Facility: Fermi 2 Scenario No.: SCN #1 Op-Test No: ILO-2019-1

Examiners: See Attached Exam Matrix Operators: See Attached Exam Matrix

Initial Conditions: MODE 1. 100% reactor power. #6 GSW Pump is out of service.

Turnover: #6 GSW Pump is out of service for motor replacement. Installation of a new motor is in progress. Return to service is expected tomorrow late in the day. Plans for the shift are to maintain the current power level. Division 2 RHR is in Torus Cooling. The shift will place D1 RHR in Torus Cooling IAW 23.205 Section 6.3.3, Discharge to Div 1 Torus Cooling Path, in preparation for HPCI Testing on the next shift. ODMI-19-006d for Steam Leak on 3rd MSIV N11F610 is provided. TB-3 floor plugs are not installed. A Camera has been installed to monitor the leak. The leak rate is stable. Outside air temperature is expected to be very high today along with very high power demand on the grid.

Critical Tasks: ATWS-RODS, PC-TWL-ED, PC-TWL-SCRAM

Event No.	Malf No.	Event Type*	Event Description
1	E11MF0029 E11MF0034	N (BOP) N (SRO)	Place RHR in service to support Torus Cooling.
2	E11MF0029 E11MF0034	C (BOP) C (SRO) TS	RHR Pump "A" or "C" Shaft Shear (whichever is running). SRO evaluates LCO 3.5.1.
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	P80MF0015	C (BOP) C (SRO) TS	Electric Fire Pump (EFP) spurious start due to a bumped instrument drain valve. BOP shuts down EFP. SRO evaluates LCO TR 3.12.2.
5	B21MF0104	R (ATC) R (SRO)	Turbine Building Steam Tunnel Area Temperature greater than 190°F due to steam leak on N1100F610. ODMI required power reduction.
6	B21MF0034 BABBF1MCC B21MF0034	C (BOP) C (SRO)	SRV M Opens / Closes when fuses are pulled.
7	E11MF0047	M (All)	Torus Leak at 1"/min., caused by SRV opening, will drive to scram.
8	N30MF0070 N30MF0071 **PC-TWL-SCRAM**	C (BOP) C (SRO)	Unisolable Torus Leak (cannot maintain TWL above -38") Scram. (CT) "E" and "W" Bypass Valves Fails Closed.
9	C71MF0006 **ATWS-RODS**	C (ATC) C (SRO)	RPS Fails to Cause a Scram / Rods insert with manual ARI actions by RO. (CT)
10	**PC-TWL-ED**	M (All)	Emergency Depressurize (ED).(CT)

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

A. NARRATIVE SUMMARY

MODE 1. 100% reactor power. #6 GSW Pump is out of service.

#6 GSW Pump is out of service for motor replacement. Installation of a new motor is in progress. Return to service is expected tomorrow late in the day. Plans for the shift are to maintain the current power level.

Division 2 RHR is in Torus Cooling. The shift will place D1 RHR in Torus Cooling IAW 23.205 Section 6.3.3, Discharge to Div 1 Torus Cooling Path, in preparation for HPCI Testing on the next shift.

ODMI-19-006d for Steam Leak on 3rd MSIV N11F610 is provided. TB-3 floor plugs are not installed. A Camera has been installed to monitor the leak. The leak rate is stable. Outside air temperature is expected to be very high today along with very high power demand on the grid.

Event: 1

The shift will place D1 RHR in Torus Cooling IAW 23.205 Section 6.3.3, Discharge to Div 1 Torus Cooling Path, in preparation for HPCI Testing on the next shift.

Event: 2

While placing RHR in Torus Cooling, the selected pump (A or C) will encounter a shaft shear. The CRS will evaluate Tech Specs for this condition.

Event: 3

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.

Event: 4

A spurious start of the Electric Fire Pump (EFP) will occur, which is caused by a plant cleaner bumping into an instrument drain valve. The crew will shut down the EFP which will require the SRO to evaluate the TRM.

Event: 5

During a startup walkdown coming out of RF-19, a steam leak on valve N1100F610 was observed. Valve N1100F610 is the third main steam isolation valve (MSIV) located on Main Steam Line (MSL) B on the Turbine Building 2nd Floor mezzanine, upstream of the 52-inch Steam Manifold. The valve is leaking by the pressure seal gasket, which is causing a steam leak at the bonnet knock-out hole. Due to rising outside air temperatures Turbine Building Steam Tunnel Area Temperature will go greater than 190°F; leak size remains stable. This will require a reduction in Reactor Power using flow.

