Facility: Fermi 2 **Scenario No.** 1 **Op-Test No:** 2009-1

Examiners: C. Moore **Operators:** _____
C. Zoia _____
C. Phillips _____

Initial Conditions: IC-99, MOC, 89% Rx. Power

Turnover: The plant is currently operating at 89% power at MOC following a power reduction for replacement of the #3 LPSV Unitized Actuator. B CRD Pump is out of service for pump rebuild. Expected return to service is 4 days. Center SAC is NON-PREFERRED USE due to oil leaks on the Compressor. Plans for the shift are to shift GSW pumps to run #6 GSW and shutdown #2 GSW to repair leaks on the discharge strainer. Also the shift is to raise power with flow to 95% and hold to validate Power vs Steam Flow per GOP 22.000.03.

NOTE: The crew's Pre-job Briefing for the reactor power increase is to be conducted prior to entering the simulator. (Suggested time 30 minutes prior to beginning the scenario.)

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	N(BOP) N(SRO)	BOP Transfers GSW Pumps per 23.131 section 4.3. Run #6 GSW and shutdown #2 GSW
2	N/A	R(ATC) R(SRO)	ATC Raises Recirculation Flow to raise Power to 95% per 22.000.03
3	C32MF0027	I(ATC) I(SRO)	"A" FW Flow Instrument Failure. ATC shifts to Single Element
4	D11MF0021	N/A	"A" Fuel Pool Radiation Monitor Upscale – SRO enters TS LCO 3.3.6.2
5	T41MF0002	C(BOP) C(SRO)	D1 CCHVAC Return Fan Trip – AOP 20.413.01 entered – SRO enters TS LCO 3.7.3, 3.7.4 – BOP starts D2 CCHVAV
6	P50MF0014 P50MF0017	C(BOP) C(SRO)	West Station Air Compressor unloads. East Compressor trips on Auto Start. AOP 20.129.01 entered. BOP manually starts Center Station Air Compressor.
7	B31MF0066	M(ALL)	Small recirculation loop leak in Drywell. ATC places Mode switch in SHUTDOWN due to rising Drywell Pressure. EOP 29.100.01 Sheet 1 and 2 entered
8	C11MF0001 C71MF0006	M(ALL) C(ATC) C(SRO)	Failure to Scram (ATWS). Rods Stuck and RPS Total Scram Failure. EOP 29.100.01 Sheet 1A entered. BOP inhibits ADS **(CT).** ATC performs FSQ 1 thru 8. SRO directs 29.ESP11.
9	C41MF0003 C41MF0004	C(ATC) C(SRO)	SRO directs SLC injection. ATC Injects SLC. First Pump started immediately trips. Second pump started runs. **(CT)**

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

Facility: Fermi 2 **Scenario No.** 1 **Op-Test No:** 2009-1

Examiners: C. Moore **Operators:** _____
C. Zoia _____
C. Phillips _____

Initial Conditions: IC-99, MOC, 89% Rx. Power

NOTE: Continued from page 1

Event No.	Malf. No.	Event Type*	Event Description
10	EOPRF0011 thru EOPRF0014	ALL	SRO directs 29.ESP.03. ATC manually inserts Control Rods per 29.ESP.03**(CT)** SRO directs 29.ESP.10. ATC resets ARI to perform scram-reset-scram per 29.ESP.03. All rods insert when ARI is re-initiated multiple times (twice).
11	EOPRF0007 EOPRF0010	ALL	SRO directs Terminate and Prevent. BOP performs Terminate and Prevent for Level to lower RPV level <114 inches. Maintain RPV level 50 to 100 inches **(CT).**
12	E51MF0002	C(BOP) C(SRO)	RCIC isolates on high exhaust diaphragm pressure. BOP utilizes alternate systems to maintain level.
13	EABQFU_TR1CC	C(BOP) C(SRO)	BOP initiates Torus Cooling/Torus Sprays. BOP initiates Drywell Sprays. **(CT)** E1150-F028A fails during Torus Cooling Lineup BOP utilizes Division 2 for Containment Cooling

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

Op-Test No.: 2009-1 Scenario No.: 1 Event No.: N/A Page 1 of 20

Event Description: Overview

Initial Conditions:

The plant is currently operating at 89% power at MOC following a power reduction for replacement of the #3 LPSV Unitized Actuator. B CRD Pump is out of service for pump rebuild. Expected return to service is 4 days. Center SAC is NON-PREFFERED USE due to oil leaks on the compressor. Plans for the shift are to shift GSW pumps to run #6 GSW and shutdown #2 GSW to repair leaks on the discharge strainer. Also the shift is to raise power with flow to 95% and hold to validate power vs steam flow per GOP 22.000.03.

The objectives of this scenario are to:

1. Recognize, respond to, and take the required actions for an instrument / equipment failures requiring the use of operator and Tech Spec actions.
2. Direct and supervise the Shift team during Normal, Abnormal, and Emergency operations.
3. Recognize and respond to “A” Feedwater Flow Instrument Failure
4. Recognize and respond “A Fuel Pool Radiation Monitor Failure Upscale
5. Recognize and respond to Division 1 CCHVAC Return Fan Trip – AOP 20.413.01
6. Recognize and respond to Loss of Station Air – 20.129.01
7. Recognize and respond to High Drywell Pressure
8. Execute steps of RPV Control – ATWS Sheet 1A
9. Execute steps of PC Control – 29.100.01 Sheet 2
10. Recognize and respond to trip of an SLC Pump
11. Manually insert Control Rods per 29.ESP.03
12. Recognize and respond to Isolation of RCIC
13. Execute steps of Primary Containment Control EOP
14. Initiate Torus Cooling, Torus Spray and Drywell Spray using the RHR System
15. Recognize and respond to failure of E1150F028A

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

1. Transfer GSW Pumps
2. Raise Recirculation Flow to raise Power to 95%
3. "A" FW Flow Instrument Failure
4. "A" Fuel Pool Radiation Monitor Upscale (TS LCO 3.3.6.2)
5. D1 CCHVAC Return Fan Trip (TS LCO 3.7.3, 3.7.4)
6. Loss of Station Air Compressors
7. Small Recirculation Loop leak in Drywell.
8. Failure to Scram (ATWS). Rods Stuck and RPS Total Scram Failure.
9. SLC Pump Trip
10. RCIC isolates on start at L2
11. Crew manually inserts Control Rods
12. Failure of E1150F028A
13. Crew initiates Torus Cooling/Torus Sprays/Drywell Sprays

Op-Test No.: 2009-1 Scenario No.: 1 Event No.: 1 Page 3 of 20

Event Description: Transfer GSW Pumps per 23.131

Time	Position	Applicant's Actions or Behavior
0 min	SRO	• SRO directs BOP to start #6 GSW Pump and shutdown #2 GSW Pump per 23.131 • Acknowledges GSW Pump shift complete
	BOP	• BOP conducts short Brief on shift of GSW Pumps • BOP contacts Chemistry to ensure NPDES requirements will not be exceeded (Typically Telephone Call) ***ROLE PLAY: Chemistry confirms NPDE requirements will NOT be exceeded.*** • BOP contacts Outside Rounds to walkdown and verify #6 GSW Pump ready for start ***ROLE PLAY: After about 2 min., Outside Rounds reports #6 GSW Pump Ready for Start*** • BOP directs Outside Rounds to place Strainer Controller for #6 GSW Pump in CONTINUOUS ***ROLE PLAY: After about 1 min, Outside Rounds reports #6 GSW Pump Strainer Controller is in CONTINUOUS*** o BOP makes HI-COM announcement for GSW Pump start • Crew Update " Starting #6GSW Pump, Stopping #2 GSW Pump" • BOP Starts #6 GSW Pump by placing CMC Switch in RUN. ***ROLE PLAY: After about 1 min., Outside Rounds reports good start on #6 GSW Pump*** • BOP Stops #2 GSW Pump by placing CMC Switch in OFF-RESET o BOP verifies correct system pressure response to pump shift • BOP directs Outside Rounds to place #6 GSW Pump Strainer Controller in INTERMITTENT ***ROLE PLAY: After about 1 min., Outside Rounds reports #6 GSW Strainer Controller in INTERMTTENT***

Op-Test No.: 2009-1 Scenario No.: 1 Event No.: 1 Page 4 of 20

Event Description: Transfer GSW Pumps per 23.131

Time	Position	Applicant's Actions or Behavior
	BOP	• BOP directs Outside Rounds to place #2 GSW Pump Strainer Controller in OFF ***ROLE PLAY: After about 1 min., Outside Rounds reports #2 GSW Pump Strainer Controller in OFF*** • BOP reports pump shift completed

Op-Test No.: 2009-1 Scenario No.: 1 Event No.: 2 Page 5 of 20

Event Description: Raise Recirculation Flow to raise Power to 95% per 22.000.03

Time	Position	Applicant's Actions or Behavior
+10 min	SRO	• Conducts brief for raising power to 95% • Directs BOP to monitor and maintain Condensate Filter Demineralizer Flows >2000 GPM • Directs ATC to maintain Turbine Flow Limiter 5% > Reactor Power. • Directs ATC to maintain Turbine Speed Load Demand ≥100 MWe greater than actual. • Directs ATC to commence raising power with recirculation flow. o Hi-Com announcement “raising reactor power to 95%”.
	ATC	• Crew Update, “Raising reactor power with Recirc flow.” • Raises reactor power per SOP 23.138.01, “Reactor Recirc System”, Section 6.1, by adjusting North and South RR MG Set speeds using B31-R621A and B, N and S RR MG Set Speed Controllers. Speed will be incrementally increased on N and S RR Pumps to achieve about 95% Power o ATC will direct RB Rounds to monitor and maintain RR MG Set Lube Oil Temperatures 110 to 130 degrees F ***ROLE PLAY: RB Rounds responds to monitor and maintain RR MG Set Lube OIL temperatures110 to 130 degrees F*** • Maintains Turbine Flow Limiter 5% > Reactor Power. • Maintains Turbine Speed Load Demand ≥100 MWe greater than actual.
	BOP	• BOP directs Turbine Building Rounds monitor and maintain Condensate Filter Demineralizer Flows >2000 GPM ***ROLE PLAY: Turbine Building Rounds responds to monitor and maintain Condensate Filter Demineralizer Flows >2000 GPM***

Op-Test No.: 2009-1 Scenario No.: 1 Event No.: 3 Page 6 of 20

Event Description: "A" FW Flow Instrument Failure

Time	Position	Applicant's Actions or Behavior
+30 min		***MALFUNCTION - C32MF0027 - A FW Level Transmitter Failure***
	SRO	• Acknowledges Alarm 3D156 and 3D164 • Direct shift to Single Element • Conducts Brief • Acknowledges DCS in Single Element • May contact WWM for assistance and followup
	ATC	• Announces 3D156 and 3D164 • Identifies "A" Feedwater Flow reading low at 0 • Identifies DCS has shifted to Forced Single Element • Reviews 3D156 and 3D164 ARPs • Recommends shifting to Single Element • Shifts to Single Element • Reports DCS in Single Element Control o May Note IPCS Heat Balance Affected by Instrument Failure

