Simulator Scenario Summary

NRC Form 3.3-1 Scenario Outline

Facility:	**Fermi 2**	Scenario #:	**1**	Source:	**New**	Op Test #	**2023 ILT**

Examiners:		Applicants/ Operators:	
Validating Operators:	A. Snowberger (CRS)		J. Walters (BOP)
	D. Roberts (ATC)		J. Holdwick (CRS)
	S. Erickson (ATC)		G. Pezzino (BOP)

Initial Conditions:	**68%, no equipment out of service, Rod Pattern Adjust (RPA) is in progress**
Turnover:	**Reactor Power is at 68% near the end of a Rod Pattern Adjustment. When you take the shift, you will be expected to withdraw control rods to achieve the target rod pattern in accordance with the rod pull sheets to be provided.**
Critical Tasks:	**(CT-1, SC-SCRAM)** With reactor at power and with a primary system discharging into the secondary containment MANUALLY SCRAM the reactor, before any area exceeds the Maximum Safe Operating (MSO) levels. **(CT-2, 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.

Event No.	Malf No.	Event Type* / Position		Event Description
1	N/A	R	ATC	The exam team will brief the crew on the status of the plant, specifically regarding the rod pattern adjustment in progress. The crew will take the shift and perform a short brief for the rod pull evolution. The crew will then complete the rod pull as briefed.
2	C51MF0197	I	ATC/SRO	When the 5th rod, which is CR 30-55, is selected and withdrawn past position 14, RBM A will fail. The crew will need to respond using ARPs, which will send them to 23.607 to bypass the RBM. The CRS will evaluate Tech Specs and determine TS 3.3.2.1 is applicable.
		TS	SRO	

Simulator Scenario Summary

Event No.	Malf No.	Event Type* / Position		Event Description
3	D11MF0021	TS	SRO	East Fuel Pool Division 1 Radiation Monitor will fail downscale. The crew will take action per ARP 3D27 to investigate the cause. This CRS will evaluate Tech Specs and determine that TS 3.3.6.2 and TS 3.3.7.1 are applicable.
4	Multiple	C	ATC/SRO	Loss of CRD Pump suction pressure caused by failure of the CRD Suction Pressure Control Valve will cause the running CRD pump to trip. If the standby pump is started, it will also trip. A CRD pump will be restored by directing field actions to manually bypass the CRD pump suction PCV and then starting a CRD pump
5	N30MF0051	C	BOP/SRO	An event will occur that will cause a loss of the in-service pressure regulator to fail low. As a result, the system will swap to the backup regulator. The crew will take actions per the AOP to complete the swap to the backup pressure regulator.
		MC	BOP	
6	E41MF0007 E41RF0033	M	ALL	Steam leaking from the HPCI system will cause the crew to enter 20.000.02, Abnormal Release of Radioactive Material and 29.100.01 Sheet 5, Secondary Containment Control. Attempts to isolate the steam leak will be unsuccessful and HPCI room temperatures will approach the Maximum Safe Operating (MSO) value
7	P603_A048_3	C	ATC/SRO	With HPCI room temperatures approaching MSO, the SRO should direct the Mode Switch taken to Shutdown BEFORE the MSO is reached (**CT-1, SC-SCRAM**).
		MC	ATC	
8	N30MF0070 N30MF0072 B21MF0030	C	BOP/SRO	With the HPCI watertight door unable to be closed, the crew will attempt to anticipate emergency depressurization by opening Main Turbine Bypass Valves. Both BPVs will fail to operate. Div 2 CSS Pump Room temperature will begin to rise and eventually exceed Maximum Safe Operating temperature of 210F. This will prompt the crew to emergency depressurize the plant using 5 SRVs, ADS preferred (**CT-2, SC-ED**).

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor, (TS)Tech Spec, (MC)Manual Control

Simulator Scenario Summary

A. INITIAL CONDITIONS / PRE-SHIFT BRIEFING:

Plant is at 68% power for Rod Pattern Adjustment, with the following:

- The Core Monitor is inhibited.
- Core flow is approximately 70%.
- The Rod Line is approximately 85%.
- GOP Section 5.0, Power Decrease, was completed through Step 5.2.13.
    - Turbine Flow Limiter is 5% above reactor power.
    - CFD H was removed from service.
    - East HFP was shut down.
- GOP 22.000.03 Section 4.0, Power Increase, is in progress currently at step 4.2.18 (next action to take is at 75% power).