Event: 6

SRV M will open, requiring the crew to enter the Stuck Open SRV AOP and take actions. The SRV will close when fuses are pulled.

Event: 7 to 10

An unisolable leak from the Torus will occur. The leak will cause a high Torus Room Sump level condition, and both sump pumps to run, which is an EOP entry condition.

The operators will implement a leak isolation strategy; however, the torus leak is unisolable, requiring a reactor scram before Torus Water Level lowering below -38". Control Rods will not insert on the scram, due to a failure of RPS, but manual Alternate Rod Insertion (ARI) actions by the operators will insert the control rods and shut down the reactor.

As Torus Water Level continues to lower, the crew will anticipate Emergency Depressurization (ED) and try to fully opening the failed Main Turbine Bypass Valves, however Main Turbine Bypass Valves will not open. The crew will ED by opening 5 SRVs when TWL cannot be kept greater than -38".

SCENARIO CRITIQUE			
Place a check mark in the column corresponding to the performance, non-performance or non-applicability of any CRITICAL TASK. **It should be noted that no scenario can anticipate all operator actions. As a result, some critical tasks may not be required to be performed.** **CRITICAL TASK EVALUATION CRITERIA**	PERFORMED	NOT PERFORMED	NOT APPLICABLE
PC-TWL-ED *When suppression pool water cannot be maintained greater than -38 inches,* ***INITIATE Emergency Depressurization****.* ***BASES****: Safety Significant -The -38" limit is used in conjunction with the HCL and PSP curves to preclude failure of the containment or equipment necessary for the safe shutdown of the plant, and to preclude loss of the suppression function of containment.* *Cue -Suppression pool level cannot be maintained greater than -38".* *Performance Indicator -Initiate emergency depressurization using SRVs -OR- anticipate emergency depressurization, depressurizing using the Bypass valves and ignoring cooldown rates such that the reactor vessel is depressurized.* *Feedback -Reactor pressure is decreasing.*			
ATWS-RODS *With a reactor scram required and the reactor not shutdown,* ***TAKE ACTION TO REDUCE POWER*** *by inserting control rods, to prevent exceeding the primary containment design limits.* ***BASES****: Safety Significant -The challenge to containment becomes the limiting factor that defines the requirement for boron injection. If control rods can be inserted sufficiently to shutdown the reactor, boron injection may be terminated or avoided altogether. Thus shutting down the reactor can preclude failure of containment or equipment necessary for the safe shutdown of the plant.* *Cue -Reactor scram required and the reactor not shutdown.* *Performance Indicator -Reducing reactor power to prevent exceeding primary containment design limits.* *Feedback -Reactor Power is decreasing.*			
PC-TWL-SCRAM *With reactor at power and suppression pool water level cannot be maintained greater than -38",* ***MANUALLY SCRAM*** *the reactor before reaching -38".* ***BASES****: Safety Significant – The -38" limit bounds the HCL and PSP Curves. If action to control suppression pool water level is ineffective, then initiation of a reactor scram, if one has not yet been initiated, assures the reactor is scrammed and shutdown before RPV depressurization is initiated.* *Cue -Suppression pool level is approaching the HCL and PSP bounding limit of -38".* *Performance Indicator -Initiate a reactor manual scram before pressure reduction.* *Feedback -Reactor scram is inserted.*			

NOTE:
For any significant crew deviations from the validated time, submit an AIM for further evaluation by the instructional designer. IF the result of the AIM is that the operator should have been able to complete the actions as designed (based on objective data and knowledge of plant design), THEN submit a CARD for resolution.

Facility: Fermi 2 Scenario No.: SCN #2 Op-Test No: ILO-2019-1

Examiners: See Attached Exam Matrix Operators: See Attached Exam Matrix

Initial Conditions: MODE 1. 90% reactor power.

Turnover: The plant is operating at 90% following a rod pattern adjustment. Power is being held at 90% pending an evaluation of thermal limits by Reactor Engineering. GOP 20.000.03 4.2.20, 4.2.21 complete. Next GOP step 4.2.22.