Op-Test No.: 2009-1 Scenario No.: 1 Event No.: 4 Page 7 of 20

Event Description: "A" Fuel Pool Radiation Monitor Upscale

Time	Position	Applicant's Actions or Behavior
+40 min		***MALFUNCTION – D11MF0021 – "A" Fuel Pool Radiation Monitor Failure***
	SRO	• Acknowledges Alarms identified by ATC • Enters TS 3.3.6.2, and 3.3.7.1; TRM 3.3.6.2 and 3.3.7.1 • Conducts Brief
	ATC	• Announces alarms 3D31, 3D35 • Review applicable ARPs, provides TS Articles to SRO. • Dispatches operator to investigate failure of Fuel Pool Radiation Monitor in the Relay Room ***ROLE PLAY: Investigate failure of Fuel Pool Radiation Monitor in the Relay Room*** ***ROLE PLAY: Reports "A" Fuel Pool Radiation Monitor reading upscale, all others reading normal***
	BOP	• Checks indication of Fuel Pool Radiation Monitor recorder on back panel • Reports "A" Fuel Pool Radiation Monitor reading upscale, all others reading normal

Op-Test No.: 2009-1 Scenario No.: 1 Event No.: 5 Page 8 of 20

Event Description: D1 CCHVAC Return Fan Trip

Time	Position	Applicant's Actions or Behavior
+40 min		***MALFUNCTION - T41MF0002 – D1 CCHVAC Return Fan Trip***
	SRO	• Acknowledges Alarm • Acknowledges Division 1 Return Fan Trip • Enters AOP 20.413.01 • Conducts AOP Brief • Directs BOP to start Division 2 CCHVAC • Enters TS LCO 3.7.3, 3.7.4 • Acknowledges Division 2 CCHVAC
	BOP	• Announces Motor Tripped Alarm 8D72 • Identifies Division 1 CCHVAC Return Fan Trip • Dispatches RB Rounds Operator to investigate Trip of Div 1 CCHVAC Return Fan ***ROLE PLAY: Reactor Building Rounds replies; "Investigate trip of Division 1 CCHVAC Return Fan"*** • Dispatches Operator to check Division 1 CCHVAC Return Fan breaker for cause of trip ***ROLE PLAY: Investigate Division 1 CCHVAC Return Fan Breaker at 72C-2A-1B*** • Informs RB Rounds Starting Division 2 CCHVAC • Crew Update: "Starting Division 2 CCHVAC" • Starts Division 2 CCHVAC using AOP 20.413.01 • Reports Division 2 CCHVAC is running ***ROLE PLAY: After about 3 min., Reactor Building Rounds reports no obvious cause for trip at D1 CCHVAC Return Fan*** ***ROLE PLAY: After about 5 min., Operator reports no obvious cause for trip at 72C-2A-1B***

Op-Test No.: 2009-1 Scenario No.: 1 Event No.: 6 Page 9 of 20

Event Description: W Station Air Compressor Loading Failure, E SAC Trip

Time	Position	Applicant's Actions or Behavior
+50 min		***MALFUNCTION – P50MF0014 – W SAC Loader Failure*** ***MALFUNCTION – P50MF0017 – E SAC Trip***
	SRO	• Acknowledges Alarm 7D72 • Acknowledges loading failure report on W SAC from BOP • Acknowledges E SAC Trip report from BOP • Enter AOP 20.129.01 'Loss of Station and Control Air" • Conducts AOP Brief • Directs BOP to start C SAC • Acknowledges Station Air pressure recovery o Contacts WWM for assistance and follow up
	BOP	• Announces Alarm 7D72 • Reports W SAC running unloaded • Reports trip of E SAC • Directs Turbine Building Rounds to investigate unloader failure on W SAC ***ROLE PLAY: Investigate loading failure on W SAC*** • Directs Radwaste Operator to investigate breaker following trip of E SAC ***ROLE PLAY: Investigate trip of E SAC at breaker 72N-4D*** • Informs Rounds operator C SAC being started. • Crew Update: " Starting C SAC" • Starts C SAC as directed. • Reports Station Air Pressure rising

Op-Test No.: 2009-1 Scenario No.: 1 Event No.: 6 Page 10 of 20

Event Description: W Station Air Compressor Loading Failure, C SAC Trip

Time	Position	Applicant's Actions or Behavior
		• Completes additional subsequent actions as directed ***ROLE PLAY: After about 3 min., Turbine Building Rounds reports unknown cause for loading failure on W SAC*** ***ROLE PLAY: After about 5 min., Radwaste Operator reports Ground Fault, 64 device indicated on 72N-4D breaker.***

Op-Test No.: 2009-1 Scenario No.: 1 Event No.: 7 Page 11 of 20

Event Description: High Drywell Pressure

Time	Position	Applicant's Actions or Behavior
+60 min		***MALFUNCTION – B31MF0066 – A Recirc Loop Leak***
	SRO	• Requests Scram Reports o May direct Mode Switch to SHUTDOWN on rising High Drywell Pressure • Crew Update: "Entering EOPs on Failure to Scram and High Drywell Pressure" • Initially enters EOP 29.100.01 Sheet 1 o SRO announces Reactor Scram on Hi-Com • Acknowledges Scram Reports
	ATC	• Announces Reactor Scram Signal on High Drywell Pressure • Places Mode Switch in SHUTDOWN • Identifies/Announces Failure to Scram Condition • Depresses Manual Scram Pushbuttons • Provides Scram Report when requested
	BOP	o Identifies rising Drywell Pressure • Provides Scram Report when requested

Op-Test No.: 2009-1 Scenario No.: 1 Event No.: 8 Page 12 of 20

Event Description: ATWS (Rods Stuck) /RPS Failure

Time	Position	Applicant's Actions or Behavior
+61 min		***MALFUNCTION – C11MF0001 - ATWS – Rods Stuck*** ***MALFUNCTION – C71MF0005 - Total Scram Failure***
	SRO	• Transitions to EOP 29.100.01 Sheet 1A • Directs ATC to perform FSQ 1 thru 8 • Directs BOP to confirm isolations and actuations for level as they occur • Directs BOP to Inhibit ADS • Directs BOP to bypass and restore drywell pneumatics and order 29.ESP.11 • Directs BOP to maintain pressure 900 to 1050 psig. May expand lower end of band due to leak in drywell. • SRO acknowledges FSQ-1 thru 8 complete • SRO acknowledges ADS inhibited • SRO acknowledges report on Drywell Pneumatics and 29.ESP.11 • Conducts EOP Brief
	ATC	• ATC performs FSQ 1 thru 8 (Hard Card) 1. Confirm Mode Switch in SHUTDOWN 2. Confirm RR Flow Runback to Minimum (Hard Card) • Place or verify A & B Flow Limiter 2/3 Defeat Switch to DEFEAT • Adjust Setpoint of B31-R621A(B) N(S) RRMG Set Speed Controllers to 30% 3. Shutdown RR Pumps 4. Confirm ARI – verifies auto initiation or performs manual initiation • ATC reports FSQ-1 thru 8 is Complete and Reactor Power is __%

Op-Test No.: 2009-1 Scenario No.: 1 Event No.: 8 Page 13 of 20

Event Description: ATWS (Rods Stuck) /RPS Failure

Time	Position	Applicant's Actions or Behavior
	BOP	• BOP verifies isolations and actuations for level as they occur (Hard Card) • BOP Inhibits ADS **(CRITICAL TASK)** • BOP reports ADS inhibited • BOP defeats Drywell Pneumatic Isolation with Keylock Switches on H11 P808 and P817 • BOP contacts Tagging Center(Operator outside CR) to perform 29.ESP.11 • BOP reports Drywell Pneumatics bypass and restored and 29.ESP.11 ordered ***ROLE PLAY: About 10 min after request, install defeats for 29.ESP.11 and report to Control Room that 29.ESP.11 is complete***

Op-Test No.: 2009-1 Scenario No.: 1 Event No.: 9 Page 14 of 20

Event Description: First SLC Pump started trips/Second Pump starts

Time	Position	Applicant's Actions or Behavior
+64 min		***MALFUNCTION – C41MF0003 – Trip SLC Pump A OR*** ***MALFUNCTION – C41MF0004 – Trip SLC Pump B***
	SRO	• Directs SLC Started • Acknowledges SLC Pump trip report o May direct standby SLC Pump started • Acknowledges SLC report
	ATC	• Starts SLC Pump and identifies Pump Trip • ATC starts standby SLC Pump **(CRITICAL TASK)** • ATC informs SRO of SLC Pump Trip • ATC reports SLC injecting, Time started, Initial SLC Tank Level and reports isolation of RWCU

Op-Test No.: 2009-1 Scenario No.: 1 Event No.: 10 Page 15 of 20

Event Description: Manual Insertion of Control Rods/Scram-Reset-Scram per 29.ESP.03

Time	Position	Applicant's Actions or Behavior
+65 min	SRO	• Directs ATC to Defeat ARI using 29.ESP.10 • Directs ATC to insert Control Rods using 29.ESP.03 • After all rods in, SRO directs SLC shutdown • After all rods in, SRO transitions back to 29.100.01 Sheet 1
	ATC	• Contact Tagging Center(Operator outside CR) and directs performance of 29.ESP.10 ***ROLE PLAY: Tagging Center acknowledges perform 29.ESP.10*** ***ROLE PLAY: About 10 min after request, trigger ESP10 Defeats and report to Control Room that 29.ESP.10 is complete*** • Using 29.ESP.03, utilizes one or more of the following to attempt to insert Control Rods: ▪ Raise CRD Hydraulic D/P (section 2.0) ▪ Manual Control Rod Insertion (section 3.0) ▪ Scram-Reset-Scram (section 4.0) • Attempts to drift rods using section 2.0 ▪ Place CRD Flow Controller in MANUAL ▪ Starts 2nd CRD Pump ▪ Open Flow Control Valve using CRD Flow controller ▪ Open C1152-F003 to maximize cooling water flow • Manually inserts Control Rods **(CRITICAL TASK)** ▪ Place CRD Flow Controller in MANUAL ▪ Starts 2nd CRD Pump ▪ Adjust Flow Controller and C1152-F003 to maintain sufficient D/P for rod motion ▪ Place the RWM in Bypass ▪ Close C11-F034 if needed to maintain drive D/P ▪ Insert the Cram Array ▪ Insert rods in checkerboard pattern spiraling out from center. Continue inserting remaining rods spiraling out from center

Op-Test No.: 2009-1 Scenario No.: 1 Event No.: 10 Page 16 of 20

Event Description: Manual Insertion of Control Rods/Scram-Reset-Scram per 29.ESP.03

Time	Position	Applicant's Actions or Behavior
	ATC	• Scram Reset and Scram Reinitiation ▪ Verify 8 Blue Scram lights are on ▪ May re-open C1100-F034 to re-charge accumulators ▪ After 29.ESP.10 is complete, reset ARI ▪ Verify SDV vent and drain valves are open ▪ Allow the SDV to drain (3D94 Clear) ▪ Initiate a manual scram by performing one or both of the following: ▪ Depress four manual scram pushbuttons ▪ Arm and depress ARI pushbuttons ▪ If Rods move inward, repeat • ATC observes inward rod movement, resets ARI and waits for 3D94 to clear • ATC initiates ARI and again observes inward rod movement (2nd Time) • ATC verifies all rods in with RWM and full core display • Crew Update: ”All rods in” • ATC shuts down running SLC pump

Op-Test No.: 2009-1 Scenario No.: 1 Event No.: 11 Page 17 of 20

Event Description: Terminate and Prevent/Maintain RPV Water Level

Time	Position	Applicant's Actions or Behavior
+66 min	SRO	• SRO determines that Terminate and Prevent is required. Crew Update "We have met the conditions to Terminate and Prevent for Level" • Directs BOP to Terminate and Prevent all injection into the RPV with the exception of Boron, CRD and RCIC • Directs level lowered less than 114" Wide Range. Directs BOP to maintain RPV level 50 to 100 inches. • After all rods in, directs BOP to restore and maintain RPV water level 173 to 214 inches
	BOP	• BOP Acknowledges order to Terminate and Prevent • BOP Acknowledges lower RPV level less than 114 inches. Maintain level 50 to 100 inches on Wide Range • BOP performs Terminate and Prevent (Hard Card) 1. CS Division 1 Pumps to OFF 2. RHR Division 1 Pumps to OFF 3. SBFW Pumps to OFF 4. CS Division 2 Pumps to OFF 5. RHR Division 2 Pumps to OFF 6. HPCI Aux Oil Pump OFF if HPCI not running or Lower HPCI Setpoint to Minimum if running. 7. Crew Update: Lowering RPV Level 8. If RFP Running, Lower Speed on both RFP in Manual to close FW Check Valves. 9. When RPV Level is less than 114 inches, commence feeding with available sources. **(CRITICAL TASK)** • Uses FW or SBFW to maintain RPV level 50 to 100 inches • After rods are all in, restores and maintains RPV level 173 to 214 inches using available systems.

