S TWMS Pump Inbd Suct Iso Vlv. ☐ G5100-F605, TWMS Rtrn To RHR Otbd Iso Vlv is open and closes. ☐ G5100-F607, TWMS Rtrn To CS Otbd Iso Vlv is open and closes. ☐ G5100-F603, N TWMS Pump Otbd Suct Iso Vlv is open and closes. ☐ G5100-F601, S TWMS Pump Otbd Suct Iso Vlv is open and closes. ☐ Responds to alarm 7D71, Torus Water Level Trouble and reports EOP entry condition when TWL is <-2".

Op-Test No.: 2020-1 Scenario No.: SCN #1 Event No.: 5 to 9 Page 4 of 6

Event Description: Torus Leak - on Low Pressure Feed source. Operators Isolate feed source and establish new feed source.

Time	Position	Applicant's Actions or Behavior
	ATC	☐ Directs the performance of 29.ESP.21 to field operator. **ROLE PLAY as NO: If directed to perform of 29.ESP.21, acknowledge direction. No action required.** ☐ Aligns TWMS for raising TWL IAW 23.144. ☐ Stops Torus room sump pumps. ☐ Coordinates verification/closing watertight doors. **ROLE PLAY as NO: If directed to verify watertight doors in the RB corner rooms are closed, wait 10 minutes, and report doors are closed.** Performs leak isolation for Division 1 systems per 29.ESP.27: Division 1 Core Spray (CS): ☐ If Div 1 Core spray is being used for injection Closes E2150-F005A, Div 1 CS INBD ISO VLV as the CRLNO injects with Div 2 Core Spray. ☐ Place E2101-C001A & C, Div 1 CS Pump A & C, CMC in OFF/RESET. ☐ Place E2150-F036A keylock switch in OPER. ☐ Close E2150-F036A, Div 1 CS PMPs Torus Suct Vlv. ☐ Monitor Torus water level and determine the leak is isolated (if Div 1 Core Spray was injecting). **CRITICAL TASK:** **PC-TWL-ISO(CT2) With suppression pool water level lowering due to an isolable leak, isolate the leak before suppression pool water level, reaches -38 inches.** If the leak was not isolated: ☐ Open E2150-F036A, Div 1 CS PMPs Torus Suct Vlv. ☐ Place E2150-F036A keylock switch in LOCK. ☐ Place E2101-C001A, Div 1 CS Pump A, CMC in AUTO. ☐ Place E2101-C001C, Div 1 CS Pump C, CMC in AUTO.
	BOP	If Div 1 Core spray is being used for injection coordinates with P603 to establish injection with Div 2 Core Spray as follows: ☐ Verifies Div 2 Core Spray is running or places E2101-C001B & D, Div 2 CS Pump B & D CMC in RUN. ☐ Opens E2150-F005B, Div 2 CS INBD ISO VLV as needed to maintain RPV level. ☐ Verifies E2150-F031B, Div 2 CS Pumps Min Flow VLV Closes.

Op-Test No.: 2020-1 Scenario No.: SCN #1 Event No.: 5 to 9 Page 5 of 6

Event Description: Torus Leak - on Low Pressure Feed source. Operators Isolate feed source and establish new feed source.

Time	Position	Applicant's Actions or Behavior
	ATC	Division 1 Residual Heat Removal (RHR): Note: If RHR is in Torus Cooling, P603 will back out of Torus Cooling before shutting down the RHR pump by Throttle closed E1150-F024A/B, Div 1/2 RHR Torus Clg Iso and then Shutdown operating RHR Pumps used for Torus Cooling by placing CMC in OFF/RESET ☐ Place E1102-C002A & C, Div 1 RHR Pump A & C, CMC in OFF/RESET. ☐ Place E1150-F004C keylock switch in OPER. ☐ Place E1150-F004A keylock switch in OPER. ☐ Close E1150-F004C, Div 1 RHR Pump C Torus Suct Iso. ☐ Close E1150-F004A, Div 1 RHR Pump A Torus Suct Iso. ☐ Monitor Torus water level and determine leak is not isolated. ☐ Open E1150-F004C, Div 1 RHR Pump C Torus Suct Iso. ☐ Open E1150-F004A, Div 1 RHR Pump A Torus Suct Iso. ☐ Place E1150-F004C keylock switch in LOCK. ☐ Place E1150-F004A keylock switch in LOCK. ☐ Place E1102-C002A, Div 1 RHR Pump A, CMC in AUTO. ☐ Place E1102-C002C, Div 1 RHR Pump C, CMC in AUTO. ☐ Reports leak isolation actions to the CRS. ☐ Monitors and reports that TWL continues to lower.

Op-Test No.: 2020-1 Scenario No.: SCN #1 Event No.: 5 to 9 Page 6 of 6

Event Description: Torus Leak - on Low Pressure Feed source. Operators Isolate feed source and establish new feed source.