Critical Tasks: RPV– LL–ED, RPV–LL–FLOOD

Event No.	Malf No.	Event Type*	Event Description
1		N (BOP) N (SRO)	Start Center RBCCW Pump.
2	C51MF0006	I (ATC) I (SRO) TS	APRM Flow Unit #2 fails upscale. ATC bypasses APRM #2 and SRO evaluates LCO 3.3.1.1.
3	E11MF0029 E11MF0031 E11MF0034 E11MF0036	C (ATC) C (SRO)	First division of RHR used for containment, shaft shear RHR pump, forcing the crew to used other division.
4	P42MF0005	C (BOP) C (SRO)	The Center RBCCW pump will trip.
5	R11RF0044	I (BOP) I (SRO) TS	An electrical short occurs causing the fuses in 2PA2-14 Circuit 2 to fail. Loss of control power to bus 72C. SRO evaluates 72CF throw-over scheme INOPERABLE with entry into T.S 3.5.1 and T.S. 3.0.3.
6	N22MF0017 B31MF0070	I (ATC) I (SRO)	North Heater Drain Pump (HDP) Trip Recirc. Manual Runback failure.
7		R (ATC) R (SRO)	RO manually reduces flow for rapid power reduction. Insert CRAM Array.
8	B31MF0049	C (ATC) C (SRO)	Jet Pump Failure. Entry into 20.138.02, Jet Pump Failure AOP.
9	B31MF0067	M (All)	Small LOCA caused by damage from Jet Pump Failure. Slow Rise in Drywell Pressure. Crew Places Mode S/W to Shutdown. Scram Increases LOCA size.
10	E51MF0006	C (BOP) C (SRO)	RCIC Speed control Failure. The operator must start manually.
11	B21MF0073 B21MF0059 B21MF0060 **RPV– LL–ED** **RPV–LL–FLOOD**	M (All)	A Loss of Level will occur that will require ED(CT) and Flooding(CT)

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

A. NARRATIVE SUMMARY

MODE 1. 90% reactor power.

The plant is operating at 90% following a rod pattern adjustment. Power is being held at 90% pending an evaluation of thermal limits by Reactor Engineering. GOP 20.000.03 4.2.20, 4.2.21 complete. Next GOP step 4.2.22.

Event: 1

This shift is to start the Center RBCCW pump for a post-maintenance run per 23.127 Reactor Building Closed Cooling Water/Emergency Equipment Cooling Water System Section 6.1 Alternating RBCCW Pumps.

Event: 2 to 3

APRM #2 will fail upscale. The crew should investigate and subsequently enter Technical Specification LCO 3.3.1.1 as a tracking LCO.

Event: 4

The Center RBCCW pump will trip. This will require entry into 20.127.01, Loss of RBCCW AOP. The crew will start the standby RBCCW pump and take actions to verify proper EECW system initiation and restore cooling to the CRD Pumps.

Event: 5

An electrical short occurs causing the fuses in 2PA2-14 Circuit 2 to fail. This fault will cause a loss of control power to bus 72C. The crew will be alerted by 1D7 & 2D29, which will both come in and clear. The fault will cause an automatic throw-over of 72C-F to 72F. This makes the 72CF throw-over scheme INOPERABLE and T.S 3.5.1 Condition K applies, which puts them in T.S.3.0.3.

Event: 6 to 7

The North HDP will trip requiring the crew to enter the Loss of Feedwater or Feedwater Control AOP and perform a Rapid Power Reduction. Failure of the Recirc Manual Runback pushbutton will require the ATC to manually lower flow. The ATC will evaluate P/F map conditions and insert the CRAM Array as necessary.

Event: 8 to 11

The jet pump failure leads to a degrading condition and a small reactor coolant leak. RCIC will start but will have a speed control failure and will not be able to inject without manual action. The crew will enter 29.100.01 Sheet 2. And a loss of all RPV Level indication will require Emergency Depressurization(ED) and RPV Flooding.

First division of RHR used for containment, shaft shear RHR pump, forcing the crew to used other division.