Op-Test No.: 2009-1 Scenario No.: 1 Event No.: 12 Page 18 of 20

Event Description: RCIC isolates on start at L2.

Time	Position	Applicant's Actions or Behavior
		MALFUNCTION - E51MF0002 – RCIC Isolation
+68 min	SRO	• Acknowledges RCIC Isolation o May inquire if available sources are adequate to maintain level
	BOP	• Identifies RCIC has isolated • Utilizes SBFW or Feedwater to Maintain RPV Level 50 to 100 inches o May direct investigation by Rounds Operator for cause of RCIC isolation at Testability Cabinets

Op-Test No.: 2009-1 Scenario No.: 1 Event No.: 13 Page 19 of 20

Event Description: Crew initiates Torus Cooling/Torus Sprays/Drywell Sprays

Time	Position	Applicant's Actions or Behavior
		MULFUNCTION - EABQFU_TR1CC – E11-F28A Failure
70 min	SRO	• Directs BOP to place Division 1 RHR in Torus Cooling and Torus Sprays • Acknowledges report on E1150F028A • Directs BOP to place Division 2 RHR in Torus Cooling and Torus Sprays • Directs BOP to prepare to Spray Drywell • Directs ATC to shutdown all Drywell Cooling Fans • Verifies DWSIL Curve (on IPCS) • Directs BOP to Spray Drywell **(CRITICAL TASK)** • Directs Torus and Drywell Spray override to BOP
	BOP	• Place Division 1 RHR in Torus Cooling/Torus Spray Lineup (Hard Card • BOP reports failure of E1150F028A o BOP may direct operator to check breaker at MCC position for E11-F028A (72B-3A-2A) ***ROLE PLAY: Investigate failure of E1100-F028A at MCC 72A-3A-2A*** ***ROLE PLAY: After about 5 min, reports visual inspection shows no apparent cause for valve failure at MCC 72A-3A-2A*** • BOP starts Division 1 RHRSW (Hard Card) • BOP lines up Division 1 RHR for Drywell Spray (Hard Card) • BOP reports ready to spray Drywell • BOP sprays Drywell (Hard Card) • BOP monitors Torus/Drywell Pressure • BOP acknowledges Torus and Drywell Spray Override o BOP stops Torus Sprays if required **(CRITICAL TASK)** o BOP stops Drywell Sprays if required **(CRITICAL TASK)**

Op-Test No.: 2009-1 Scenario No.: 1 Event No.: 13 Page 20 of 20

Event Description: Crew initiates Torus Cooling/Torus Sprays/Drywell Sprays

Time	Position	Applicant's Actions or Behavior
	ATC	• ATC stops all Drywell Cooling Fans • ATC assists in monitoring and maintaining RPV level

Facility: Fermi 2 **Scenario No.** 2 **Op-Test No:** 2009-1

Examiners: C. Moore
C. Zoia
C. Phillips

Operators: _____
_____
_____

Initial Conditions: IC-20, MOL, 100% Rx. Power

Turnover: The plant is currently operating at 100% Power at EOC. The # 6 GSW Pump is out of service for motor replacement. Expected return to service is 4 days. Plans for the shift are to shift MTLO Pumps to South Pump running and North Pump in automatic. Also crew will lower power with Recirc flow to <93% power in preparation for the next shift to perform 24.109.02, "Turbine Bypass Valve Operability Test".

NOTE: The crew's Pre-job Briefing for the reactor power decrease is to be conducted prior to entering the simulator. (Suggested time 30 minutes prior to beginning the scenario.)

Event No.	Malf. No.	Event Type*	Event Description
1	NA	N(BOP) N(SRO)	BOP Shifts MTLO Pumps per 23.114.01 sect 11.0
2	NA	R(ATC) R(SRO)	ATC Lowers Reactor Power to <93% using Recirc flow. Preparation for performance of 24.109.02 on next shift
3	C97MF1087	NA	Seismic Event. at 0.02g H and V. AOP 20.000.01 entry
4	C11MF1027	C(ATC) C(SRO)	CR 54-19 Drifts into Core. SRO enters AOP 20.106.07. Control Rod fully inserted and disarmed. SRO enters TS LCO 3.1.3.
5	P43MF0025	C(BOP) C(SRO)	Trip of N TBCCW Pump. AOP 20.128.01 entered. BOP start standby pump.
6	C97MF1087	NA	Aftershock - Seismic Event. at 0.04g H and V. AOP 20.000.01 entered
7	C51MF0002	I(ATC) I(SRO)	APRM 2 Downscale. ATC bypasses APRM 2. SRO enters TS LCO 3.3.1.1 Tracking LCO
8	BB01B3103 C001C_MT FSEIZUR	C(ATC) C(SRO)	B1 RR Oil Pump Failure. B RRMG Trip. AOP 20.138.01 entry. Loss of HD. BOP evaluates for potential Loss of Feedwater Heating per AOP 20.107.02.
9	NA	R(ATC) R(SRO)	ATC Inserts Cram Array <65% power. SRO enters TS LCO 3.4.1
10	C97MF1087	NA	Aftershock - Seismic Event. at 0.08g H and V. AOP 20.000.01 entered

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

Facility: Fermi 2 **Scenario No.** 2 **Op-Test No:** 2009-1

Examiners: C. Moore **Operators:** _____
C. Zoia _____
C. Phillips _____

Initial Conditions: _____.

NOTE: Continued from page 1

Event No.	Malf. No.	Event Type*	Event Description
11	B31MF0064 B31MF0065 B31MF0066	ALL	B RR Pump Lower Seal Failure, followed by B RR Pump Upper Seal Failure. Crew identifies slowly rising Drywell Pressure.
12	NA	M(ALL)	ATC places Mode Switch in SHUTDOWN due to rising Drywell Pressure. SRO enters EOP 29.100.01 Sheet 1 and 2. BOP maintains RPV level and pressure. ATC starts Torus Cooling/Torus Spray. ATC starts Drywell Spray. **(CT)**
13	B21MF0060 B21MF0059 B21MF0073	C(BOP) C(SRO)	All RPV Level Instrumentation Fails. Crew identifies Loss of RPV level indication. SRO enters 29.100.01 Sheet 3. BOP depressurizes RPV and Crew floods RPV to the Main Steam Lines. **(CT)**

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

Op-Test No.: 2009-1 Scenario No.: 2 Event No.: NA Page 1 of 17

Event Description: Overview

Initial Conditions:

The plant is currently operating at 100% Power at EOC. The # 6 GSW Pump is out of service for motor replacement. Expected return to service is 4 days. Plans for the shift are to shift MTLO Pumps to South Pump running and North Pump in automatic. Also crew is to lower power with Recirc flow to <93% power in preparation for the next shift to perform 24.109.02 "Turbine Bypass Valve Operability Test".

The objectives of this scenario are to:

1. Recognize, respond to, and take the required actions for an instrument / equipment failures requiring the use of operator and Tech Spec actions.
2. Direct and supervise the Shift team during Normal, Abnormal, and Emergency operations.
3. Recognize and respond to Seismic Events
4. Recognize and respond to Control Rod Drift into the Core
5. Recognize and respond to TBCCW Pump Trip
6. Recognize and respond to APRM Downscale
7. Recognize and respond to Reactor Recirculation Pump Trip
8. Execute steps of EOP 29.100.01, RPV Control Sheet 1
9. Execute steps of EOP 29.100.01, Primary Containment Control Sheet 2
10. Execute steps of EOP 29.100.01, RPV Flooding Sheet 3

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

1. Shift MTLO Pumps per SOP 23.114
2. Lower Reactor Power to 93% using Recirculation Flow
3. Seismic Event
4. CR 54-19 Drifts into Core (TS LCO 3.1.3)
5. Trip of N TBCCW Pump
6. APRM 2 Downscale (TS LCO 3.3.1.1)
7. B RRMG Set Trip (TS LCO 3.4.1)
8. Seismic Event
9. RR Pump Seal Failures
10. Leak in Drywell
11. Loss of all RPV Level Instrumentation

Op-Test No.: 2009-1 Scenario No.: 2 Event No.: 1 Page 3 of 17

Event Description: Shift MTLO Pumps per 23.114.01, Section 11.0

Time	Position	Applicant's Actions or Behavior
0 min	SRO	• Directs BOP to Shift MTLO Pumps per 23.114
	BOP	• Conducts short brief on MTLO Pump Shift per 23.114, section 11.0 • Contacts Turbine Building Rounds that MTLO Pumps will be shifted. Requests check that South MTLO ready for start. ***ROLE PLAY: Turbine Building Rounds reports South MTLO Pump ready for start.*** o High-Com announcement: Starting South MTLO Pump, shutting down North MTLO Pump. • Crew Update: "Starting S MTLO Pump" • Starts South MTLO Pump ***ROLE PLAY: Turbine Building Rounds reports good start on South MTLO Pump*** • Contacts Turbine Building to check local pump discharge pressure at 60-70 psig ***ROLE PLAY: Turbine Building rounds report local oil pressure at 60 psig*** • Place North MTLO Pump switch in OFF-RESET • Place North MTLO Pump switch in AUTO • BOP reports pump shift complete

Op-Test No.: 2009-1 Scenario No.: 2 Event No.: 2 Page 4 of 17

Event Description: Lower Reactor Power to <93%% using Recirc flow.