Time	Position	Applicant's Actions or Behavior
	ATC	Performs leak isolation for Division 2 systems per 29.ESP.27: Division 2 Core Spray (CS): ☐ If Div 2 Core spray is being used for injection Closes E2150-F005B, Div 2 CS INBD ISO VLV as the CRLNO injects with Div 1 Core Spray. ☐ Place E2101-C001B & D, Div 2 CS Pump B & D, CMC in OFF/RESET. ☐ Place E2150-F036B keylock switch in OPER. ☐ Close E2150-F036B, Div2 CS PMPs Torus Suct Vlv. ☐ Monitor the Torus water level and determine the leak is isolated. CRITICAL TASK: PC-TWL-ISO(CT2) With suppression pool water level lowering due to an isolable leak, isolate the leak before suppression pool water level, reaches -38 inches. ☐ Reports isolation of Torus leak to CRS
	SRO	☐ Acknowledge isolation of Torus leak.
	BOP	If Div 2 Core spray is being used for injection coordinates with P603 to establish injection with Div 1 Core Spray as follows: ☐ Verifies Div 1 Core Spray is running or places E2101-C001A & C, Div 1 CS Pump A & C CMC in RUN. ☐ Opens E2150-F005A, Div 1 CS INBD ISO VLV as needed to maintain RPV level. ☐ Verifies E2150-F031A, Div 1 CS Pumps Min Flow VLV Closes.

Appendix D Scenario Outline eForm ES-D-1

Facility: Fermi 2 Scenario No.: SCN #2 Op-Test No: ILO-2020-1 Examiners: See Attached Exam Matrix

Operators: See Attached Exam Matrix

Initial Conditions: MODE 1. 100% reactor power. East CRD Pump is out of service.

Turnover: The East CRD Pump is tagged out and work is progressing to repair an oil leak. Work is expected to be completed in about 2 days. Plans for the shift are to maintain 100% power.
Main Circ Water pump lineup shift is required to prepare for maintenance. After taking the shift the crew will shutdown #3 Main Circ Water pump.

Critical Tasks: ATWS-ADS(CT1), ATWS-PWR(CT2)

Event No.	Malf No.	Event Type*	Event Description
1		N (BOP) N (SRO)	Shift Main Circ Water pump
2	BADCB21N096 ATVSP	TS	Condenser Pressure Instrument Failure. CRS will evaluate LCO 3.3.6.1.
3	P43MF0023	C (BOP) C (SRO)	A leak will occur on the North TBCCW pump. The crew will shift to the standby TBCCW pump and isolate the North TBCCW pump.
4	C11MF0004	C (ATC) C (SRO)	The 'A' CRD Flow Control Valve will fail. High CRD temperatures will alert the crew to the failure. The crew will enter AOP 20.106.03 and switch to B FCV.
5	NHAIALARM_UNIT554497REV	R (ATC) R (SRO)	4D53 - AVR General Alarm. The crew will diagnose that there is a failure of one thyristor bank. The ARP requires reducing reactor power so generator output
6	E41MF0010	C (BOP) C (SRO) TS	Spurious start of HPCI, BOP will shut down HPCI, and SRO will complete TS evaluation.
7	N30MF0020 C71MF0006 C11MF0001	M (All) CT1 CT2	AVR Trip of Turbine, the crew will place Mode Switch to Shut down. Manual RPS Fails to Cause a Scram (Total Scram Failure). ATWS actions required. ATWS-ADS(CT1), ATWS-PWR(CT2)
8	C41MF0004 C41MF0003	C (ATC) C (SRO)	SRO directs SLC injection. ATC Injects SLC. RWCU requires manual isolation.

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

A. NARRATIVE SUMMARY

MODE 1. 100% reactor power. East CRD Pump is out of service.

The East CRD Pump is tagged out and work is progressing to repair an oil leak. Work is expected to be completed in about 2 days. Plans for the shift are to maintain 100% power.

Main Circ Water pump lineup shift is required to prepare for maintenance. After taking the shift the crew will shutdown #3 Main Circ Water pump.

Event: 1

Main Circ Water pump lineup shift is required to prepare for maintenance. After taking the shift the crew will shutdown #3 Main Circ Water pump.

Event: 2

A failed Condenser Pressure Instrument results in a ½ isolation of NSSSS and the evaluation of Technical Specifications.

Event: 3

A leak will occur on the North TBCCW pump. The crew will receive alarms and field indications that will result in shifting to the standby TBCCW pump and isolating the North TBCCW pump.

Event: 4

Failure of CRD Flow Control Valve 'A' causes high CRD temperatures. The crew will enter the AOP and switch to B FCV.

Event: 5

4D53 - AVR General Alarm will alarm due to thyristor bank blocked.
Based on the ARP, the crew will reduce Reactor Power, so Generator output <2400 Field amps.

Event: 6

HPCI will start. Evaluation by the crew will show that HPCI is running without an initiation signal. The crew will shutdown HPCI and complete TS evaluation.

Event: 7 to 8

The turbine trips because of an AVR failure. A manual scram by the crew results in an Anticipated Transient Without Scram(ATWS). SLC will inject, however RWCU will require manual isolation. The crew will manually insert control rods while controlling the RPV water level per the Emergency Operating Procedures (EOP)s. And as a result, Reactor Power will lower to below the power range.