The crew is to continue rod withdrawal when you take the shift.

- The STA will perform duties as the Rx Management SRO.
- The 3rd LNO will perform duties as the Rod Movement Verifier.
- Signed, approved copies of the Reactivity Maneuvering Plan Step Sheets are available. In summary, withdrawal Group 10/1 rods as follows:
    - Group 10/1 from 00 to 12. Predicted power increase is 2% total (0.5% per rod).
    - Group 10/1 from 12 to 20. Predicted power increase is 2% total (0.5% per rod).
    - Group 10/1 from 20 to 30. Predicted power increase is 2.5% total (0.6% per rod). RBM Upscale may occur during these rod pulls. Analyses for Thermal Limit verifications have been pre-performed.
    - Group 10/1 from 30 to 48. Predicted power increase is 2.0% total (0.5% per rod).
- Additional RMP Step Sheets, and guidance for raising Core Flow, will be provided after the above is complete.

Please conduct your Reactivity Management brief, and prepare all procedures to support rod withdrawal, prior to taking the shift.

No additional equipment is out of service.

All licensed operators are in the Main Control Room (MCR).

Normal shift complement of non-licensed operators are available.

Simulator Scenario Summary

B. SUMMARY OF EVENTS

Event 1:	Pull Rods to target rod pattern using provided pull sheets
The exam team will brief the crew on the status of the plant, specifically regarding the rod pattern adjustment in progress. The crew will take the shift and perform a short brief for the rod pull evolution. The crew will then complete the rod pull as briefed.	

Event 2:	On 3rd rod pull, RBM A failure will occur
When the 5th rod, which is CR 30-55, is selected and withdrawn past position 14, RBM A will fail. The crew will need to respond using ARPs, which will send them to 23.607 to bypass the RBM. The CRS will evaluate Tech Specs and determine TS 3.3.2.1 is applicable.	

Event 3:	FP Vent Exhaust Downscale
East Fuel Pool Division 1 Radiation Monitor will fail downscale. The crew will take action per ARP 3D27 to investigate the cause. This CRS will evaluate Tech Specs and determine that TS 3.3.6.2 and TS 3.3.7.1 are applicable.	

Event 4:	Loss of CRD Suction
Loss of CRD Pump suction pressure caused by failure of the CRD Suction Pressure Control Valve will cause the running CRD pump to trip. If the standby pump is started, it will also trip. A CRD pump will be restored by directing field actions to manually bypass the CRD pump suction PCV and then starting a CRD pump	

Event 5:	Pressure Regulator Fault
An event will occur that will cause a loss of the in-service pressure regulator to fail low. As a result, the system will swap to the backup regulator. The crew will take actions per the AOP to complete the swap to the backup pressure regulator.	

Event 6:	HPCI Steam Leak to MSO
Steam leaking from the HPCI system will cause the crew to enter 20.000.02, Abnormal Release of Radioactive Material and 29.100.01 Sheet 5, Secondary Containment Control. Attempts to isolate the steam leak will be unsuccessful and HPCI room temperatures will approach the Maximum Safe Operating (MSO) value	

Simulator Scenario Summary

Event 7:	HPCI>MSO, Mode Switch fails, RPS push buttons work, Div 2 CS Pump area temp rising
With HPCI room temperatures approaching MSO, the SRO should direct the Mode Switch taken to Shutdown BEFORE the MSO is reached (***CT-1, SC-SCRAM***). When the Mode Switch is taken to Shutdown, the crew will be informed that the watertight door to the HPCI room is open and unable to be closed. This will cause rising temperatures in the Div 2 Core Spray Pump Room area	

Event 8:	Anticipate ED, BPV failure, 2 areas > MSO, ED
With the HPCI watertight door unable to be closed, the crew will attempt to anticipate emergency depressurization by opening Main Turbine Bypass Valves. Both BPVs will fail to operate. Div 2 CSS Pump Room temperature will begin to rise and eventually exceed Maximum Safe Operating temperature of 210F. This will prompt the crew to emergency depressurize the plant using 5 SRVs, ADS preferred (***CT-2, SC-ED***).	

Termination Criteria
Scenario is terminated following ED when plant is stable, at the discretion of the Lead Evaluator.