SCENARIO CRITIQUE			
Place a check mark in the column corresponding to the performance, non-performance or non-applicability of any CRITICAL TASK. **It should be noted that no scenario can anticipate all operator actions. As a result, some critical tasks may not be required to be performed.** **CRITICAL TASK EVALUATION CRITERIA**	**PERFORMED**	**NOT PERFORMED**	**NOT APPLICABLE**
RPV – Loss of Level – *WHEN RPV water level cannot be determined, inject into the RPV to FLOOD the RPV to the Main Steam Lines prior to diverting water from the RPV to containment cooling/sprays OR prior to core damage.* **BASES**: Safety Significant – When RPV water level cannot be determined and pressure is below the MSCP, SRV steam flow may no longer be sufficient to cool the uncovered portion of the core. Injection into the RPV must be established to maintain adequate core cooling by raising RPV pressure above the MSCP or by establishing indications of core flooding to re-establish core submergence. The RPV is therefore flooded to assure that adequate core cooling is established and maintained. The consequences of not establishing flooded RPV conditions, or restoring RPV pressure above the MSCP, under these conditions could include a loss of adequate core cooling or failure of the primary containment. Cue -RPV water level is unknown and RPV pressure is below the MSCP. Performance Indicator – Injection into the RPV occurs to establish flooded conditions or raise RPV pressure above the MSCP for the number of open SRVs. Feedback – Flooded conditions are established or RPV pressure indicates greater than the MSCP for the number of open SRVs.			
RPV – Loss of Level – ED *WHEN RPV water level cannot be determined, depressurize the RPV, ignoring cooldown rate by opening the Minimum Number of SRVs Required for Decay Heat Removal (MNSDHR) of 2 SRVs within 6 minutes of recognizing loss of all RPV Level Indication.* **BASES**: Safety Significant -If RPV water level cannot be determined, adequate core cooling by submergence cannot be verified. The RPV is therefore depressurized to allow for removing heat energy from the RPV and to allow for lower pressure to permit higher injection flowrates, possibly reducing the time to flood the RPV. The consequences of not depressurizing the RPV under these conditions could include a loss of adequate core cooling or failure of the primary containment. Cue -RPV water level is unknown. Performance Indicator -Initiate emergency depressurization, when RPV water level cannot be determined. Feedback -RPV pressure is decreasing.			

NOTE:
For any significant crew deviations from the validated time, submit an AIM for further evaluation by the instructional designer. IF the result of the AIM is that the operator should have been able to complete the actions as designed (based on objective data and knowledge of plant design), THEN submit a CARD for resolution.

Facility: Fermi 2 Scenario No.: SCN #3 Op-Test No: ILO-2019-1

Examiners: See Attached Exam Matrix Operators: See Attached Exam Matrix

Initial Conditions: MODE 1. 100% reactor power.

Turnover: The Center RBCCW is OOS for motor replacement, and is due to be returned to service next week. Plans for the shift are to maintain 100% power.
North TBCCW is being returned to service after maintenance. The shift is to start the North TBCCW for the PMT using the SOP and then shutdown the South TBCCW pump.

Critical Tasks: ATWS-ADS, ATWS-INJ, ATWS-RODS, ATWS-SLC

Event No.	Malf No.	Event Type*	Event Description
1		N (BOP) N (SRO)	Shift TBCCW Pumps.
2	T41MF0002	C (BOP) C (SRO) TS	Div 1 CCHVAC Return Fan will trip. The CRS will enter AOP 20.413.01. The crew will start D2 CCHVAC and shutdown D1. The CRS will evaluate TS LCO 3.7.4 & 3.7.3.
3	P43MF0023	C (BOP) C (SRO)	A leak will occur on the North TBCCW pump. The crew will shift to the South TBCCW pump and isolating the North TBCCW pump.
4	NHAIALARM UNIT554497 V		4D53 - AVR General Alarm.
5		R (ATC) R (SRO)	ARP 4D53 requires reducing reactor power so generator output<2600 Field amps to one thyristor bank.
6	N30MF0020	M (All)	AVR Trip of Turbine, the crew will place Mode Switch to Shut down.
7	C71MF0006 C11MF0001 **ATWS-RODS** **ATWS-ADS**	C (ATC) C (SRO)	Manual RPS Fails to Cause a Scram (Total Scram Failure) and All Rods Stuck, inhibit ADS. (CT) Manually insert control rods per 29.ESP.03 Alternate Control Rod Insertion Methods. (CT)
8	C41MF0004 C41MF0003 **ATWS-SLC**	C (ATC) C (SRO)	SRO directs SLC injection. ATC Injects SLC. Delayed Pump trip. Start Second pump Crew Injects SLC. (CT)
9	**ATWS-INJ**		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)

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

A. NARRATIVE SUMMARY

MODE 1. 100% reactor power.