B. SCENARIO OBJECTIVE

1. Given conditions in the simulator that include a minor leak in TBCCW, control the plant per applicable alarm response procedures and 23.128 TBCCW SOP.
2. Given conditions in the simulator that require operator action for the High Pressure Coolant Injection System, take action per 23.202 High Pressure Coolant Injection System.
3. Given conditions in the simulator that include a component failure, implement Technical Specifications per the Fermi 2 Operating License and ODE-12 LCOs.
4. Given conditions in the simulator that require entry into 29.100.01 Sheet 1A, RPV Control ATWS, control the plant per 29.100.01 Sheet 1A, RPV Control ATWS and ODE-10 EOP Expectations.
5. Given conditions in the simulator that include a instrument failure, implement Technical Specifications per the Fermi 2 Operating License and ODE-12 LCOs.
6. Given conditions in the simulator that include a component failure causing one thyristor bank blocked, control the plant per 4D53 - AVR General Alarm.
7. Given conditions in the simulator that include a component failure that results in an entry condition for AOP 20.106.03, CRD Flow Control Valve Failure, take action to control the plant per AOP 20.106.03, CRD Flow Control Valve Failure.
8. Given conditions in the simulator that require operator action for the Circulating Water System, take action per 23.101 Circulating Water System.

CRITICAL TASKS

ATWS-PWR(CT2) When directed by the EOPs, TAKE ACTION TO REDUCE POWER BELOW 3% by injecting SLC or Boron using the alternate means; -OR- lowering RPV water level; -OR- inserting control rods prior to exceeding the Heat Capacity Limit curve (HCL).

NUREG 1021 App D BASIS:

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 prior to the MSIV isolation.

Initiating Cue -- Reactor scram required and reactor not shutdown.
Measurable Performance -- Reduce reactor power using boron, control rods, or RPV level.
Performance Feedback – Reactor Power is decreasing until below 3%.
Expected action - Inject SLC; and/or insert control rods; and/or lower RPV water level while monitoring reactor power to ensure power is reduced <3%.

ATWS-ADS(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.

Op-Test No.: 2020-1 Scenario No.: SCN #2 Event No.: 1 Page 1 of 1

Event Description: Shift Main Circ Water pump

Time	Position	Applicant's Actions or Behavior
T0+1 min.	BOOTH	**Role play as NO (Outside Rounds): When directed report on station at Circ Water Pump House with Copy of 23.101. When directed to perform actions per 23.101 wait a few minutes, then report actions completed.**
	SRO	☐ Direct the shutdown of #3 Circ Water Pump per 23.101 Section 6.2 ☐ Acknowledge system status.
	ATC	☐ May assist with communications.
	BOP	☐ Acknowledge direction to shutdown of #3 Circ Water Pump per 23.101 Section 6.2 ☐ Station an operator at CW Pump House to monitor Circ Water Pumps during shutdown. ☐ Close N7100-F603 CW Pump #3 Disch Iso Valve, for Circ Water Pump selected to be shutdown. ☐ Verify Circ Water Pump # 3 trips when CW Pump Disch Iso Valve is fully closed; if not, manually stop Circ Water Pump. ☐ Close or verify closed N7100-F603 CW Pump #3 Disch Iso Valve. ☐ Place CMC switch, N7100-C003 Circ Water Pump #3 for Circ Water Pump being shutdown in OFF/RESET. ☐ Close N7100-F510 CWP #3Lube & Clg Wtr Iso Vlv, for Circ Water Pump being shutdown. ☐ Report system status to CRS.

Op-Test No.: 2020-1 Scenario No.: SCN #2 Event No.: 2 Page 1 of 1

Event Description: Condenser Pressure Instrument Failure. CRS will evaluate LCO 3.3.6.1.

Time	Position	Applicant's Actions or Behavior
T0+8 min.	BOOTH	**Action: Trigger Cond. Pressure Instrument Failure**
	SRO	☐ Reviews 23.601 for failed instrument and determines that the B21-N096A-D (696A-D Trip Units) are susceptible. ☐ SRO reviews 23.601 for impact of failed instrument. **TS 3 3.6.1, FUNCTION 1.d Condition A.1 place channel in trip within 24 hours.** ☐ Conducts brief for impact of instrument malfunction. ☐ Contact WWM to start investigation, write CARD, troubleshooting, etc. and to verify no other NSSSS related work is in progress. **ROLE PLAY as WMM: If called, acknowledge direction to troubleshoot, etc.**
	ATC	☐ Dispatches operator to Testability to investigate trip units B21-N696A-D. **ROLE PLAY as NO: When dispatched to Testability Cabinets, wait about 3 min, and report B21-N696A indicates upscale with RED TRIP light ON. All other 696 trip units indicate normally.** ☐ Relays field report to the CRS.
	BOP	☐ Responds to alarm 1D39, NSSSS Isolation CH A/C Trip. ☐ Refers to ARP for 1D39. ☐ Refers to IPCS Main Steam System and Isolation Channel Information screen and recognizes a trip condition on Condenser Pressure. ☐ Monitors Condenser Pressure. ☐ Reports indications to CRS.