Simulator Scenario Summary

C. SIMULATOR SETUP

SCENARIO SPECIFIC SETUP:

1. Initialize the simulator to IC-171
    a. **SELECT** any withdrawn rod and notch in then out to clear IPCS alarms.
    b. **FREEZE** the simulator and save the IC for later use (or in case something happens).
2. **PLACE** the simulator in **RUN**.
3. **OPEN** and **EXECUTE** lesson ILT 2023 Scenario 1.
4. **TRIGGER Setup** step
5. For ROD PULL Steps, **PRINT** and **SIGN** the following and place on CRS's desk:
    a. The first page of RMP Step Sheets for group 10/1 (from 00 to 12).
    b. Predictor sheet for the rod pulls.
    c. Maneuvering plan.
6. **MARK GOP** 22.000.03 complete through step 5.2.13 (Power Decrease section).
7. **Turn GOP** 22.000.03 to page 16, Step 4.2.18 (Power Increase section).
8. **REMOVE** red CRAM Array dots.
9. **REMOVE** CRAM Book from MCR.
10. **RESET** LPRM alarms @ P603 panel on APRM ODAs (Trip Status Screen, push RESET Memory).

GENERIC SETUP:

1. **PROVIDE** crew a list of available NOs
2. **ENSURE** that all annunciators are acknowledged and the plant is stable
3. **ACKNOWLDGE** DCS alarms
4. **VERIFY** GSW placard is in place and indicates INTERMITTENT.
5. **VERIFY** CFD placard has current dates (within the last 14 days is acceptable).
6. **COMPLETE** Attachment 1 of NTWI 5.12
7. **ALLOW** the operators to enter the room, provide them with a turnover in accordance with Section E, and allow them to walk down the panels
8. **ENSURE** simulator alarms are NOT silenced
9. **TRIGGER** steps as directed by the guide/Lead Evaluator
10. **START** Simulator data recorder
11. **RECORD** communications with crew members on NTWI 5.12 Attachment 3

Simulator Scenario Summary

D. CRITICAL TASKS

CRITICAL TASK EVALUATION CRITERIA	SAT	UNSAT	NA
CT-1, SC-SCRAM *- With reactor at power and with a primary system discharging into the secondary containment, MANUALLY SCRAM the reactor before any area exceeds any Maximum Safe Operating (MSO) value.*			

Safety Significance: If temperatures in any one of the areas listed in in tables 11, 12, 13, or 14 of the Secondary Containment Control EOP approach their maximum safe operating value, adequate core cooling, containment integrity, safety of personnel, or continued operability of equipment required to perform EPG actions can no longer be assured. A reactor scram is initiated through entry of the RPV Control guideline to reduce the primary system discharge into secondary containment and in anticipation of possible RPV depressurization.

Safety significant boundary conditions: Defined by the BWROG EPGs/SAGs, appendix B, rev 4. This analysis requires that a reactor scram be initiated prior to any area radiation, water level, or temperature reaches its max safe value. If indicated parameters in any one of the areas listed in tables 11, 12, 13, or 14 of the Secondary Containment Control EOP approach their maximum safe operating value, adequate core cooling, containment integrity, safety of personnel, or continued operability of equipment required to perform EOP related actions can no longer be assured. Therefore, a manual scram is required prior to reaching any of these indicated values.

Failure Criteria reasoning: Crew will fail if the reactor is not scrammed BEFORE any secondary containment parameter (Radiation / Temperature / Water Level) reaches its max safe (MSO) value.

Initiating Cue: Primary system discharging into secondary containment and any area parameter is approaching maximum safe operating levels.

Measurable Performance Standard: Mode Switch is placed in Shutdown and/or RPS pushbuttons depressed prior to the MSO value being reached.

Performance Feedback: RPS actuates, all control rods indicate full in and reactor power decreasing.

Expected action: Reactor Mode Switch placed in Shutdown and/or RPS pushbuttons depressed.

Simulator Scenario Summary

CRITICAL TASK EVALUATION CRITERIA	SAT	UNSAT	NA
CT-2, 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.*			

Safety Significance Should secondary containment temperatures exceed their maximum safe operating values in more than one area, the RPV must be depressurized to preclude further temperature increases.

Safety significant boundary conditions: Defined by the BWROG EPGs/SAGs, appendix B, rev 4. This analysis requires that an emergency depressurization be performed if secondary containment temperatures continue to increase and exceed their maximum safe operating values in more than one area. RPV depressurization places the primary system in its 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 un-isolated and discharging into the secondary containment.