The Center RBCCW is OOS for motor replacement, and is due to be returned to service next week. Plans for the shift are to maintain 100% power.

North TBCCW is being returned to service after maintenance. The shift is to start the North TBCCW for the PMT using the SOP and then shutdown the South TBCCW pump.

Event: 1

North TBCCW is being returned to service after maintenance.

Event: 2

Div 1 CCHVAC Return Fan will trip. The crew will identify the alarms associated with the failure and review the applicable ARPs. The CRS will enter AOP 20.413.01. The crew will start D2 CCHVAC and shutdown D1. The CRS will evaluate TS LCO 3.7.4 & 3.7.3.

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 South TBCCW pump and isolating the North TBCCW pump.

Event: 4 to 5

4D53 - AVR General Alarm will alarm because one thyristor bank blocked.
Based on the ARP the crew will reduce Reactor Power so Generator output <2600 Field amps.

Event: 6 to 9

The AVR will fail causing a turbine trip. This will result in an ATWS with Total Scram Failure and All Rods Stuck. The crew will inhibit ADS and perform FSQ1-8. When SLC is the first SLC pump will fail after running for 30 seconds. The crew will start the second SLC pump. The crew will insert control rods using 29.ESP.03

The crew will control PRV level <114 inches per the EOPs and will need to terminate and prevent to establish level in band of 50 to 100 inches.

SCENARIO CRITIQUE			
Place a check mark in the column corresponding to the performance, non-performance or non-applicability of any CRITICAL TASK. **It should be noted that no scenario can anticipate all operator actions. As a result, some critical tasks may not be required to be performed.** **CRITICAL TASK EVALUATION CRITERIA**	**PERFORMED**	**NOT PERFORMED**	**NOT APPLICABLE**
ATWS-INJ *When conditions are met to re-establish injection use available injection systems to* ***MAINTAIN*** *RPV water level above the Minimum Steam Cooling RPV Water Level preventing the need for Emergency Depressurization.* **BASES**: Safety Significant -The Minimum Steam Cooling RPV water level is defined to be the lowest RWL at which the covered portion of the reactor core will generate sufficient steam to preclude any clad temperature in the uncovered portion of the core from exceeding 1500°F. When RWL is deliberately lowered, power instabilities may produce noticeable oscillations in RWL and make it difficult to maintain water level exactly at the TAF. The low end of RWL control range is therefore utilized to preclude fuel damage with RWL lowered to below the TAF. Cue -When conditions are met to re-establish injection. Performance Indicator -RPV level is restored and maintained above minimum steam cooling RPV water level. Feedback -RPV level is restored and maintained above minimum steam cooling RWL.			
ATWS-RODS *With a reactor scram required and the reactor not shutdown,* ***TAKE ACTION TO REDUCE POWER*** *by inserting control rods, to prevent exceeding the primary containment design limits.* ***BASES***: *Safety Significant -The challenge to containment becomes the limiting factor that defines the requirement for boron injection. If control rods can be inserted sufficiently to shutdown the reactor, boron injection may be terminated or avoided altogether. Thus shutting down the reactor can preclude failure of containment or equipment necessary for the safe shutdown of the plant.* *Cue -Reactor scram required and the reactor not shutdown.* *Performance Indicator -Reducing reactor power to prevent exceeding primary containment design limits.* *Feedback -Reactor Power is decreasing.*			
ATWS-SLC *With a reactor scram required and the reactor not shutdown, TAKE ACTION TO REDUCE POWER by injecting SLC or Boron using the alternate means, to prevent exceeding the primary containment design limits.* ***BASES***: *Safety Significant -The challenge to containment becomes the limiting factor that defines the requirement for boron injection. Thus shutting down the reactor can preclude failure of containment or equipment necessary for the safe shutdown of the plant.* *Cue -Reactor scram required and reactor not shutdown.* *Performance Indicator -Reducing reactor power to prevent exceeding primary containment design limits.* *Feedback -Reactor Power is decreasing.*			
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.* ***BASES***: *Safety Significant -In order to effect a reduction in reactor power, actions may be taken to lower RPV water level to a level below the automatic initiation setpoint of ADS. This actuation imposes a severe thermal transient on the RPV and may significantly complicate efforts to restore and maintain RPV water level. Further, rapid and uncontrolled injection of large amounts of relatively cold, unborated water from low pressure injection systems may occur. This would quickly dilute in-core boron concentration and might add sufficient positive reactivity to cause a reactor power excursion large enough to severely damage the core.* *Cue -ATWS, prevent an uncontrolled RPV depressurization.* *Performance Indicator -Inhibit ADS.* *Feedback -ADS inhibited white lights and alarm window.*			