Op-Test No.: 2020-1 Scenario No.: SCN #2 Event No.: 3 Page 1 of 3

Event Description: A leak will occur on the North TBCCW pump. The crew will shift to the standby TBCCW pump and isolate the North TBCCW pump.

Time	Position	Applicant's Actions or Behavior
T0+12 min.	BOOTH	**ACTION Trigger Lesson for a leak on the North TBCCW Pump. Note this event takes time to build in and will need to be triggered during the previous event.**
	SRO	☐ Acknowledges report of 5D10, TBCCW CNDS MAKEUP FLOW HIGH and auto start of lead Demin Storage Transfer Pump. ☐ May enter 20.000.03 Turbine Building Flooding and 20.128.01 Loss Of Turbine Building Closed Cooling Water System. ☐ Acknowledges recommendation to shifting to South TBCCW pump and then shutting down and isolation the N. TBCCW pump. ☐ Makes plant announcement.
	ATC	☐ May assist with communications or monitor temperatures of systems cooled by TBCCW.
	BOP	☐ Reports auto start of lead Demin Storage Transfer Pump to CRS. ☐ Responds to ARPs 5D10, TBCCW CNDS MAKEUP FLOW HIGH ☐ Direct an operator to verify P43-F400, TBCCW Head Tank Demin Water Makeup LCV, is> 80% open (TB3-R6) **ROLE PLAY:** **NO: When directed to investigate TBCCW, wait 2 minutes and report LARGE leak from the casing of the North TBCCW pump.** **NO: If asked about leak isolations, state that the pump will need isolated.** **NO: When asked Head tank level or Makeup valve position refer to P4300_M200081_a in Orchid ME or Provided Ichart.** ☐ Acknowledges leak on the N. TBCCW Pump based on indications and communications and reports to CRS or crew. ☐ Recommend to CRS Shifting to standby TBCCW pump and then shutting down and isolation the N. TBCCW pump.

Op-Test No.: 2020-1 Scenario No.: SCN #2 Event No.: 3 Page 2 of 3

Event Description: A leak will occur on the North TBCCW pump. The crew will shift to the standby TBCCW pump and isolate the North TBCCW pump.

Time	Position	Applicant's Actions or Behavior
	SRO	☐ Directs Starting standby TBCCW pump and then shutdown and isolation of N. TBCCW pump. ☐ Conducts brief to assign priorities and closeout of ARP actions. ☐ Directs shutdown of lead Demin Storage Transfer Pump. ☐ Contacts or directs another operator to contact WWM. **ROLE PLAY as WWM/FSS: If contacted, acknowledge report of TBCCW pump and need to write CARD, Tagging, etc.**
	ATC	☐ May assist with communications or monitor temperatures of systems cooled by TBCCW.
	BOP	☐ Acknowledges direction to starting standby TBCCW pump and then shutdown and isolation of N. TBCCW pump. Per 23.128, "Turbine Building Closed Cooling Water System:" ☐ Makes plant announcement, informs NO. ☐ Starts Standby TBCCW Pump. **ROLE PLAY as NO: Report good start of S. TBCCW Pump.** ☐ Stops pump to be removed from service, P4300-C001 North TBCCW Pump. ☐ Verifies Supply Header Pressure is approximately 36 to 43 psig. ☐ Verifies P43-F405, TBCCW DP Control Vlv, is maintaining a differential pressure across the TBCCW Pumps of 20 to 30 psid. ☐ Verifies system parameters return to normal and reports system status to the CRS. ☐ Shuts down lead Demin Storage Transfer Pump and reports status of Demin Storage to CRS.

Op-Test No.: 2020-1 Scenario No.: SCN #2 Event No.: 3 Page 3 of 3

Event Description: A leak will occur on the North TBCCW pump. The crew will shift to the standby TBCCW pump and isolate the North TBCCW pump.

Time	Position	Applicant's Actions or Behavior
	BOP	**ROLE PLAY:** **NO: If asked for isolation recommendations, recommend closing P4300-F024A and P4300-F017A.** **NO: When directed to close P4300-F024A and P4300-F017A TRIGGER TBCCW Leak Isolation. After 1-minute report the valves are closed, and leak has stopped** **NO: When asked Head tank level or Makeup valve position refer to P4300_M200081_a in Orchid ME or Provided Ichart.** **NO: When directed to close P4300-F005, report that the valve needs a ladder to access and it will take time to get setup. Note: No further action is required for evaluation. Advise the lead examiner to step the scenario.** ☐ Based on field report identifies isolations for leak using SOP/M-5728-1. ☐ Once P4300-C001 North TBCCW Pump is removed from service, directs field operator to close P4300-F024A and P4300-F017A.

Op-Test No.: 2020-1 Scenario No.: SCN #2 Event No.: 4 Page 1 of 1

Event Description: The 'A' CRD Flow Control Valve will fail. High CRD temperatures will alert the crew to the failure. The crew will enter AOP 20.106.03 and switch to B FCV.