Failure Criteria reasoning: Crew will fail if 2 SRVs or the Main Turbine Bypass valves are not open and area radiation/temperature/water levels exceed maximum safe operating levels in more than one area for greater than 6 minutes (2 x validated time).

Initiating Cue: Primary system discharging into the secondary containment and area temperatures exceed maximum safe operating levels in more than one area.

Measurable Performance Standard: Initiate emergency depressurization using SRVs - OR – anticipate emergency depressurization and depressurize using Bypass valves ignoring cooldown rates such that the reactor vessel is depressurized.

Performance Feedback: SRVs or BPVs indicate open and reactor pressure lowering.

Expected action: Open 5 SRVs – OR – fully open main turbine bypass valves.

Simulator Scenario Summary

E. LIST OF MALFUNCTIONS

The following malfunctions and/or remote functions are to be active/activated as indicated in the time line:

MF/RF/PO/LBL	DESCRIPTION	TARGET VALUE	STEP NO.	RAMP	DELAY
insert C11RF0398	Mode SW Failure	RESET	S1	0	0
insert C71MF0006		ACTIVE		0	0
cd=' P603_A048_1 EQ 1 AND H_P804_B002_2 EQ 0'	East and West BPVs fail closed when MS in S/D	N/A	S2	0	0
insert N30MF0070		ACTIVE		0	5
insert N30MF0072		ACTIVE		0	5
Insert C51MF0197 cd= H_P603_A0550631_2 eq 1 and H_P603_B091_2 eq 1 and P603_A059_3 eq 1	RBM A Failure conditional on rod select	ACTIVE	1A	0	0
insert D11MF0021	N010A Fuel Pool Vent D1 East Rad Mon Fail	0.0	3	0	0
insert C103N018ZNPCAP	Loss of CRD Suction	30.0	4	0	0
insert C101F412TASTEM		0		0	0
insert C101F412ZMANTYP		1		0	0
insert C101F212ZDIREC		TRUE		0	0
insert C97MF0298		Failed-On		0	0
insert C101F412TASTEM	Manual CRD Suction Control	1.0	4a	0	0
insert C103N018ZNPCAP		0.00143141		0	0
insert C97MF0298		Inactive		0	0
insert C11RF0210	Reset CRD High Temp	RESET	4b	0	0
insert N30MF0051	Press Reg Fails LOW	900.0	5	60	0
insert EOPRF0022	Unisolable HPCI Steam Leak	DEFEAT	6	0	0
insert E4BDK34TVSP		0		0	0
insert E41MF0007		25		700	0
insert E41MF0008 cd='H_P602_B112_2 EQ 1'		99		0	0

Simulator Scenario Summary

MF/RF/PO/LBL	DESCRIPTION	TARGET VALUE	STEP NO.	RAMP	DELAY
insert E41RF0033 cd='H_P602_B206_2 EQ 1'		OPEN		0	0
insert C71MF0006 cd='H_P603_B211_1 EQ 1'	Clears scram MF with RPS Pushbuttons	CLEAR	6A	0	0
P603_A048_1	Triggers Event 7/8 steps	EQ 1	7/8	0	0
cd='NBKGANA_COND795 942OUT LE 350 AND H_P601_A197_2 EQ 0'	Continues Temp Ramp if RPV < 350 psig BEFORE ED	N/A	7/8	0	0
insert TA20TEN207TFASIS		TRUE		0	0
insert TA20TEN207ZSOUT delay=0 ramp=on=0 off=0		225		300	0
insert TA20TEN206ZSOUT delay=0 ramp=on=0 off=0		225		360	0
cd=' TA20TEN207ZSOUT GT 140'	Ramps Temp in 2nd area	N/A		0	0
insert TA20TEN206TFASIS		TRUE		0	0
insert TA20TEN206ZSOUT		225		360	0
cd='H_P601_A197_2 EQ 1'	Ramps down Room Temps after ED	N/A		0	0
insert TA20TEN207TFASIS		TRUE		0	0
insert TA20TEN206ZSOUT		100		600	0
insert TA20TEN207ZSOUT		100		600	0

Simulator Scenario Summary

F. REFERENCES

The following is a list of expected Procedure References used in this scenario:

✓	PROCEDURE	TITLE
☐	1D66	STEAM LEAK DETECTION AMBIENT TEMP HIGH
☐	1D70	STEAM LEAK DETECTION DIFF TEMP HIGH
☐	3D1	CRD PUMP A/B SUCTION PRESSURE LOW
☐	3D5	CRD CHARGING H2O PRESSURE LOW
☐	3D10	CRD ACCUMULATOR TROUBLE
☐	3D13	CRD HYDRAULIC TEMPERATURE HIGH
☐	3D18	IPCS MONITORED INPUTS ABNORMAL
☐	3D27	DIV I/II FP VENT EXH RADN MONITOR DNSCL/INOP
☐	3D34	SEC CONTM TEMP HIGH-HIGH EOP ENTRY
☐	3D96	MOTOR TRIPPED
☐	3D109	RBM UPSCALE/INOP
☐	3D110	RBM DOWNSCALE
☐	3D111	RBM TROUBLE
☐	3D113	CONTROL ROD WITHDRAWAL BLOCK
☐	4D91	ELECTRIC GOVERNOR TROUBLE
☐	5D126	NORMAL HOTWELL SUPPLY PUMP AUTO START
☐	16D27	FIRE ALARM
☐	20.000.02	ABNORMAL RELEASE OF RADIOACTIVE MATERIAL
☐	20.106.01	CRD HYDRAULIC SYSTEM FAILURE
☐	20.109.02	REACTOR PRESSURE CONTROLLER FAILURE

Simulator Scenario Summary

✓	PROCEDURE	TITLE
☐	23.106	CONTROL ROD DRIVE HYDRAULIC SYSTEM
☐	23.607	ROD BLOCK MONITORING SYSTEM
☐	23.601	INSTRUMENT TRIP SHEETS
☐	23.623	REACTOR MANUAL CONTROL SYSTEM
☐	29.ESP.21	DEFEAT OF TORUS WATER MANAGEMENT ISOLATIONS AND TORUS LEVEL CONTROL
☐	TS 3.3.2.1	Control Rod Block Instrumentation
☐	TS 3.3.6.2	Secondary Containment Isolation Instrumentation
☐	TS 3.3.7.1	Control Room Emergency Filtration (CREF) System Instrumentation

Form 3.3-2 Required Operator Actions

Op Test No.: **Fermi 2023**	Scenario No.: **1**	Page **1** of **19**

Event 1	Rod pattern adjustment	**Type:**	RX
Event Description: The exam team will brief the crew on the status of the plant, specifically regarding the rod pattern adjustment in progress. The crew will take the shift and perform a short brief for the rod pull evolution. The crew will then complete the rod pull as briefed. Symptoms/Cues: Crew begins rod pull after taking the shift.			

Time	Position	Applicant's Actions or Behavior
T_0 min	**Booth Action**	Trigger **Event 1** placeholder. **Event 2** will trigger automatically when CR 30-55 is withdrawn past position 14
T_0 +1 min	**CRS/ATC**	Will conduct brief of reactivity manipulation.
T_0 +5 min	**ATC**	Continues rod withdrawal, as directed, per the approved rod pull sheets: ☐ Turns on Rod Select Power. ☐ Selects next Control Rod (CR) using Rod Select Matrix Push Button. ☐ Verifies the correct CR is selected using the 4-Rod Display, the RWM, the Full Core Display, IPCS and the Rod Block Monitor. ☐ Communicates selected CR, and target position, to the Rod Movement Verifier. ☐ Withdraws selected CR to one notch shy of target position. ☐ Withdraws selected CR to target position. ☐ Communicates CR position to Rod Movement Verifier. ☐ Selects the next CR for movement. Completes the above actions for these rod movements: ☐ Group 10/1 (30-55, 30-07, 54-31 and 06-31) from 00 to 12. ☐ Group 10/1 (30-55) from 12 to 20. **NOTE**: When CR 30-55 is moved past position 14, Event 2 will automatically trigger.
	SRO	Provides oversight of CR withdrawals. Acknowledges communications from the ATC. Ensures BOP is monitoring secondary plant for power rise.
	BOP	Monitors secondary plant for power rise. Assists ATC as necessary to support CR withdrawal.