Time	Position	Applicant's Actions or Behavior
+10 min	SRO	• Conducts brief on power reduction o May make HI-COM announcement about reducing Power • Directs ATC to lower Power to 93% using flow • Directs ATC to maintain Turbine Flow Limit >5%above Reactor Power • Directs BOP to monitor Condensate Demin flows • Acknowledges completion of power reduction
	ATC	• Lowers Reactor Power using Reactor Recirc flow to 93% • Directs Reactor Building Rounds to maintain oil temperatures on RRMG at 110 to 130 degrees F ***ROLE PLAY: Reactor Building responds to maintain oil temperature 110 to 130 degrees*** • Reports power at 93% upon completion of power reduction.
	BOP	• Monitors Condensate Demin differential pressure • Directs Turbine Building Rounds to Monitor Condensate Demin Flows. ***ROLE PLAY: Turbine Building Rounds responds to monitor Condensate Demin Flows during Power Reduction.***

Op-Test No.: 2009-1 Scenario No.: 2 Event No.: 3 Page 5 of 17

Event Description: Seismic Event. at 0.02g H and V.

Time	Position	Applicant's Actions or Behavior
+30 min		***MALFUNCTION - C97MF1087 – 6D69 – Seismic Event/Trouble***
	SRO	• Acknowledges Seismic Event/Trouble alarm • Acknowledges Power, Pressure and level are stable • Enters AOP 20.000.01, “Earthquake” • SRO acknowledges seismic information • Conducts AOP Brief • SRO directs ATC/BOP to monitor parameters • SRO directs BOP to perform subsequent actions (AC4 thru AC6)
	ATC	• Monitors plant conditions and announces “Power, Pressure and Level are normal” • Monitors parameters as directed
	BOP	• Announces 6D69 “Seismic Event/Trouble” Alarm • Reviews ARP 6D69 • Directs Operator to investigate Seismic event using SOP 23.612 in Relay Room ***ROLE PLAY: Investigate Seismic Event in Relay Room using SOP 23.612.*** ***ROLE PLAY: After about 2 min, Operator reports seismic information: “Event light is ON, ERROR light is OFF, printout shows 0.02g horizontal and 0.02g vertical.”*** • BOP reports seismic information to SRO • Monitors parameters as directed • BOP directs Reactor Building Rounds to reset CCHVAC Purge Compressors ***ROLE PLAY: Reactor Building Rounds acknowledges reset CCHVAC purge Compressors*** • BOP informs Outside Rounds that MDCT Fans will be started.

Op-Test No.: 2009-1 Scenario No.: 2 Event No.: 3 Page 6 of 17

Event Description: Seismic Event. at 0.02g H and V.

Time	Position	Applicant's Actions or Behavior
		ROLE PLAY: Outside Rounds acknowledges starting all MDCT Fans • BOP start all MDCT fans ***ROLE PLAY: Outside Rounds inspect fans as fans are started. Reports good start on all fans***

Op-Test No.: 2009-1 Scenario No.: 2 Event No.: 4 Page 7 of 17

Event Description: CR 54-19 Drifts into Core

Time	Position	Applicant's Actions or Behavior
+31 min		***MALFUNCTION - C11MF1027 – CR 54-19 Drifts into Core(1 min delay)***
	SRO	• Acknowledges Rod Drift Alarm • Acknowledges CR 54-19 Drifting in to the core • Enters AOP 20.106.07, Rod Drift • Conducts AOP Brief • Directs ATC to fully insert CR 54-19 • Directs ATC to hydraulically disarm CR 54-19 • Enters TS 3.1.3 • Acknowledges CR 54-19 is hydraulically isolated • Contacts SNE to report CR 54-19 drifted into core and disarmed o May conduct Brief and exit AOP
	ATC	• Announces Rod Drift Alarm • Identifies CR 54-19 drifting into the core • Reports CR 54-19 has fully inserted • Dispatches RB Rounds to HCU 54-19 ***ROLE PLAY: Go to HCU 54-19 and standby to hydraulically disarm CR 54-19*** ***ROLE PLAY: RB Rounds: Standing by at HCU 54-19*** • ATC directs RB Rounds to close C11-F103 at HCU 54-19 ***ROLE PLAY: Close C11-F103 at HCU 54-19*** ***ROLE PLAY: C11-F103 at HCU 54-19 is closed*** • ATC directs RB Rounds to close C11-F105 at HCU 54-19 ***ROLE PLAY: Close C11-F105 at HCU 54-19*** ***ROLE PLAY: C11-F105 at HCU 54-19 is closed*** • Reports to CRS that CR 54-19 is hydraulically isolated
		NOTE: Delete C11MF1027 to allow CR to settle to 00

Op-Test No.: 2009-1 Scenario No.: 2 Event No.: 5 Page 8 of 17

Event Description: Trip of N TBCCW Pump.

Time	Position	Applicant's Actions or Behavior
+40 min		***MALFUNCTION - P43MF0025 – North TBCCW Pump Trip***
	SRO	• Acknowledges Trip of N TBCCW Pump • Enters AOP 20.128.01, Loss of TBCCW • Conducts AOP Brief • Directs BOP to Start South TBCCW Pump • Acknowledges S TBCCW Pump Running o May Exit AOP
	BOP	• Announces Trip of North TBCCW Pump • Dispatches TB Rounds Operator to investigate trip of N TBCCW Pump at pump ***ROLE PLAY: Investigate Trip of N TBCCW Pump*** • Informs TB Rounds Operator that South TBCCW Pump will be started ***ROLE PLAY: Starting South TBCCW Pump*** • Starts South TBCCW Pump ***ROLE PLAY: After about 1 min, TB Rounds reports "Good Start on South TBCCW Pump"*** • Dispatches Operator to investigate breaker for tripped North TBCCW Pump at 72M-2D ***ROLE PLAY: Investigate trip of North TBCCW Pump at 72M-2D*** ***ROLE PLAY: After about 3 min, TB Rounds reports "No apparent cause for North TBCCW Pump trip at the pump"*** • BOP reports S TBCCW Pump running ***ROLE PLAY: After about 5 min, Operator reports "no apparent cause for trip at 72M-2D***

Op-Test No.: 2009-1 Scenario No.: 2 Event No.: 6 Page 9 of 17

Event Description: APRM 2 Downscale

Time	Position	Applicant's Actions or Behavior
+50 min		***MALFUNCTION - C51MF0002 – APRM 2 Failure***
	SRO	• Acknowledges Alarm 3D98, 3D113 • Directs ATC to bypass APRM 2 per SOP • Enters TS 3.3.1.1 (Tracking LCO) • Conducts Brief
	ATC	• Announces Alarm 3D98, 3D113 • Identifies Failure of APRM 2 Downscale • Reviews ARPs • Identifies applicable TS to SRO • Dispatches Operator to Relay Room to investigate failure of APRM 2 ***ROLE PLAY: Investigate failure of APRM 2*** • Bypasses APRM 2 per SOP ***ROLE PLAY: After about 3 min, report from Relay Room, no apparent cause for failure at APRM 2, APRM 2 reading downscale. All other APRMs reading normal***

Op-Test No.: 2009-1 Scenario No.: 2 Event No.: 7 Page 10 of 17

Event Description: B1 RR Oil Pump Failure. B RRMG Trip.

Time	Position	Applicant's Actions or Behavior
+60 min		***MALFUNCTION - BB01B3103C001C_MTFSEIZUR – B1 RR Oil Pump Failure***
	SRO	• Acknowledges Trip of B Recirc Pump o Acknowledges B1 RRMG Oil pump trip • Enters AOP 20.138.01, Crew Update" Entering AOP for Recirc Pump Trip" o May make Hi-Com announcement for RR Pump Trip • Conducts AOP Brief • Acknowledges RPV water level recovering • Directs ATC to perform Subsequent Action C of AOP 20.138.01 • Directs BOP to validate Feedwater Temperature drop with guidance from AOP 20.107.02, Loss of Feedwater Heating • Acknowledges Feedwater Temperature change is satisfactory. o Contact Chemistry and Radiation Protection for power change • Acknowledges Power > 67.2% o May Contacts WWM for assistance and follow-up
	ATC	• Announces Trip of B Recirc Pump • Evaluates Alarms 3D132, 3D136, and 3D155 o Reports B1 RRMG Oil Pump trip • Reports High RPV Water Level Alarm, RPV level recovering o Directs Reactor Building Rounds to investigate trip of B1 RR Oil Pump ***ROLE PLAY: Investigate trip of B1 RRMG Oil Pump*** o Directs operator to investigate Breaker for B1 RRMG Oil Pump at 72E-5D ***ROLE PLAY: Investigate trip of B1 RRMG Oil Pump at 72E-5D*** • Verifies A RRMG set speed is $\leq$ 75% • Verifies power $\leq$ 67.2% • Reports Power > 67.2%

Op-Test No.: 2009-1 Scenario No.: 2 Event No.: 7 Page 11 of 17

Event Description: B1 RR Oil Pump Failure. B RRMG Trip.

Time	Position	Applicant's Actions or Behavior
	ATC	• Verifies 3D129 and places 2/3 Limiter Defeat Switch in DEFEAT • Closes B3105-F031B • Reopens B3105-F031B (may be delayed by Cram Array) • Reports actions complete with exception of lowering power with Cram Array o May monitor LPRMS for instability ***ROLE PLAY: After about 3 min, report no indications at pump for cause of trip*** ***ROLE PLAY: After about 5 min, report no apparent cause for trip at breaker 72E-5D***
	BOP	• Announces Loss of Heater Drains • Validates Feedwater Temperature drop with guidance from AOP 20.107.02, Loss of Feedwater Heating is consistent with power change • Reports Feedwater temperature change is consistent with power change

Op-Test No.: 2009-1 Scenario No.: 2 Event No.: 8 Page 12 of 17

Event Description: Insert Cram Array <67.2% power

Time	Position	Applicant's Actions or Behavior
+65 min	SRO	• Directs ATC to insert Cram Array (red cram rods) to <67.2% • Acknowledge Red Cram Rods inserted o Directs ATC to insert another group of rods o Contact SNE
	ATC	• Inserts Cram Array (red cram Rods) • Reports Cram Array (red cram rods) inserted o If power still greater than 67.2%, may request to insert another group of rods • Inserts another Cram Array group • Reports 3rd rod group inserted, power < 67.2%

Op-Test No.: 2009-1 Scenario No.: 2 Event No.: 9 Page 13 of 17

Event Description: Aftershock - Seismic Event. at 0.04g H and V.

Time	Position	Applicant's Actions or Behavior
+75 min		***MALFUNCTION - C97MF1087 - 6D69 – Seismic Event/Trouble***
	SRO	• Acknowledges Seismic Event/Trouble alarm • Acknowledges Power, Pressure and level are stable • SRO acknowledges seismic information • SRO directs ATC/BOP to monitor parameters
	ATC	• Monitors plant conditions and announces “Power, Pressure and Level are normal” • Monitors parameters as directed
	BOP	• Announces 6D69 “Seismic Event/Trouble” Alarm • Reviews ARP 6D69 • Directs Operator to investigate Seismic event using SOP 23.612 in Relay Room ***ROLE PLAY: Investigate Seismic Event in Relay Room using SOP 23.612.*** ***ROLE PLAY: After about 2 min, Operator reports seismic information: “Event light is ON, ERROR light is OFF, printout shows 0.04g horizontal and 0.04g vertical.”*** • BOP reports seismic information to SRO • Monitors parameters as directed

Op-Test No.: 2009-1 Scenario No.: 2 Event No.: 10 Page 14 of 17

Event Description: B RR Pump Seal Failures. Rising Drywell Pressure.