Facility: Fermi 2 Scenario No.: SCN #5 Op-Test No: ILO-2019-1

Examiners: See Attached Exam Matrix Operators: See Attached Exam Matrix

Initial Conditions: MODE 1. 100% reactor power.

Turnover: North TWMS Pump Tagged out for motor replacement. Div 1 RHRSW Reservoir Chemical Treatment is in progress. Plans for the shift are to maintain 100% power.
After taking the shift you are to start the Div 1 EESW pump per 23.208 Section 5.9 EESW Manual Initiation for Reservoir Chemical Treatment per PST event AG75, AH75, AI75.

Critical Tasks: SC-ED, SC-SCRAM

Event No.	Malf No.	Event Type*	Event Description
1		N (BOP) N (SRO)	Start the Div 1 EESW pump IAW the SOP for Reservoir Chemical Treatment per PST.
2	P41MF0009	C (BOP) C (SRO)	Oil Leak on #6 GSW Pump. Crew will start standby GSW pump and shutdown #6 GSW pump.
3	C11MF1106 B21MF0094 C11RF0395	I (ATC) I (SRO) TS	B21-N078A, Reactor Vessel Steam Dome Pressure High will fail. This results in a Single Control Rod Scram; because of a blown fuse for one rod. SRO will evaluate TS.
4		R (ATC) R (SRO)	Reduce Power per SNE Direction to recover Rod. Replace blown fuse on the scrammed rod (Time Compression) and recover that rod.
5	TACLFU_TR1C	C (BOP) C (SRO)	Trip of North Steam tunnel cooler. Crew will start the South Steam tunnel cooler.
6	E4AHFU_01(	TS	A rigging event results in damage to the power supply to E4150-F600 HPCI Steam Supply Outboard Isolation Bypass Valve.
7	EOPRF0022 E4BDK34TV E41MF0007	C (BOP) C (SRO)	HPCI Steam Leak (field report). AOP 20.000.02 Abnormal Release Of Radioactive Material
8	**SC-SCRAM**	M (All)	EOP 29.100.01 Sheet 5, Secondary Containment - >MSO Temperature – HPCI exceeds Max Safe -> Mode Switch to Shutdown (CT)
9	C11MF0001	C (ATC) C (SRO)	10 Rods Out ATWS EOP entry required.
10	TA20TEN207 FASIS TA20TEN207 SOUT **SC-ED**	M (All)	EOP 29.100.01 Sheet 1A RPV Control Two Areas > MSO Temperature due to HPCI watertight door not closed – EOP 29.100.01 Sheet 3A – ED ATWS (CT)

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

A. NARRATIVE SUMMARY

MODE 1. 100% reactor power.

North TWMS Pump Tagged out for motor replacement. Div 1 RHRSW Reservoir Chemical Treatment is in progress. Plans for the shift are to maintain 100% power.

After taking the shift you are to start the Div 1 EESW pump per 23.208 Section 5.9 EESW Manual Initiation for Reservoir Chemical Treatment per PST event AG75, AH75, AI75.

Event: 1

The crew will brief and then start the Div 1 EESW pump IAW the SOP for Reservoir Chemical Treatment.

Event: 2

Field report of large oil leak on #6 GSW Pump. Crew will start standby GSW pump and shutdown #6 GSW pump.

Event: 3

B21-N078A, Reactor Vessel Steam Dome Pressure High will fail. This results in a Single Control Rod Scram; a fuse for one rod will blow. The CRS will implement Technical Specifications for the instrument failure and direct actions per the AOP for CR Drift. The ½ scram and this rod will be recoverable after fuse replacement.