Form 3.3-2 Required Operator Actions

Op Test No.: **Fermi 2023**	Scenario No.: **1**	Page **2** of **19**

Event 2	RBM A Failure	**Type:**	I, TS

Event Description: When the 5th rod, which is CR 30-55, is selected and withdrawn past position 14, RBM A will fail. The crew will need to respond using ARPs, which will send them to 23.607 to bypass the RBM. The CRS will evaluate Tech Specs and determine TS 3.3.2.1 is applicable.

Symptoms/Cues: Alarms 3D110, RBM DOWNSCALE and 3D113, CONTROL ROD WITHDRAWAL BLOCKED will be received. RBM A will indicate downscale.

Time	Position	Applicant's Actions or Behavior
T_0 +25 min	**ATC**	Responds to 3D110, RBM DOWNSCALE and 3D113, CONTROL ROD WITHDRAWAL BLOCKED: ☐ Monitors RBM displays to determine cause. ☐ Notes that RBM A power is 0.0% and reports to CRS. ☐ May recommend bypassing RBM per 23.607. ☐ May direct NO to Relay Room to investigate.
	Role Play	**NO/STA:** If contacted to walk down RBM A in the RR: ☐ **Wait 2 minutes** and **REPORT**: "RBM A shows downscale in the Relay Room. No obvious indications as to why."
	SRO	Acknowledges report from RO and: ☐ Directs ATC to bypass RBM A per 23.607 section 5.1 ☐ May contact SNE to evaluate cause of alarm and actions to be taken. ☐ Evaluates TS for INOPERABLE RBM.
	Role Play	**SNE:** If contacted about 3D110, 3D113 and RBM failure: ☐ **ACKNOWLEDGE** report from the MCR.
	ATC	Acknowledges CRS direction to bypass the RBM. Bypasses RBM IAW 23.607 Section 5.1: ☐ Places RBM BYPASS joystick in position A ☐ Verifies white RBM A Bypassed light is ON ☐ Verifies BYPASS displayed on RBM A display ☐ May direct NO to walk down RBM display in the Relay Room.
	Role Play	**NO/STA:**If contacted walk down RBM A in the RR after it has been bypassed. ☐ **Wait 1 minute** and **REPORT**: "RBM A shows bypassed.
	SRO	Conducts follow-up brief for actions to contact WWM, write CARD, etc., and TS Impact. LCO: TS 3.3.2.1, Control Rod Block Inst.

Form 3.3-2 Required Operator Actions

<table>
<tr><th>Time</th><th>Position</th><th colspan="3">Applicant's Actions or Behavior</th></tr>
<tr><td rowspan="4"></td><td rowspan="4">TS Impact</td><td colspan="3">TS 3.3.2.1, Control Rod Block Instrumentation:
The control rod block instrumentation for each Function-in table 3.3.2.1-1 shall be OPERABLE.</td></tr>
<tr><td>CONDITION</td><td>REQUIRED ACTION</td><td>COMPLETION TIME</td></tr>
<tr><td>A. One rod block monitor (RBM) channel inoperable</td><td>A.1 Restore RBM channel to OPERABLE status</td><td>24 Hours</td></tr>
<tr><td colspan="3"></td></tr>
</table>

Form 3.3-2 Required Operator Actions

Op Test No.: **Fermi 2023**	Scenario No.: **1**	Page **4** of **19**

Event 3	East Fuel Pool Div 1 Rad Monitor downscale failure	**Type:**	TS

Event Description: East Fuel Pool Division 1 Radiation Monitor will fail downscale. The crew will take action per ARP 3D27 to investigate the cause. This CRS will evaluate Tech Specs and determine that TS 3.3.6.2 and TS 3.3.7.1 are applicable.

Symptoms/Cues: 3D27, Div I/II FP Vent Exh Rad Monitor Dnscl/Inop and downscale indication on the Div 1 East Fuel Pool Vent Exh Radiation Monitor (back of H11-P601).