Time	Position	Applicant's Actions or Behavior
T0+25 min.	BOOTH	**ACTION: Trigger Step to initiate failure of the A CRD FCV.**
	SRO	☐ Acknowledge failure of A CRD FCV. ☐ Enters AOP 20.106.03, CRD Flow Control Valve Failure. ☐ Directs Manual Control of CRD FCV per Condition A ☐ Conducts follow up brief per ODE-3 to close out AOP actions SRO/STA/SM: ☐ Contact WWM to conduct troubleshooting, write CARD, etc.
	ATC	☐ Identifies failure of A CRD FCV and reports to CRS. ☐ Responds to ARP 3D13, CRD Hydraulic Temperature High. ☐ Attempts Manual Control and informs CRS that valve is unresponsive. ☐ Dispatches operator to check FCV. ☐ SRO directs shifting to Standby CRD FCV – Cond B. ☐ Directs actions to NO to shift CRD FCVs from A to B in service per AOP 20.106.03 Cond B. **ROLE PLAY:** **NO: When dispatched after 5 min., report air-line to the A FCV has been crimped. Appears due to scaffold installation work in the area.** **NO: If asked you DO have a copy of the AOP 20.106.03.** **NO: Follow along with the AOP. When directed, trigger to perform (and report) the following actions (depending on how the P603 directs the steps):** **Trigger step for failed FCV in MANUAL and minimum (valve closed).** **Trigger step to OPEN C11-F046B / F047B.** **Verify RO has C11-K612 in MANUAL and minimum (Radio).** **Trigger step to place B FCV controller in AUTO locally.** **Notify P603 that B FCV is ready for service (Radio).** **Trigger step to CLOSE C11-F046A/F047A.** ☐ Attempts to control system flow with B CRD FCV and reports to CRS that B FCV is in service. ☐ Refers to ARP 3D13 and directs NO to relay room to RESET alarm. **ROLE PLAY:** **NO: When sent to RR to reset 3D13, wait 5 min and trigger Step.** **NO: Report that all alarms are clear and you will bring list of alarming CRDs to the MCR.**

Op-Test No.: 2020-1 Scenario No.: SCN #2 Event No.: 5 Page 1 of 2

Event Description: 4D53 - AVR General Alarm. The crew will diagnose that there is a failure of one thyristor bank. The ARP requires reducing reactor power so generator output

Time	Position	Applicant's Actions or Behavior
T0+40 min.	BOOTH	**ACTION: Trigger step to cause a thyristor bank failure.**
	SRO	☐ Acknowledges report of channel 49 Failure of Thyristor Bridge 2GA for the AVR. ☐ Acknowledges direction to lower Reactor Power to establish 2400 Field amps. ☐ May contact and obtain direction from operations management to lower power. **ROLE PLAY as Operations Management: Concur with requirements of ARP to lower power. Direct CRS to lower power to point required for 2400 field amps.**
	ATC	☐ May assist with communication, briefing field operators and HiCom announcements.
	BOP	☐ Responds to 4D53 AVR General Alarm. ☐ Reports Alarm to CRS and review ARP. ☐ Directs an operator to H21-P272, Rectifier Cubicle, to record any abnormal lights/alarms and direct an operator to obtain Key #111 and perform the ARP actions at the Excitation Control Cubicle (RR H11 P630): **ROLE PLAY as Operator: Acknowledge direction for AVR General Alarm. State that you will obtain a copy of ARP on your way and will report status based on direction given. Two operators will be needed. The locations are the H11P603-Relay Room and H21P272TB2 L3.** ☐ Acknowledges report from Operation Panel and report of alarm for Channel 49. and acknowledge report from an operator at H21P272 that Cubicle EG1 "BLOCK" light is ON and 'N-1 op' key light is illuminated at H11 P630. **ROLE PLAY as Operator: Wait 3 minutes and report from Operation Panel that Channel 49 is in alarm and N-1 'op' key light is illuminated at H11 P630 (Relay Room - Use HiCOM) and from H21P272 that Cubicle EG1 "BLOCK" light is ON (TB2 L3-Radio).** ☐ May request assistance from system engineer. **ROLEPLAY as System Engineer: If questioned about Channel 49 and the N-1 'op', direct the operator to re-read the Corrective Action for Channel 49. Explain that the N-2 'op' key light will be illuminated after the Corrective Actions taken and the N-1 'op' key light should currently be illuminated.** ☐ Reports status to CRS based on ARP and field reports

Op-Test No.: 2020-1 Scenario No.: SCN #2 Event No.: 5 Page 2 of 2

Event Description: 4D53 - AVR General Alarm. The crew will diagnose that there is a failure of one thyristor bank. The ARP requires reducing reactor power so generator output