Event: 4

The crew will identify that the half scram and a blown fuse resulted in the scrammed rod. Fuse replacement will be directed and completed in the field (using time compression). The Station Nuclear Engineer will require Reactor Thermal Power to be lowered to 95 % prior to recovering rod. The control rod can then be recovered to its required position using 23.623 Reactor Manual Control System.

Event: 5

Trip of 72B-4A Pos 1E will cause power loss to North Steam tunnel cooler. Crew will start the South Steam tunnel cooler.

Event: 6

The rigging trips and block 2PB-1-11B. The field report will indicate no injured personnel, however, the power to E4150-F600 HPCI Steam Supply Outboard Isolation Bypass Valve is off and cannot be restored. The valve is open locally. This will require a TS entry for primary containment isolation for the E4150-F600

Event: 7 to 10

An HPCI steam leak will occur requiring entry into AOP 20.000.02, Abnormal Release of Radioactive Material. A rounds operator will call the Main Control Room, upon evacuation of the HPCI room, reporting that the watertight door was NOT closed on his way out of the area. Attempts to isolate HPCI will fail so EOP entry and a reactor scram will be required before exceeding the Maximum Safe Operating (MSO) Value in the HPCI Area.

On the scram, 10 rods fail to scram requiring EOP 29.000.01 SH1A. Due to the open water tight door, the steam leak will progress to more than one area requiring Emergency Depressurization (ED) EOP 29.000.01 SH3A.

SCENARIO CRITIQUE			
Place a check mark in the column corresponding to the performance, non-performance or non-applicability of any CRITICAL TASK. **It should be noted that no scenario can anticipate all operator actions. As a result, some critical tasks may not be required to be performed.** **CRITICAL TASK EVALUATION CRITERIA**	**PERFORMED**	**NOT PERFORMED**	**NOT APPLICABLE**
SC-SCRAM *- With reactor at power and with a primary system discharging into the secondary containment MANUALLY SCRAM the reactor, before any area exceed the Maximum Safe Operating (MSO) levels.* ***BASES****: Safety Significant -Scramming the reactor reduces to decay heat levels the energy that the RPV may be discharging into the secondary containment.* *Cue -Primary system discharging into the secondary containment and any area is approaching maximum safe operating levels.* *Performance Indicator -Initiate a reactor manual scram.* *Feedback -Reactor scram is inserted.*			
SC-ED *- With a primary system discharging into the secondary containment and area radiation/temperature/water levels exceed maximum safe operating levels in more than one area,* ***INITIATE Emergency Depressurization.*** ***BASES:*** *Safety Significant -Depressurizing the RPV promptly places the primary system in the lowest possible energy state, rejects heat to the suppression pool in preference to outside the containment, and reduces the driving head and flow of primary systems that are not isolated and discharging into the secondary containment.* *Cue -Primary system discharging into the secondary containment and area radiation/temperature/water levels exceed maximum safe operating levels in more than one area.* *Performance Indicator -Initiate emergency depressurization.*			

NOTE:
For any significant crew deviations from the validated time, submit an AIM for further evaluation by the instructional designer. IF the result of the AIM is that the operator should have been able to complete the actions as designed (based on objective data and knowledge of plant design), THEN submit a CARD for resolution.

Facility: Fermi 2 Scenario No.: SCN #7 Op-Test No: ILO-2019-1

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. The GOP directs startup Reactor Feedwater Pump(s) in accordance with 23.107, "Reactor Feedwater And Condensate Systems." All prerequisites have been met for 5.3 Reactor Feed Pump Turbine Startup. Plans for the shift are to start the North Reactor Feed Pump as required by the GOP and re-commence power ascension by withdrawing control rods.