Time	Position	Applicant's Actions or Behavior
T_0 +40 min	**Booth Action:**	Trigger **Event 3** to initiate East FP Div 1 Rad Monitor Downscale Failure (D11MF0021).
	ATC/BOP	Responds to alarm 3D27, Div I/II FP Vent Exh Rad Monitor Dnscl/Inop. ☐ Directs an NO/LNO/RTC to the H11-P606 panel to check Rad Monitors at D11-R605.
	Role Play	**NO/LNO/RTC:** If dispatched **wait 3 minutes** and **REPORT:** D11-K609A (Div 1 Fuel Pool East Vent Exh Duct Rad Monitor) is downscale (<0.01 mr/hr) with a white downscale light lit. All other Fuel Pool Rad Monitors indicate about 0.1 mr/hr. **NO/LNO/RTC:** If asked (per ARP), Mode Switch is in OPERATE. **NO/LNO/RTC:** If asked to attempt to clear the alarm (per the ARP), report that you depressed the RESET pushbutton and the indications are the same as before.
	BOP	Checks indications on back of P601. Recognizes and reports Div 1 East Fuel Pool Vent Exh Rad Monitor is downscale.
	SRO	Acknowledges reports for Fuel Pool Rad Monitor failure. Reviews 23.601 and Evaluates Technical Specifications Conducts follow up brief with crew. May notify Work Control personnel of Rad Monitor failure.

	TS Impact	**TS 3.3.6.2, Secondary Containment Isolation Instrumentation:** The secondary containment isolation instrumentation for each function in Table 3.3.6.2-1 shall be OPERABLE. **Function 3 is affected.**		
		CONDITION	**REQUIRED ACTION**	**COMPLETION TIME**
		A. One or more channels inoperable	A.1 Place channel in trip	24 Hours
	TS Impact	**TS 3.3.7.1, Control Room Emergency Filtration (CREF) System Inst.** The CREF System instrumentation for each Function in table 3.3.7.1-1 shall be OPERABLE. **Function 3 is affected.**		
		CONDITION	**REQUIRED ACTION**	**COMPLETION TIME**
		A. One or more required channels inoperable	A.1 Enter condition referenced in table 3.3.7.1-1 for the channel.	Immediately
		B. As required by Required Action A.1 and referenced in table 3.3.7.1-1	B.2 Place channel in trip.	24 Hours

Form 3.3-2 Required Operator Actions

Op Test No.: **Fermi 2023**	Scenario No.: **1**	Page **6** of **19**

Event 4	Failed CRD Suction Pressure Control Valve	**Type:**	C

Event Description: Loss of CRD Pump suction pressure caused by failure of the CRD Suction Pressure Control Valve. This will cause the running CRD pump to trip. If the standby pump is started, it will also trip. A CRD pump will be restored by directing field actions to manually bypass the CRD pump suction PCV and then starting a CRD pump.

Symptoms/Cues: 3D1, CRD Suction Pressure Low. Trip of the running CRD Pump.

Time	Position	Applicant's Actions or Behavior
T_0 +50 min	**Booth Action**	Trigger **Event 4** to initiate Loss of CRD Pump Suction.
	ATC	Recognizes and reports trip of the running CRD Pump. Recognizes and reports receipt of 3D1, CRD PUMP A/B SUCTION PRESSURE LOW.
	SRO	Acknowledges report of tripped CRD Pump: ☐ Enters 20.106.01 – Loss of CRD Hydraulics AOP. ☐ Makes plant announcement. ☐ Reviews / discusses Immediate Actions (not applicable when RPV Pressure > 900 psig. ☐ Directs monitoring for Override conditions. ☐ Directs Condition A of AOP. Directs verifying CRD suction pressure in accordance with 3D1.
	ATC	Directs NO to: ☐ Investigate CRD Suction Control Valve indications locally. ☐ Walkdown 64B-B11 ☐ Check CRD Suction Pressure locally (will have to valve in suction pressure gauge). ☐ Isolate Reference Leg Backfill. Monitors for accumulator trouble alarm(s) and informs CRS when 2nd one received, with at least one on a withdrawn control rod.