Time	Position	Applicant's Actions or Behavior
+80 min		***MALFUNCTION - B31MF0064 – B RR Pump Outer Seal Failure*** ***MALFUNCTION - B31MF0065 – B RR Pump Inner Seal Failure*** ***MALFUNCTION - B31MF0066 – A Recirc Loop Leak***
	SRO	• Acknowledge Alarms o May direct ATC to isolate B RR Pump per SOP 23.138.01 • Acknowledges rising Drywell pressure
	ATC	• Announces Alarm 3D147 • Reports rising pressure on inner seal on RR Pump B • Reviews ARP • Announces Alarm 3D145 • Reports lowering pressure on both RR Pump B seals o May attempt B RR Pump isolation per SOP 23.138.01
	BOP	• Announces rising Drywell pressure, Crew Update " rising Drywell pressure"

Op-Test No.: 2009-1 Scenario No.: 2 Event No.: 11 Page 15 of 17

Event Description: Mode Switch to SHUTDOWN - Rising drywell pressure

Time	Position	Applicant's Actions or Behavior
+85 min	SRO	• Directs ATC to place Mode Switch to SHUTDOWN • Requests Scram Reports • Crew Update, “Entering EOPs on High Drywell Pressure and Level 3” • Directs BOP to Verify Isolations/Actuations for Level as they occur (Hard Card) • Directs BOP to restore and maintain RPV water level 173 to 214 inches • Directs BOP to maintain RPV pressure 900 to 1050 pounds o May lower pressure band due to leak in Drywell • Crew Update, Entering EOPs on High Drywell Temperature” • Directs ATC to Verify initiation of EECW, isolation of EECW to the drywell, and to restore cooling to CRD. • Directs BOP to prevent injection from CS and LPCI pumps not required for ACC • Directs ATC to place Division 1 RHR in Torus Cooling and Torus Spray Mode o May direct ATC to close E1150F010 • Directs ATC to verify RR Pumps are shutdown • Verifies within DWSIL (IPCS) • Directs ATC to shutdown all Drywell Cooling Fans • Directs ATC to prepare to spray the Drywell • Directs ATC to spray the Drywell • Directs Torus and Drywell Pressure Override to ATC (0 psig)
	ATC	• Places Reactor Mode Switch in SHUTDOWN • Provides Scram Report • Verifies initiation of EECW • Verifies isolation of EECW to the drywell

Op-Test No.: 2009-1 Scenario No.: 2 Event No.: 11 Page 16 of 17

Event Description: Mode Switch to SHUTDOWN - Rising drywell pressure

Time	Position	Applicant's Actions or Behavior
	ATC	• Restores Cooling to CRD Pumps • Shutdown Drywell Cooling Fans • Place Division 1 RHR in Torus Cooling and Torus Spray Mode (Hard Card) • Starts Division 1 RHRSW (Hard Card) o May close E1150-F010 • Performs lineup to spray the Drywell • Sprays the drywell when directed by SRO **(CRITICAL TASK)** • Stops Torus or Drywell Sprays if override conditions met (0 psig) **(CRITICAL TASK)**
	BOP	• Provides Scram Report • Restores and maintains RPV water level 173 to 214 inches with available systems • Verifies isolation and actuations for level as they occur • Shutdown CS and LPCI pumps not needed for RPV level. (Hard Cards) • Maintains RPV pressure as directed • Reports when out of Pressure Band

Op-Test No.: 2009-1 Scenario No.: 2 Event No.: 12 Page 17 of 17

Event Description: RPV Level Instrumentation Fails. RPV Flooding

Time	Position	Applicant's Actions or Behavior
+90 min		***Malfunction - B21MF0060 – Division 1 Reference Leg Failure (12A)*** ***Malfunction - B21MF0059 – Division 2 Reference Leg Failure (12B)*** ***Malfunction - B21MF0073 – Floodup Level Transmitter Failure***
	SRO	• Acknowledges Loss of all RPV level Indication • Crew Update: " We have met the conditions for RPV Flooding" • Transitions to EOP 29.100.01 Sheet 3 • Directs BOP to open 5 SRVs – ADS preferred • Directs ATC to bypass and restore Drywell Pneumatics • Directs BOP to Close MSIVs, Main Steam Drains, RCIC Steam Supply and HPCI Steam Supply Valves • Directs BOP to Flood the RPV to Main Steam Lines • Directs BOP to have operator monitor SRV Tailpipe temperatures
	ATC	• Identifies/Verifies Loss of all RPV level Indication • Bypasses isolation signals with Keylock Switches and opens Drywell Pneumatics Valves if closed
	BOP	• Identifies/Verifies Loss of all RPV level Indication • BOP opens 5 ADS SRVs • BOP closes MSIVs, Main Steam Drains, RCIC Steam Supply and HPCI Steam Supply Valves • BOP floods RPV to the Main Steam Lines with available systems as directed by the SRO **(CRITICAL TASK)** • BOP directs operator to monitor SRV tailpipe temperatures ***ROLE PLAY: Monitor SRV Tailpipe Temperatures in the Relay Room*** ***ROLE PLAY: After flooding conditions are established, report SRV tailpipe temperatures for the open SRV(s) are 265 degrees and lowering slowly.***

Facility: Fermi 2 **Scenario No.** 3 **Op-Test No:** 2009-1

Examiners: C. Moore
C. Zoia
C. Phillips

Operators: _____
_____
_____

Initial Conditions: IC-20, MOL, 100% Rx. Power

Turnover: The plant is currently operating at 100% Power at MOC. South Main Turbine Lube Oil Pump is out of service for motor replacement. Expected return to service is 3 days. Plans for the shift are to shift TBCCW Pumps to South and Center TBCCW running and North TBCCW shutdown. Severe Thunderstorms are forecast throughout the day. Monroe County is under a Severe Thunderstorm Warning until 6PM today.

NOTE: The crew's Pre-job Briefing for the reactor power decrease is to be conducted prior to entering the simulator. (Suggested time 30 minutes prior to beginning the scenario.)

Event No.	Malf. No.	Event Type*	Event Description
1	NA	N(BOP) N(SRO)	BOP Shifts TBCCW Pumps per 23.128 sect 6.0. South and Center Pumps running.
2	D11MF0015	ALL	B MSL Radiation Monitor Fails Downscale. SRO enters TS LCOs 3.3.1.1 and 3.3.6.1
3	P41MF0006	C(BOP) C(SRO)	Trip of #2 GSW Pump. AOP 20.131.01 entered. BOP starts a standby pump
4	N21MF0029	C(BOP) C(SRO)	Trip of North RFP. RR Runback. Loss of HD. AOP 20.107.01 entered. BOP Injects into RPV with SBFW at 1200 gpm.
5	NA	R(ATC) R(SRO)	ATC Inserts Cram Array to <65% Power. BOP shutdown SBFW pumps.
6	B21MF0023	I(BOP) I(SRO)	SRV "A" spuriously opens. AOP 20.000.25 entered. Fuses for SRV "A" pulled. SRV closes. SRO enters TS LCO 3.4.3, 3.6.1.6
7	C11MF0004	C(ATC) C(SRO)	A CRD FCV fails closed. AOP 20.106.03 entered. ATC shifts to B FCV.
8	B21MF0102 B21MF0023 NACDN22M 801ATVSP	M(ALL)	Spurious MSIV Closure. Reactor Scram. EOP entry – 29.100.1 Sheet 1. Loss of HFPs. "A" SRV sticks partially open. BOP/ATC restore and maintain RPV level.
9	E41MF0005	C(ATC) C(SRO)	HPCI isolates upon receipt of start signal at L2. BOP uses alternate injection systems

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

Facility: Fermi 2 **Scenario No.** 3 **Op-Test No:** 2009-1

Examiners: C. Moore **Operators:** _____
C. Zoia _____
C. Phillips _____

Initial Conditions: IC-20, MOL, 100% Rx. Power

NOTE: Continued from page 1

Event No.	Malf. No.	Event Type*	Event Description
10	N21MF0031	C(BOP) C(SRO)	SBFW F001 fails to fully open. BOP uses alternate injection systems
11	NA	ALL	RPV level continues to lower. BOP inhibits ADS. **(CT)**
12	B21MF0030	M(ALL) C(BOP) C(SRO)	BOP reports unable to maintain level above TAF. EOP entry to 29.100.01 Sheet 3. At TAF, SRO directs ED. BOP attempts to opens 5 ADS SRVs. **(CT).** "H" SRV fails to open. BOP opens another SRV.
13	NA	ALL	BOP/ATC restores and maintains 173-214 inches with Low Pressure Systems **(CT)**

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

Op-Test No.: 2009-1 Scenario No.: 3 Event No.: NA Page 1 of 16

Event Description: Overview

Initial Conditions:

The plant is currently operating at 100% Power at MOC. South Main Turbine Lube Oil Pump is out of service for motor replacement. Expected return to service is 3 days. Plans for the shift are to shift TBCCW Pumps to South and Center TBCCW running and North TBCCW shutdown. Severe Thunderstorms are forecast throughout the day. Monroe County is under a Severe Thunderstorm Warning until 6PM today.

The objectives of this scenario are to:

1. Recognize, respond to, and take the required actions for an instrument / equipment failures requiring the use of operator and Tech Spec actions.
2. Direct and supervise the Shift team during Normal, Abnormal, and Emergency operations.
3. Recognize and respond to Main Steam Line Radiation Monitor
4. Recognize and respond to GSW Pump Trip
5. Recognize and respond to Reactor Feedwater Pump Trip
6. Recognize and respond to multiple SRV Failures
7. Recognize and respond to CRD A FCV Failure
8. Recognize and respond to MSIV Closure and Reactor Scram
9. Execute steps of RPV Control EOP 29.100.01 Sheet 1
10. Recognize and respond to Loss of Feedwater
11. Recognize and respond to HPCI RCIC and SBFW Failures
12. Execute Steps of Emergency Depressurization EOP 29.100.01 Sheet 3

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

1. Shift TBCCW pumps per 23.128
2. B MSL Radiation Monitor Fails Downscale Failure (TS LCO 3.3.1.1 and 3.3.6.1)
3. Trip of #2 GSW Pump
4. Trip of North RFP. RR Runback. Loss of Heater Drains
5. Multiple SRV Failures (TS LCO 3.4.3, 3.6.1.6)
6. CRD A FCV Failure
7. Spurious MSIV Closure. Reactor Scram
8. Loss of Feedwater System
9. HPCI Isolation, RCIC and SBFW System Failures
10. Emergency Depressurization

Op-Test No.: 2009-1 Scenario No.: 3 Event No.: 1 Page 3 of 16

Event Description: Shift TBCCW Pumps per 23.128 sect 6.0

Time	Position	Applicant's Actions or Behavior
0 min	SRO	• Directs BOP to shift TBCCW Pumps per 23.128 • Acknowledges Pump Shift Complete
	BOP	• Conducts short brief on shift of TBCCW Pumps • Contacts Turbine Building Rounds to prepare for shift of TBCCW Pumps ***ROLE PLAY: Turbine Building Rounds reports South TBCCW Pump ready for start*** • Acknowledges South TBCCW Pump ready for start o Makes Plant Announcement for Pump shift • Contacts Turbine Building Rounds to inform of imminent start of S TBCCW Pump ***ROLE PLAY: Turbine Building Rounds acknowledges start of South TBCCW Pump*** • Starts South TBCCW Pumps and stops North TBCCW Pump • Monitors pressures, D/P Control Valve response and temperature to verify correct response. ***ROLE PLAY: Turbine Building Rounds reports "Good Start on North TBCCW Pump"*** • Acknowledges Turbine Building Rounds on satisfactory start on North TBCCW Pump • Informs SRO TBCCW Pump shift is complete

Op-Test No.: 2009-1 Scenario No.: 3 Event No.: 2 Page 4 of 16

Event Description: B MSL Radiation Monitor Fails Downscale

Time	Position	Applicant's Actions or Behavior
+10 min		***MALFUNCTION - D11MF0015 - B MSL Radiation Monitor Fails Downscale***
	SRO	• Acknowledges Alarm 3D84 • Conducts Brief • Enters TS LCO 3.3.6.1 and 3.3.1.1 o May Contact WWM for assistance and follow-up
	ATC	• Announces Alarm 3D84 • Reviews ARP 3D84 o Reports TS LCOs to SRO • Dispatches Operator to Check MSL Radiation Monitors in Relay Room ***ROLE PLAY: Investigate MSL Radiation Monitors in the Relay Room.*** ***ROLE PLAY: Operator reports "No apparent cause for B MSL Radiation Monitor failure. MSL B radiation Monitor reading downscale. All other monitors reading normal.***
	BOP	• Checks MSL Radiation Monitor Recorder Indications on back on H11-P601 • Reports MSL Radiation Monitor B reading downscale.