Time	Position	Applicant's Actions or Behavior
T0+40 min.	BOOTH	**ROLE PLAY as RR Operator: If direct to monitor and report field amps as power is lowered use soft panel values from S12-R815 MTG Field Current (H_P804_C027_1 can be used for a graph).**
	SRO	☐ Reviews GOP for reducing power. ☐ Directs notifying MOC/SOC of power reduction. ☐ Directs lowering power to 2400 field amps. ☐ Acknowledges report of P/F and at 2400 field amps.
	ATC	Lowers power using flow per 23.138.01 until 2400 field amps: Adjusts speeds of RRMG Sets, per 23.138.01: o Verifies B31-R621A (B), N RR MG Set Speed Controllers, in AUTO, or places N RRMG Set Speed Controllers in MANUAL o Adjust setpoint (SP), or output if in MANUAL, of B31-R621A (B), N RR MG Set Speed Controllers to the desired speed. o Adjusts RR MG Set speeds, to match Recirculation Loop Jet Pump flows on B21-R611A and B. o Verifies indicated RR MG Set speeds agree within 3%, as indicated on B31-R621A & B, N and S RR MG Set Speed Controller, process variable (PV) or if available, C32-816, FW & RR Flat Panel Display. ☐ Verifies P/F map and reports P/F to CRS.
	BOP	☐ When directed contacts MOC/SOC and reports status. ☐ Provides peer check for lower power using flow per 23.138.01.

Op-Test No.: 2020-1 Scenario No.: SCN #2 Event No.: 6 Page 1 of 2

Event Description: Spurious start of HPCI, BOP will shut down HPCI, and SRO will complete TS evaluation.

Time	Position	Applicant's Actions or Behavior
T0+69 min.	BOOTH	**ACTION Trigger step for Spurious start of HPCI.**
	SRO	☐ Acknowledges the HPCI system is injecting and does not have a valid initiation signal report. ☐ Acknowledges report on Reactor Power, RPV pressure, and RPV level. ☐ Directs HPCI shutdown ☐ Evaluates TS 3.5.1 ECCS—Operating CONDITION E. HPCI System inoperable. REQUIRED ACTION E.1 Verify by administrative means RCIC System is OPERABLE. COMPLETION TIME Immediately. AND REQUIRED ACTION E.2 Restore HPCI System to OPERABLE status. COMPLETION TIME 14 days.
	ATC	☐ Responds to 3D164, FEEDWATER CONTROL DCS TROUBLE ☐ May identify the HPCI system has initiated and informs the crew (Crew Update) ☐ Reports the status of Reactor Power, RPV pressure, and RPV level. ☐ May recommend lowering power using flow.
	BOP	☐ Responds to 2D62, HPCI CNDR VAC TANK PRESSURE HIGH, and evaluates the HPCI system. ☐ Identifies the HPCI system is injecting and informs CRS. Verifies the HPCI system does not have a valid initiation signal: o Reactor Vessel Low Water Level - Low Level 2 o High Drywell Pressure ≤ 1.68 PSIG ☐ Informs CRS that no valid Actuation signal exits and may recommend shutting down the HPCI system.

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Event Description: Spurious start of HPCI, BOP will shut down HPCI, and SRO will complete TS evaluation.

Time	Position	Applicant's Actions or Behavior
	SRO	☐ Acknowledges report of HPCI system status. ☐ Directs verification of RCIC standby lineup - TS action.
	ATC	☐ May assist with field communications.
	BOP	☐ Acknowledges direction to shutdown HPCI. Shutdowns HPCI per 23.202 Section 8.1 HPCI Shutdown: ☐ Places E4101-C005, HPCI Turbine Aux Oil Pump, in RUN ☐ Places E4101-C003, HPCI Baro Cndr Vacuum Pump, in RUN. ☐ Places E41-K615, HPCI Pump Flow Controller, in MANUAL. ☐ Lowers HPCI Turbine Speed to > 2,000 rpm, as indicated on E41-R700. Trips HPCI Turbine as follows: ☐ Arms Turbine Trip Pushbutton. ☐ Verifies 2D57, HPCI ISO TURBINE TRIP PUSHBUTTON ARMED POS, alarms. Depresses and HOLD Turbine Trip Pushbutton and verify: o White HPCI Turbine Trip Solenoid Energized light comes ON. o E4100-F067, HPCI Turb Stm Stop Vlv, closes. o E4101-C005, HPCI Turbine Aux Oil Pump, starts as HPCI Turbine coasts down. o HPCI Turbine stops rotating as indicated by zero rpm ☐ Places E4101-C005, HPCI Turbine Aux Oil Pump, in OFF to prevent HPCI from re-starting. ☐ Releases Turbine Trip pushbutton. ☐ Verifies RCIC lineup and reports status to CRS.

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Event Description: AVR Trip of Turbine, the crew will place Mode Switch to Shut down. Manual RPS Fails to Cause a Scram (Total Scram Failure). ATWS actions required. SRO directs SLC injection. ATC Injects SLC. RWCU Fails to isolate.