Critical Tasks: ATWS-SD, RPV-LOCA

Event No.	Malf No.	Event Type*	Event Description
1		R (ATC) R (SRO)	Raise Rx Pressure per GOP
2	P502PSE_N45CLSP P50MF0014	C (BOP) C (SRO)	A Field report and control room indications will show that the West Station Air Compressor is cycling under load. This will prompt the MRC to shift to standby Station Air Compressor and Shutdown West.
3	R11RF0978	C (BOP) C (SRO) TS	A spurious trip of 65E-E6 will result in a loss of Bus 65E. The crew will perform actions for 20.300.65E Loss of Bus 65E. SRO will evaluate TS.
4	C11MF1118	C (ATC) C (SRO)	Trip of East CRD pump. An HCU accumulator alarm will occur before the standby pump can be started. Place Mode S/W in SHUTDOWN per IA 20.106.01 CRD Hydraulic System Failure.
5		M (All)	Manual Scram.
6	C11MF0001 C71MF0006 **ATWS-SD**	C (ATC) C (SRO)	Manual RPS Fails to Cause a Scram (Total Scram Failure) and All Rods Stuck - LOW POWER ATWS ATC will be able to insert rods with ARI.(CT)
7	E51MF0006 N20MF0018 N20MF0019 N20MF0020 E41MF0009 B31MF0066 **RPV-LOCA**	C (BOP) C (SRO)	Small LOCA. Trip of all condenser pumps, RCIC/HPCI auto start failure, BOP will start an alternant source of feed to maintain level (HPCI/RCIC/SBFW) (CT)

* (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. The GOP directs startup Reactor Feedwater Pump(s) in accordance with 23.107, "Reactor Feedwater And Condensate Systems." All prerequisites have been met for 5.3 Reactor Feed Pump Turbine Startup. Plans for the shift are to start the North Reactor Feed Pump as required by the GOP and re-commence power ascension by withdrawing control rods.

Event: 1

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

Event: 2

A Field report and control room indications will show that the West Station Air Compressor is cycling under load. This will prompt the MRC to shift to standby Station Air Compressor and Shutdown West.

Event: 3

A spurious trip of 65E-E6 will result in a loss of Bus 65E. The crew will perform actions for 20.300.65E Loss of Bus 65E SRO will evaluate T.S 3.5.1,3.7.1,3.8.1,3.8.4,3.8.7

Event: 4

Trip of East CRD pump due to an electrical fault. The crew enters AOP 20.106.01. However, the crew will be forced to take override from 20.106.01 and place the MODE S/W in SHUTDOWN

Event: 5 to 6

When the Mode S/W is placed in SHUTDOWN, RPS will fail to cause a scram and all rods will be stuck. All rods insert when ARI is initiated by manual action by the ATC.

Event: 7

After the SCRAM a small LOCA will occur, this will be complicated by the trip of all condenser pumps. HPCI and RCIC will not automatically inject and the crew will start HPCI/RCIC/SBFW manually to stabilize reactor water level.(CT)

SCENARIO CRITIQUE			
Place a check mark in the column corresponding to the performance, non-performance or non-applicability of any CRITICAL TASK. **It should be noted that no scenario can anticipate all operator actions. As a result, some critical tasks may not be required to be performed.** **CRITICAL TASK EVALUATION CRITERIA**	**PERFORMED**	**NOT PERFORMED**	**NOT APPLICABLE**
RPV-LOCA *With RPV level lowering, restore and maintain RPV water level above TAF, by* ***INJECTING*** *with all available system(s).* ***BASES****: Safety Significant -Adequate core cooling exists so long as RPV water level remains above TAF. RPV depressurization may need to be performed to maximize the injection flowrate from operating sources of injection.* *Cue -RPV lowering.* *Performance Indicator -Operate available injection system(s).* *Feedback -Increasing RPV water level or injection flowrate.*			
ATWS-SD *With a reactor scram required and the reactor not shutdown,* ***TAKE ACTION TO SHUTDOWN THE REACTOR****, to ensure the reactor will remain shutdown under ALL conditions without boron.* ***BASES:*** *Safety Significant -When there is not a challenge to containment, and a reactor scram is required, action must be taken to place the reactor in a shutdown condition and to ensure that it remains shutdown under all conditions. This is necessary unless RPV water level is being controlled using EOP contingencies to guarantee ACC.* *Cue -Reactor scram required and the reactor not shutdown.* *Performance Indicator -Reactor will remain shutdown under ALL conditions without boron.* *Feedback -Reactor Power is decreasing.*			

NOTE:
For any significant crew deviations from the validated time, submit an AIM for further evaluation by the instructional designer. IF the result of the AIM is that the operator should have been able to complete the actions as designed (based on objective data and knowledge of plant design), THEN submit a CARD for resolution.