Op-Test No.: 2009-1 Scenario No.: 3 Event No.: 3 Page 5 of 16

Event Description: Trip of #2 GSW Pump.

Time	Position	Applicant's Actions or Behavior
+20 min		***MALFUNCTION - P41MF0006 - Trip of #2 GSW Pump***
	SRO	• Acknowledges report of #2 GSW Pump Trip • Crew Update "Entering AOP for Loss of GSW" • Enters AOP 20.131.01, "Loss of GSW" • Conducts AOP Brief • Directs BOP to start available GSW Pump • Acknowledges indicated cause of pump trip o May request follow-up by Tagging Center/WWM
	BOP	• Announces Motor Tripped Alarm 7D72 • Announces Trip of #2 GSW Pump • Directs Outside Rounds to investigate trip of #2 GSW Pump at pump and breaker ***ROLE PLAY: Outside Rounds Operator acknowledges investigate Trip of Number 2 GSW Pump*** • Starts available GSW Pump o Makes plant announcement for start of GSW Pump • Contacts Outside Rounds Operator to inform that GSW Pump has been started. • Monitors GSW pressure to ensure correct system response to pump start ***ROLE PLAY: Outside Rounds reports, "Good start on Number ? GSW Pump"*** • Acknowledges good start on GSW start • Checks indicated GSW intake level indication ***ROLE PLAY: Outside Rounds reports, "64 Device tripped on Number 2 GSW Pump Breaker*** • Reports indicated cause of #2 GSW Pump trip to SRO

Op-Test No.: 2009-1 Scenario No.: 3 Event No.: 4 Page 6 of 16

Event Description: Trip of North RFP. RR Runback

Time	Position	Applicant's Actions or Behavior
+30 min		***MALFUNCTION - N21MF0029 - Trip of North RFP***
	SRO	o Crew Update: "Trip of North RFP" • Crew Update: "Entering AOP for Loss of Feedwater" • Conducts AOP Brief • Directs BOP to start SBFW and inject at 1200 GPM • Acknowledges SBFW injecting at 1200 GPM • After <65% Power, directs BOP to shutdown SBFW
	ATC	o Crew Update: "Trip of North RFP" • Monitors Power, Pressure and Level • Announces RPV level is recovering
	BOP	o Crew Update: "Trip of North RFP" o May direct operator to investigate potential cause of North RFP trip • Starts SBFW using Hard Card ▪ Start West and East Aux Oil Pumps ▪ Start West and East Standby Feedwater Pumps ▪ Verify N2103-F001, SBFW Disch. Valve automatically opens ▪ Throttle open N2103-F002, SBFW Flow Control Valve until desired flow is achieved • Reports SBFW injecting at 1200 GPM • Reviews ARPs for applicable alarms • Shuts down SBFW as directed using Hard Card

Op-Test No.: 2009-1 Scenario No.: 3 Event No.: 5 Page 7 of 16

Event Description: Insert Cram Array to <65% Power

Time	Position	Applicant's Actions or Behavior
+ 35 min	SRO	• Directs ATC to insert Cram Array • Directs ATC to insert another group of rods
	ATC	• Inserts Cram Array (red cram Rods) • Reports Cram Array (red cram rods) inserted • Reports power still >65% • Insert another Cram Array group • Reports 3rd rod group inserted

Op-Test No.: 2009-1 Scenario No.: 3 Event No.: 6 Page 8 of 16

Event Description: SRV "A" spuriously opens.

Time	Position	Applicant's Actions or Behavior
+45 min		***MALFUNCTION - B21MF0023 - SRV "A" Failure***
	SRO	• Acknowledges Alarm and open SRV • Enters AOP 20.000.25, "SRV Failure" • Conducts AOP Brief • Directs BOP to have fuses pulled for SRV A per Enclosure A in AOP20.000.25 • SRO acknowledges Pulling Fuses on SRV A • SRO acknowledges SRV indications • Enters TS LCO 3.4.3, 3.6.1.6
	BOP	• Announces 1D61, "SRV Open" Alarm • Identifies Open SRV • Attempts to Open and attempts to close SRV A • Reports SRV will not close • Requests Tagging Center send Operator to Relay Room to pull fuses for SRV per Enclosure A in AOP 20.000.25 ***ROLE PLAY: Send Operator to Relay Room to pull fuse for SRV A per Enclosure A in AOP*** ***ROLE PLAY: After about 3 min, call CR on phone and report standing by to pull fuses for SRV A*** • Crew Update "Pulling fuses on SRV A" • Directs operator to pull fuses on SRV A • Reports indication lost on SRV A after fuses are pulled ***ROLE PLAY: After about 3 min, contact CR on phone and report fuses pulled on SRV A*** o May direct operator to monitor SRV A tailpipe temperature in Relay Room
	ATC	• Reports Steam Flow – Feed Flow mismatch returned to original value o May report MW returned to original value

Op-Test No.: 2009-1 Scenario No.: 3 Event No.: 7 Page 9 of 16

Event Description: CRD A Flow Control Valve Fails Closed

Time	Position	Applicant's Actions or Behavior
+55 min		***MALFUNCTION – C11MF004 – A CRD Flow Control Valve Failure***
	SRO	• Acknowledges Alarm • Acknowledges Report that A CRD FCV is closed • Enters AOP 20.106.03, Crew Update: "entering AOP for CRD Flow Control Valve failure" • Conducts AOP Brief • Directs ATC to shift to B FCV per AOP subsequent Action B1 • Acknowledges B FCV in service
	ATC	• Announces Alarm 3D13 • Identifies/Reports A CRD FCV is closed • Dispatches operator to investigate failure of A FCV ***ROLE PLAY: Investigate failure of A FCV*** ***ROLE PLAY: After about 2 min, report no apparent cause for A FCV failure*** • Directs operator to check CRDM temperatures in Relay Room ***ROLE PLAY: - Check CRDM temperatures in the Relay Room*** • Informs Reactor Building Rounds – shifting to B FCV ***ROLE PLAY: Shifting to B FCV*** • Directs operator to place C11-K009A flow controller in MANUAL ***ROLE PLAY: Place C11-K009A in MANUAL*** ***ROLE PLAY: C11-K009A is in MANUAL*** • Directs operator to rotate Valve Control Knob for failed FCV until valve indicates closed ***ROLE PLAY: Rotate Valve Control Knob for failed FCV until valve indicates closed***

Op-Test No.: 2009-1 Scenario No.: 3 Event No.: 7 Page 10 of 16

Event Description: CRD A Flow Control Valve Fails Closed

Time	Position	Applicant's Actions or Behavior
	ATC	***ROLE PLAY: A FCV indicates closed*** • Directs operator to verify standby FCV in Manual and output set to minimum ***ROLE PLAY: Verify standby FCV in Manual and output set to minimum*** ***ROLE PLAY: Standby FCV is in Manual and output is set to minimum*** • Directs Operator to open C1100-F046B and F047B ***ROLE PLAY: Open C1100-F46B and F047B*** ***ROLE PLAY: C1100-F046B and F047B are open*** • Set C11K612 to MANUAL and set to minimum • Directs operator to place C11-K009B in AUTOMATIC ***ROLE PLAY: Place C11-K009B in Automatic*** ***ROLE PLAY: C11-K009B is in AUTOMATIC*** • Directs operator to close C1100-F046A and F047A ***ROLE PLAY: Close C1100-F046A and F047A*** ***ROLE PLAY: C1100-F046A and F047A are closed*** • Increase flow with CRD flow Controller to 63 GPM and place controller in AUTO • Report B FCV in service
	BOP	• Monitors plant during Flow Control Valve shift

Op-Test No.: 2009-1 Scenario No.: 3 Event No.: 8 Page 11 of 16

Event Description: Spurious MSIV Closure. Reactor Scram

Time	Position	Applicant's Actions or Behavior
+65 min		***MALFUNCTION - B21MF0009 - 00012 – Inboard MSIV Closures*** ***MALFUNCTION - NACDN22M801ATVSP – Condenser Pumps Trip*** ***MALFUNCTION – B21MF0029 – SRV G Failure***
	SRO	• Directs crew to prepare Scram reports • Completes Scram Reports • Enters EOP 29.100.01 Sheet 1 • Directs BOP verify isolations and actuation for level as they occur • Directs BOP to maintain RPV level 173 to 214 inches • Directs BOP to maintain RPV pressure 900 to 1050 psig • Directs ATC to perform Scram Procedure AOP 20.000.21
	ATC	• Announces Reactor Scram • Places Mode Switch in SHUTDOWN • Gives Scram Report • Takes actions per AOP 20.000.21, Reactor Scram
	BOP	• Gives Scram Report • Verifies isolations and actuation for level as they occur • Monitors and maintains RPV pressure 900 to 1050 psig using Low –Low Set • Attempts to maintain RPV Level 173 to 214 inches o May identify G SRV open

Op-Test No.: 2009-1 Scenario No.: 3 Event No.: 9 Page 12 of 16

Event Description: HPCI isolates on start signal at L2.

Time	Position	Applicant's Actions or Behavior
+70 min		***MALFUNCTION - E41MF0005 – Spurious HPCI Isolation***
	SRO	• Acknowledges HPCI Isolation/unavailable • Directs BOP to restore and maintain 0 to 214 inches RPV level • Conducts EOP Brief o May request help from Tagging Center to investigate HPCI isolation
	BOP	• Identifies HPCI isolation • Use other systems for RPV Injection • Reports cannot restore and maintain 173 to 214 inches • Attempts to maintain RPV level 0 to 214 inches o May direct Rounds Operator to investigate cause of HPCI isolation o May attempt to start tripped Condenser Pumps

Op-Test No.: 2009-1 Scenario No.: 3 Event No.: 10 Page 13 of 16

Event Description: SBFW N2103F001 fails to fully open. RCIC Discharge Valve failure.