Time	Position	Applicant's Actions or Behavior
T0+78 min.	BOOTH	**Action: Trigger step to trip Main Turbine.**
	SRO	☐ Acknowledges report of Failure to Scram and Reactor Power. ☐ Directs ATWS actions. ☐ Announces Failure to Scram over Hi-Com. ☐ Enters EOPs on Failure to Scram.
	ATC	☐ Identifies Reactor Scam condition due to Turbine trip and Places Mode Switch in Shutdown. ☐ Recognizes failure of RPS to actuate and depresses manual scram pushbuttons. ☐ Reports Failure to Scram to CRS and Reactor Power. ☐ Acknowledges order perform ATWS actions. ☐ Starts SLC Pump. ☐ Verifies SLC system parameters and determines SLC is injecting. ☐ Notes RWCU is not isolated and closes the following valves: o G3352-F004 o G3352-F220 ☐ Informs CRS of SLC injecting, SLC tank level and RWCU isolation with failure. ☐ Inhibits ADS and reports ADS inhibited to CRS **CRITICAL TASK:** **ATWS-ADS With a reactor scram required, reactor not shutdown, INHIBIT ADS to prevent an uncontrolled RPV depressurization, and to prevent causing a significant power excursion.** Performs Terminate and Prevent (Hard Card) when RPV level <114 inches: o CS Division 1 Pumps to OFF. o RHR Division 1 Pumps to OFF. o CS Division 2 Pumps to OFF. o RHR Division 2 Pumps to OFF. o HPCI Aux Oil Pump OFF if HPCI not running or Lower HPCI Setpoint to Minimum if running. o SBFW Pumps to OFF.
	BOP	☐ Acknowledges order perform ATWS actions. ☐ If RFP Running, lowers speed on both RFP in Manual to close FW Check Valves. ☐ When RPV Level is less than 114 inches, commences feeding with available system.

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Event Description: AVR Trip of Turbine, the crew will place Mode Switch to Shut down. Manual RPS Fails to Cause a Scram (Total Scram Failure). ATWS actions required.

Time	Position	Applicant's Actions or Behavior
	SRO	Enters 29.100.01 SH1A: Directs the following from 29.100.01 SH 1A: ☐ Confirms isolations and actuations for level as they occur. ☐ Verifies ADS Inhibited. (May have already been reported) ☐ Pressures Band of 900-1050 psig. ☐ Acknowledges report of SLC injecting, SLC tank level and RWCU isolation status (successful).
	ATC	☐ Confirms ADS inhibited in asked.
	BOP	☐ Acknowledges direction to Confirm Isolations and Actuations for Level. ☐ Verifies Isolations and Actuations for Level and reports completion to CRS. ☐ Takes action to control pressure using the Main Turbine Bypass Valves by depressing Low-Low Set logic Reset Pushbuttons as required by Pressure Control Leg of EOPs and ARP 1D38. ☐ Verifies SRV closes and that pressure is being controlled by Main Turbine Bypass Valves. ☐ May report status of Low-Low set logic and bypass valves to CRS.

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Event Description: AVR Trip of Turbine, the crew will place Mode Switch to Shut down. Manual RPS Fails to Cause a Scram (Total Scram Failure). ATWS actions required.

Time	Position	Applicant's Actions or Behavior
T0+78 min.	BOOTH	**ROLE PLAY:** **IF dispatched to install EOP defeats, use the following process:** **Wait 10 minutes for each ESP (step may have a ten-minute delay built in to assist RP timing).** **Initiate the Remote Function for the ESP defeat, if necessary.** **THEN call the control room and report, "Defeats for 29ESPxx are installed"** **Note: Reports will be from rounds or extra operators not currently assigned to other tasks (default position)**
	SRO	☐ Directs defeating logic trips (29.ESP.10) and insert rods per 29.ESP.03
	ATC	☐ Give out the order to defeat logic trips 29.ESP.10. ☐ Inserts rods per 29.ESP.03 Section 3: ☐ Places C11-K612, CRD Flow Controller, in MANUAL. ☐ Starts both CRD pumps by placing CMC in RUN as needed ☐ As necessary, throttles C1152-F003, CRD Drive/Clg Water PCV, to maintain sufficient drive water D/P for rod motion. ☐ As necessary, adjusts C11-K612, CRD Flow Controller, to maintain sufficient drive water D/P for rod motion. ☐ Places the Rod Worth Minimizer keylock switch in BYPASS. ☐ Inserts the Cram Array using EMERGENCY IN. When the Cram Array has been inserted, attempt to achieve a checkerboard control rod pattern using EMERGENCY IN as follows: ☐ Selects and fully inserts control rods in a spiral out from center pattern, other concurrent actions may preclude obtaining an actual checkerboard pattern. Continues to fully insert all remaining control rods using EMERGENCY IN as follows: ☐ Selects and fully insert control rods in a spiral out from center pattern.

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Event Description: AVR Trip of Turbine, the crew will place Mode Switch to Shut down. Manual RPS Fails to Cause a Scram (Total Scram Failure). ATWS actions required.