Time	Position	Applicant's Actions or Behavior
+75 min		***MALFUNCTION - N21MF0031 – SBFW N2103F001 Failure*** ***MALFUNCTION – E51RF0011 – E5100F0013 Breaker Open***
	SRO	• Acknowledge SBFW N2103-F001 not full open • Acknowledges loss of RCIC
	BOP	• Identifies SBFW F001 valve not full open and providing limited flow • Directs operator to investigate N2103-F001 Valve on SBFW ***ROLE PLAY: Investigate failure of SBFW N2103-F001*** • Identifies RCIC not injecting, E5100F013 lost power. • Directs operator to investigate MCC position for E5100F013 ***ROLE PLAY: Investigate MCC position for E5100F013 at 2PA-1-3B*** ***ROLE PLAY: After about 3 minutes, report N2103-F001 partially open and Actuator damaged, hand-wheel on floor.*** ***ROLE PLAY: After about 5 minutes, report MCC position 2PA-1-3B appears damaged. Black char marks on door vents and burned insulation smell, no smoke, no fire***

Op-Test No.: 2009-1 Scenario No.: 3 Event No.: 11 Page 14 of 16

Event Description: RPV level continues to lower. Inhibit ADS

Time	Position	Applicant's Actions or Behavior
	SRO	• Acknowledges cannot maintain level above TAF • Directs BOP to Inhibit ADS • Directs ATC to Inject SLC • Directs ATC to start 2ND CRD Pump per 29.ESP.04 • Acknowledges SLC Pump started • Acknowledges 2nd CRD Pump Started • Conducts brief for Emergency Depressurization
	BOP	• Reports cannot maintain level above TAF • BOP inhibits ADS **(CRITICAL TASK)** • Monitors RPV level, reports level to SRO • Reports level at Level 1, and auto start of RHR and Core Spray Pumps.
	ATC	• Start SLC A or B Pump • Reports SLC Pump started • Start 2nd CRD pump per 29.ESP.04 • Reports 2nd CRD Pump started

Op-Test No.: 2009-1 Scenario No.: 3 Event No.: 12 Page 15 of 16

Event Description: Emergency Depressurization

Time	Position	Applicant's Actions or Behavior
		MALFUNCTION – B21MF0030 – H SRV Failure
	SRO	• Transitions to EOP 29.100.01 Sheet 3 • Directs BOP to Open 5 SRVs, ADS preferred • Directs ATC to restore Drywell Pneumatics • Acknowledges SRV report
	BOP	• Monitors RPV Level • Reports RPV Level at Top of Active Fuel • Attempts to 5 ADS SRVs, determines only 4 will open • Opens additional SRV • Reports to SRO that 5 SRVs are open and 1 ADS SRV did not open **(CRITICAL TASK)** • After 461#, Reactor Low Pressure Alarm, reports Low pressure systems aligning for injection
	ATC	• Monitors RPV level

Op-Test No.: 2009-1 Scenario No.: 3 Event No.: 13 Page 16 of 16

Event Description: Restore and Maintain RPV Level 173 to 214 inches

Time	Position	Applicant's Actions or Behavior
	SRO	• Directs BOP/ATC to restore and maintain RPV level 173 to 214 inches • Directs BOP to coordinate level restoration • Acknowledges Level in Band • Directs ATC to close E1150-F010 valve • Directs ATC to place Division 1 RHR in Torus Cooling and Torus Spray
	BOP	• Acknowledges maintain RPV level 173 to 214 inches • Reports RPV injection from Core Spray and RHR pumps • Maintains full injection until RPV level is above TAF • Directs ATC to shutdown pumps as needed • Directs ATC to throttle flow as needed • Shuts down pumps as needed • Throttles flow as needed • When RPV level is in band, reports level in band to SRO **(CRITICAL TASK)**
	ATC	• Shuts down Pumps as directed • Throttles flow as directed. • Closes E1150-F010 Valve • Starts Division 1 RHR in Torus Cooling/Torus Spray Mode

Facility: Fermi 2 **Scenario No.** 4 **Op-Test No:** 2009-1

Examiners: C. Moore **Operators:** _____
C. Zoia _____
C. Phillips _____

Initial Conditions: IC-19, EOC, 100% Rx. Power

Turnover: The plant is currently operating at 100% Power at EOC. The Center Heater Drain Pump is out of service for pump rebuild. Expected return to service is 5 days. Plans for the shift are to shift CRD pumps. Grid load is very high due to abnormally high outside air temperatures. SOC has requested plant maintain maximum generation.

NOTE: The crew's Pre-job Briefing is to be conducted prior to entering the simulator. (Suggested time 30 minutes prior to beginning the scenario.)

Event No.	Malf. No.	Event Type*	Event Description
1	NA	N(ATC) N(SRO)	ATC Shifts CRD Pumps per 23.106 Section 5.1. B CRD running
2	P42MF0005	C(BOP) C(SRO)	Trip of Center RBCCW Pump. AOP 20.127.01. BOP starts standby Pumps and restores D1/D2 EECW to standby
3	C51MF0003	I(ATC) I(SRO)	APRM 3 Upscale to 120%. ATC Bypasses APRM 3. TS LCO 3.3.1.1 Tracking LCO
4	NC04LS_LXPN436BZSOUT N30RF0030	C(BOP) C(SRO)	Problem with 6S FW Heater level transmitter causes momentary High Level signal resulting in Extraction Steam Valve closure. MCC position trips when attempt made to re-open valve. Fuse replacement by Rounds allows valve to be opened.
5	NA	R(ATC) R(SRO)	Loss of FW Heating due to 6S Heater problem. AOP 20.107.02 entry. Power increase from FW temperature decrease. SRO directs power reduction. Rod insertion or flow decrease to lower power by ATC
6	C11MF1117	C(ATC) C(SRO)	Shaft Shear on B CRD Pump. AOP 20.106.01 entry. ATC starts A CRD Pump
7	E41MF0010	I(BOP) I(SRO)	Spurious start on HPCI. BOP shuts down HPCI. SRO enters TS LCO 3.5.1. BOP Verifies RCIC Operable.

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

Facility: Fermi 2 **Scenario No.** 4 **Op-Test No:** 2009-1

Examiners: C. Moore **Operators:** _____
C. Zoia _____
C. Phillips _____

Initial Conditions: _____.

NOTE: Continued from page 1

Event No.	Malf. No.	Event Type*	Event Description
8	E41MF0007 E4AHCLOSETVSP E4AQFU_TR1CC	C(BOP) C(SRO)	Steam leak on HPCI. SRO enters EOP 29.100.01 Sheet 5 HPCI fails to isolate, E41F002 Fuse Blows and E41F600 fails to operate. Rounds replaces fuse in E41F002 after ED and valve closes isolating leak.
9	NA	M(ALL)	SRO directs Manual Scram before MSO in HPCI Room ATC places Mode Switch in Shutdown. **(CT)** SRO enters EOP 29.100.01 Sheet 1. BOP/ATC restores and maintains RPV level 173 to 214 inches.
10	TA20TEN425ZSOUT TA20TEN206ZSOUT	M(ALL)	Rising temperature in SE Core Spray Pump Room exceed MSO requiring ED. SRO enters EOP 29.100.01 Sheet 3 and directs ED **(CT).** BOP opens 5 ADS SRVs. BOP/ATC maintain RPV level. All room temps trend down.

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

Op-Test No.: 2009-1 Scenario No.: 4 Event No.: NA Page 1 of 13

Event Description: Overview

Initial Conditions:

The plant is currently operating at 100% Power at MOC. The Center Heater Drain Pump is out of service for pump rebuild. Expected return to service is 5 days. Plans for the shift are to shutdown Division 1 RHRSW Pumps following Biocide Injection. Grid load is very high due to abnormally high outside air temperatures.

The objectives of this scenario are to:

1. Recognize, respond to, and take the required actions for an instrument / equipment failures requiring the use of operator and Tech Spec actions.
2. Direct and supervise the Shift team during Normal, Abnormal, and Emergency operations.
3. Recognize and Respond to RBCCW Pump Trip
4. Recognize and Respond to APRM Failure
5. Recognize and Respond to CRD Pump Failure
6. Recognize and respond to Spurious Start of HPCI
7. Recognize and respond to Steam Leak in Reactor Building
8. Execute steps of Secondary Containment Control EOP 29.100.01 Sheet 5
9. Execute steps of RPV Control EOP 29.100.01 Sheet 1
10. Execute steps of Emergency Depressurization EOP 29.100.01 Sheet 3

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

1. Shutdown Division 1 RHRSW Pumps
2. Trip of Center RBCCW Pump
3. APRM 3 Failure to 120% (TS LCO 3.3.1.1)
4. 6S Feedwater Heater Level Transmitter Failure
5. Loss of Feedwater Heating
6. CRD Pump Failure
7. HPCI Spurious Start (TS LCO 3.5.1)
8. Unisolable Steam Leak in Reactor Building
9. Manual Reactor Scram
10. Emergency Depressurization for 2 temperatures > MSO

Op-Test No.: 2009-1 Scenario No.: 4 Event No.: 1 Page 2 of 13

Event Description: Shutdown D1 RHRSW Pumps

Time	Position	Applicant's Actions or Behavior
0 min	SRO	• Directs BOP to shutdown Division1 RHRSW Pumps per 23.208 • Acknowledges pump shutdown complete
	BOP	• Conducts short brief for RHRSW Pump shutdown per 23.208 section 8.1 • Informs Reactor Building Rounds that Division 1 RHRSW are being shutdown ***ROLE PLAY: Shutting Down Division 1 RHRSW Pumps*** • Directs Reactor Building Rounds to stop Division1 RHRSW Radiation Monitor Sample Pump ***ROLE PLAY: Stop Division 1 RHRSW Radiation Monitor Sample Pump*** ***ROLE PLAY: After about 1 min, report Division 1 RHRSW Radiation Monitor Sample Pump is shutdown.*** • Crew Update:, “Shutting down Division 1 RHRSW Pumps” • Depress CLOSE Pushbutton on E1150-F068A • When flow indicates approximately 550 GPM: o Shutdown RHRSW Pump A o Shutdown RHRSW Pump C • Verify E1150-F068A fully closes • Reports Division 1 RHRSW Pumps shutdown.

Op-Test No.: 2009-1 Scenario No.: 4 Event No.: 2 Page 3 of 13

Event Description: Trip of Center RBCCW Pump.

Time	Position	Applicant's Actions or Behavior
+10 min		***MALFUNCTION – P42MF0005 – Trip of Center RBCCW Pump***
	SRO	• Acknowledges trip of Center RBCCW Pump • Enters AOP 20.127.01 • Conducts AOP Brief • Directs BOP to start South RBCCW Pump • Directs BOP to perform Attachment 1 of 20.127.01 • Directs BOP to place EECW/EESW in standby • Acknowledges overload condition at 72F-2D • Acknowledge EECW back in standby o May brief and exit AOP
	BOP	• Reports trip of Center RBCCW Pump • Verifies Division 1 and 2 EECW Auto starts • Dispatch Operator to check Center RBCCW Pump for cause of trip. ***ROLE PLAY: Check Center RBCCW Pump for cause of pump trip.*** • Dispatch Operator to check breaker for Center RBCCW Pump at 72F – 2D ***ROLE PLAY: Check Center RBCCW Pump Breaker at 72F-2D for cause of pump trip.*** • Informs RB Rounds that South RBCCW Pump is being started. ***ROLE PLAY: Starting South RBCCW Pump*** • Starts South RBCCW Pump ***ROLE PLAY: RB Rounds reports, "Good Start on South RBCCW Pump"*** ***ROLE PLAY: After about 5 min, Operator reports, "No apparent cause for trip at Center RBCCW Pump"*** ***ROLE PLAY: After about 5 min, Operator reports, "At 72F-2D, Center RBCCW Pump, have an overload flag showing on breaker."*** • Informs SRO of overload condition at 72F-2D

Op-Test No.: 2009-1 Scenario No.: 4 Event No.: 2 Page 4 of 13

Event Description: Trip of Center RBCCW Pump.