Time	Position	Applicant's Actions or Behavior
	SRO	Note: MSIVs will only close on a fault if reactor power remains above 3% for 10 minutes following the ATWS. ☐ Acknowledges report of MSIVs being closed. ☐ May direct 23.137 Section 7.1 Opening MSIVs Following an Isolation. ☐ Acknowledge report of all rods in.
	ATC	☐ Acknowledges defeat ARI logic trips in accordance with 29.ESP.10 and RPS logic trips in accordance with 29.ESP.09. ☐ Depresses ATWS ARI/RPT Div I(II) RESET pushbuttons. ☐ Verifies ARI is reset. ☐ Places C7100-M604, Scram Disch Vol Hi H2O Lvl Byp switch, in BYPASS. ☐ Cycles C7100-M605, Scram Reset Switch, to both positions (GP 1/4, GP 2/3) and release. ☐ Verifies Trip System A and B blue Pilot Scram Valve Solenoid lights are ON. ☐ Verifies the SDV vent and drain valves are open. ☐ Allows the scram discharge volume to drain. (3D94 Clears) ☐ Depresses the four manual scram pushbuttons. ☐ Arms and depresses the four ATWS ARI/RPT manual initiation pushbuttons. ☐ Observes rod motion and report to CRS when all rods are in. **CRITICAL TASK:** **ATWS-PWR When directed by the EOPs, TAKE ACTION TO REDUCE POWER BELOW 3% by injecting SLC or Boron using the alternate means; -OR- lowering RPV water level; -OR- inserting control rods prior to exceeding the Heat Capacity Limit curve (HCL).**
	BOP	☐ Observes MSIV closure and provides Crew Update. ☐ Verifies MSIV closure by depressing MSIV close push buttons and report to CRS. ☐ If directed attempts reopen using 23.137 Section 7.1 Opening MSIVs Following an Isolation.

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Event Description: AVR Trip of Turbine, the crew will place Mode Switch to Shut down. Manual RPS Fails to Cause a Scram (Total Scram Failure). ATWS actions required.

Time	Position	Applicant's Actions or Behavior
	SRO	Note: The following EOP entries may not be required based on earlier actions. ☐ When condition is met enters 20.100.01 SH3 Containment on High TWT. (Crew Update) ☐ When condition is met enters 20.100.01 SH3 Containment on High TWL. (Crew Update) ☐ Communicates EP-101 flag (FA1.1) to SM/STA. ☐ Directs RO to Lower TWL using 29.ESP.21 ☐ Directs RO to place Division 1(2) RHR in Torus Cooling and maximize cooling.
	BOP	☐ Acknowledges direction to Lower TWL using 29.ESP.21 and orders out 29.ESP.21. ☐ Confirms EECW initiation and isolation to the Drywell. Restores Cooling to CRD: ☐ Places P4400-M004 Div 2 EECW Iso Override SW in Override. ☐ Opens P4400-F604 Div 2 EECW to CRD Sply Iso Vlv. Places Division 1(2) RHR in Torus Cooling/Torus Spray Lineup (Hard Card). ☐ May contact RB Rounds for pump start and makes Hi-Com announcement. ☐ Places E1150-F028A(B) Keylock in OPERATE and opens E1150-F028A(B). ☐ Starts E1102-C002C (B,D) Div 1 RHR Pump C (B, D). ☐ Opens E1150-F024A(B). Places RHRSW in service: ☐ Depresses E1150-F068A(B) OPEN for 5 seconds. ☐ Starts an RHRSW Pump. ☐ Throttles open E1150-F068A(B) to 5600-6500 gpm. ☐ Starts second RHRSW Pump. **ROLE PLAY as NO: If dispatched, after 5 min report, report D1(D2) Radiation Monitor Sample Pump in service (no simulator actions necessary).** ☐ Fully opens E1150-F068A(B). If directed to maximize cooling: ☐ Closes E1150-F003A (B)

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Event Description: AVR Trip of Turbine, the crew will place Mode Switch to Shut down. Manual RPS Fails to Cause a Scram (Total Scram Failure). ATWS actions required.

Time	Position	Applicant's Actions or Behavior
	SRO	☐ May direct placing MDCT fans in service. ☐ Acknowledge MDCT fans in service.
	BOP	Places the MDCT in service as required by SOP or at direction of CRS. Places MDCT in service per hard card (23.208 Encl D): ☐ Depresses and hold E1156-M001(3, 2, 4) MDCT FAN A(C, B, D) VIB TRIP BYP PB. ☐ Within 5 seconds, places E1156-C001A(C, B, D), Div 1 (2) RHRSW MDCT Fan A(C, B, D), in LOW-SPEED. ☐ After MDCT Fan current has stabilized at running current, releases E1156-M001(3, 2, 4) MDCT FAN A(C, B, D) VIB TRIP BYP PB. IF desired, shifts Div 1 (2) RHRSW MDCT Fans from LOW-SPEED to HIGH-SPEED as follows: ☐ Depresses and holds E1156-M001(3, 2, 4) MDCT FAN A(C, B, D) VIB TRIP BYP PB. ☐ Within 5 seconds, places E1156-C001A(C, B, D), Div 1 (2) RHRSW MDCT Fan A(C, B, D), in HIGH-SPEED. ☐ After MDCT Fan current has stabilized at running current, releases E1156-M001(3, 2, 4) MDCT FAN A(C, B, D) VIB TRIP BYP PB ☐ Reports MDCT in service to CRS.