Time	Position	Applicant's Actions or Behavior
	BOP	• Performs Attachment 1 of 20.127.01 • Places EECW/EESW in standby per SOP 23.127 • Informs SRO that EECW/EESW back in Standby

Op-Test No.: 2009-1 Scenario No.: 4 Event No.: 3 Page 5 of 13

Event Description: APRM 3 Upscale to 120%.

Time	Position	Applicant's Actions or Behavior
+25 min		***MALFUNCTION - C51MF0003 – APRM 3 Failure***
	SRO	o May acknowledge Alarms 3D97, 3D101, 3D102, 3D113 • Acknowledges APRM failure • Enters TS LCO 3.3.1.1 (Tracking LCO) • Directs ATC to Bypass APRM 3
	ATC	o May announce Alarms 3D97, 3D101, 3D102 3D113 • Reports APRM 3 Failure • Directs Operator to Relay Room to check APRM 3 ***ROLE PLAY: Investigate failure of APRM 3 in the Relay Room*** • Reviews applicable ARPs • Provide applicable TS listed in ARPs to SRO • Bypass APRM 3 ***ROLE PLAY: After about 3 min, (by telephone) report no apparent cause for APRM 3 failure***

Op-Test No.: 2009-1 Scenario No.: 4 Event No.: 4 Page 6 of 13

Event Description: 6S Feedwater Heater Level Transmitter Failure

Time	Position	Applicant's Actions or Behavior
+30 min		***MALFUNCTION - NC04LS_LXPN436BZSOUT – 6S FW Heater Level Transmitter*** ***MALFUNCTION – N30RF0030 – N3016F614 Breaker Trip***
	SRO	• Acknowledge 6S Heater High level Alarm • Acknowledge Lowering Feedwater Temperature o Acknowledge Heater 6S Emergency Drain open • Acknowledge rising reactor power
	BOP	• Announce 6S Heater High Level Alarm • Report Extraction Steam Valve to 6S Heater closing o Report Heater 6S Emergency Drain Valve open • Report lowering Feedwater temperature
	ATC	• Report rising reactor power

Op-Test No.: 2009-1 Scenario No.: 4 Event No.: 5 Page 7 of 13

Event Description: Loss of Feedwater Heating

Time	Position	Applicant's Actions or Behavior
+40 min	SRO	• Enters AOP 20.107.02, Crew Update, “entering AOP for Loss of Feedwater Heating • Conducts AOP brief • Directs ATC to reduce power by performing Subsequent Action A1 of 20.107.02 • Directs BOP to validate Feedwater Temperature reduction per subsequent Action A2 of 20.107.02 • Contacts SNE
	ATC	• Reports power at about 103% • Lowers power by lowering Core Flow on both RRMG sets • Lowers power by insert Cram Array rods • After lowering power, reports to SRO, back on the power to flow map
	BOP	• Validates Feedwater Temperature reduction per subsequent Action A2 of 20.107.02 (Enclosure A) • Reports Feedwater Temperature is in acceptable range

Op-Test No.: 2009-1 Scenario No.: 4 Event No.: 6 Page 8 of 13

Event Description: Shaft Shear on A CRD Pump

Time	Position	Applicant's Actions or Behavior
+50 min		***MALFUNCTION - C11MF1117 – Shaft Shear on B CRD Pump***
	SRO	• Acknowledges Alarm 3D5 • Acknowledges problem with A CRD Pump • Enters AOP 20.106.01, Crew Update, “entering AOP for loss of CRD Hydraulics” • Conducts AOP Brief • Directs ATC to perform Subsequent Action A of 20.106.01 • Acknowledges Alarm 3D13 • Acknowledge B CRD Pump running • Directs ATC to shutdown A CRD Pump • Acknowledge reports from field o Contact WWM for assistance and follow-up o May exit AOP
	ATC	• Announces Alarm 3D5 • Identifies problem with A CRD Pump • Dispatches Reactor Building Rounds Operator to check A CRD Pump. ***ROLE PLAY: Investigate A CRD Pump and verify B CRD Pump ready for start*** • Places CRD Flow Controller in MANUAL and closes Flow Control valve • Close Pressure Control Valve C1152-F003 • Announces Alarm 3D13 • Dispatches operator to check temperature on CRD mechanisms in Relay Room. ***ROLE PLAY: Check CRDM Temperatures in Relay Room.***

Op-Test No.: 2009-1 Scenario No.: 4 Event No.: 6 Page 9 of 13

Event Description: Shaft Shear on B CRD Pump

Time	Position	Applicant's Actions or Behavior
	ATC	***ROLE PLAY: After about 3 min, Operator reports B CRD Pump ready for start. Reports motor running on A CRD Pump, but pump not rotating.***
		• Provide reports from field to SRO
		• Informs Reactor Building Rounds, starting B CRD Pump
		ROLE PLAY: Starting B CRD Pump
		• Starts B CRD Pump
		• Adjusts CRD flow and pressure as required and places CRD Flow Controller in AUTO
		ROLE PLAY: After about 1 min, report good start on B CRD Pump
		• Report B CRD Pump running
		• Shuts down A CRD Pump
		ROLE PLAY: After about 5 min and after B CRD Pump start, report (by telephone),1 CRDM Alarmed, 34-31. Highest temperature was 260 F and now lowering. Acknowledging alarm to clear CR annunciator.
		• Report CRDM temp/status to SRO

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Event Description: Spurious Start of High Pressure Coolant Injection System

Time	Position	Applicant's Actions or Behavior
+60 min		***MALFUNCTION - E41MF0010 – Spurious Start on HPCI***
	SRO	• Acknowledge Alarm 2D28 • Acknowledge HPCI start • Acknowledges invalid start signal on HPCI • Directs BOP to shut down HPCI • Acknowledges HPCI is shutdown • Declares HPCI inop, enters TS LCO 3.51, TRM 3.5.1 • Directs BOP to verify RCIC is operable o Contacts WWM for assistance and follow-up
	BOP	• Announces Alarm 2D28 • Announces HPCI is initiating • Verifies HPCI start is invalid, by checking RPV level and drywell pressure and reports to SRO • Shuts down HPCI using Hard Card • Reports HPCI is shutdown • Verifies RCIC is operable using SOP 23.206 o May direct operator to Testability Cabinets to investigate for any initiation signals
	ATC	• Monitors Reactor Power

Op-Test No.: 2009-1 Scenario No.: 4 Event No.: 8 Page 11 of 13

Event Description: Steam Leak on HPCI – Sec Cont EOP Entry

Time	Position	Applicant's Actions or Behavior
+65 min		***MALFUNCTION - E41MF0010 – HPCI Steam Leak***
	SRO	• Acknowledges Alarm 3D34, 1D66 • Announces rising temperature in HPCI Room on IPCS, Crew Update, “rising temperatures in HPCI Room” • Enters EOP 29.100.01 Sheet 5, Crew Update, “entering EOP on Secondary Containment temperature” • Directs BOP to isolate HPCI system • Acknowledges unable to isolate HPCI
	ATC	• Announces Alarm 3D34
	BOP	• Announces Alarm 1D66 • Reports automatic isolation of HPCI has failed after 2D49 and 2D53 • Attempts to isolates HPCI by closing E4150-F002 and/or E4150-F600 • Reports E4150-F600 failed to operate • Reports E4150-F002 MCC position tripped • Reports to SRO unable to isolate HPCI • Directs Operator to check MCC position for E4150-F002 at 72C-3A-4A ***ROLE PLAY: Check MCC for E4150-F002 at 72C-3A-4A (continued to next event)***

Op-Test No.: 2009-1 Scenario No.: 4 Event No.: 9 Page 12 of 13

Event Description: Manual Scram – RPV Control EOP Entry

Time	Position	Applicant's Actions or Behavior
+70 Min	SRO	• Conducts EOP Brief • Directs ATC to place Mode Switch in SHUTDOWN before room Temperature reaches MSO • Request Scram Reports • Enters EOP 29.100.01, Crew Update, “Entering EOPs on Level 3” • Directs BOP to verify isolations and actuations for level as they occur • Directs BOP to restore and maintain RPV level 173 to 214 inches • Directs BOP to maintain RPV pressure 900 to 1050 psig • Directs ATC to AOP 20.000.21 to perform scram actions • Conducts EOP brief
	ATC	• Places Mode Switch in SHUTDOWN **(CRITICAL TASK)** • Provides Scram Report • Performs Scram AOP 20.000.21 as directed.
	BOP	• Provides Scram Report • Verifies isolations and actuations for level as they occur • Restores and maintains RPV level 173 to 214 inches with available systems • Maintain RPV pressure 900 to 1050 psig with Bypass Valves ***ROLE PLAY: After about 5 min, report no indications of problem at 72C-3A-4A after visual inspection. Request permission to open door and check fuses.*** • Directs operator to open door on MCC ands check fuses at 72C-3A-4A ***ROLE PLAY: Open door and check fuses at 72C-3A-4A***

Op-Test No.: 2009-1 Scenario No.: 4 Event No.: 10 Page 13 of 13

Event Description: Second Temp > MSO – Emergency Depressurization

Time	Position	Applicant's Actions or Behavior
+75 min		***MALFUNCTION - TA20TEN206ZSOUT – CS Pump Room Temperature***
	SRO	• Announces rising temperatures in Southeast Core Spray Pump Room • Conducts Emergency Depressurization Brief • Enters 29.100.01 Sheet 3 • Directs BOP to Prevent injection from pumps not required for ACC • When >MSO temperature in 2 areas, directs BOP to open 5 SRVs, ADS preferred • Directs ATC to restore Drywell pneumatics • Directs ATC to place Division 1 RHR in Torus Cooling • Identifies in IPCS that room temperatures are lowering • Crew Update: “Room temperatures in Reactor Building are lowering”
	ATC	• Restores Drywell Pneumatics • Assist with RPV level control • Start Division 1 RHR in Torus Cooling (HARD CARD)
	BOP	• Shuts down all RHR and CS pumps • Opens 5 ADS SRVs **(CRITICAL TASK)** • Maintains RPV level 173 to 214 inches with FW and/or SBFW ***ROLE PLAY: After ED in progress, report that fuses at 72C-3A-4A were blown, new fuses have been obtained and installed, ready to close breaker for E4150-F002*** • Directs operator to re-energize E4150-F002 ***ROLE PLAY: Operator reports breaker closed for E4150-F002*** • Identifies E4150-F002 energized and closing • Reports to SRO that E4150-F002 closed