Time	Position	Applicant's Actions or Behavior
	Role Play	**RB NO:** If dispatched: ☐ **Wait 3 minutes** ☐ **REPORT:** C11-F412 (CRD Suction PCV) is closed locally. ☐ **REPORT:** Local CRD Suction Pressure is fluctuating between 5 and 15 psig. **RB NO:** If dispatched to investigate 64B-B11: ☐ **Wait 3 minutes** ☐ **REPORT:** No abnormalities found at 64B-B11. **RB NO:** If directed to isolate Ref Leg Backfill per 20.106.01 Step A5: ☐ **Wait 5 minutes** ☐ **REPORT:** Ref Leg Backfill is isolated (no simulator actions necessary).
	SRO	Acknowledges receipt of accumulator trouble alarm. Directs monitoring for 20 minutes per Override when 2nd alarm received, with at least one on a withdrawn control rod. Acknowledges reports of status of CRD Suction Pressure PCV. Directs bypassing CRD Suction PCV, per 3D1, IAW SOP 23.106.
	NOTE:	**Override for 20.106.01** - place mode switch in shutdown within 20 minutes if: Reactor Pressure > 900 psig. **AND** More than one accumulator trouble light received (at least one on a withdrawn control rod). **AND** No CRD pump running.
	ATC/BOP	Coordinates / directs NO to bypass CRD Suction PCV IAW 23.106, Section 5.6.2 (ATTACHED) Reports actions taken and status of CRD to CRS.
	Role Play	**RB NO:** When directed to bypass CRD Suction Pressure Controller: ☐ 23.106 Sec 5.6 is attached to scenario guide. Follow along with MCR. ☐ Repeat back steps, with 30 second delay, as directed. **RB NO:** When directed to throttle open C1100-F031: ☐ **Wait 30 seconds** ☐ **Trigger Step 4a** – Manual CRD Suction Pressure Control. ☐ **Report**: Final Pump Suction Pressure is 35 psig.

Time	Position	Applicant's Actions or Behavior
	SRO	Directs standby CRD Pump started IAW 20.106.01 Condition A.
	ATC	RO perform the following from 20.106.01, Condition A: ☐ Place CRD FCV in MANUAL. ☐ Close CRD FCV. ☐ Close CRD PCV. ☐ Direct NO to Isolate Reference Leg Backfill. ☐ Start Standby CRD Pump ☐ Adjust CRD flow (37 to 63 gpm) and drive water pressure (255 to 265). ☐ Contact I&C to restore Reference Leg Backfill. RO may dispatch NO to check pump ready for start prior to start. RO inform NO of start of CRD Pump.
	Role Play	**RB NO:** If directed to check/report status of CRD Pump: ☐ CRD Pump(s) ready for start. ☐ CRD Pump looks good on start (when re-started after adjusting CRD suction pressure). **RB NO:** When directed to clear 3D13: ☐ **TRIGGER Step 4b** to clear 3D13 malfunction ☐ **REPORT** "CRD Hydraulic Temperature High has been reset" **RB NO:** IF asked, report that you made an adjustment and CRD Suction pressure is 35 psig. **I&C:** When directed to restore reference leg backfill: ☐ **ACKNOWLEDGE** direction to isolate reference leg backfill. ☐ No further simulator booth action required.
	SRO	May conduct follow-up brief

Form 3.3-2 Required Operator Actions

Op Test No.: **Fermi 2023**	Scenario No.: **1**	Page **9** of **19**

Event 5	Pressure Regulator Fault	**Type:**	C, MC

Event Description: An event will occur that will cause a loss of the in-service pressure regulator to fail low. As a result, the system will swap to the backup regulator. The crew will take actions per the AOP to complete the swap to the backup pressure regulator.

Symptoms/Cues: 4D91, ELECTRIC GOVERNOR TROUBLE with a slight rise (~3.5 psig) in reactor pressure and reactor power (~1%).

Time	Position	Applicant's Actions or Behavior
T_0 +65 min	**Booth Action**	Trigger **Event 5** to fail the in-service Pressure Regulator LOW.
	ATC/BOP	Recognizes and reports a rise in reactor power and reactor pressure. Responds to 4D91, Electric Governor Trouble. Diagnoses and reports failure of the in-service pressure regulator. Diagnoses and reports that auto transfer to the backup pressure regulator. May direct NO to the RR to investigate.
	SRO	Acknowledges report from RO. Enters AOP 20.109.02, Pressure Controller Failure with a Crew Update. Directs Actions of Condition B of 20.109.02.
	BOP	Acknowledge direction / performs Actions for 20.109.02 Condition B: ☐ Verify the following: o Backup Pressure Regulator takes control. o Indicated Pressure Regulator Setpoints are the same as before the failure. o Indicated Pressure controlling ~ 3.5 psi higher ☐ Return Pressure Setpoint to value prior to failure by: o Depress Regulator No. 1(2) pushbutton for Pressure Regulator in control. o Depress Pressure Controls LOWER pushbutton to lower Regulator Pressure Setpoint. Verify Reactor Pressure returns to value prior to Regulator failure.
	SRO	Acknowledges actions taken and status of the Pressure Regulator / Reactor Pressure. Directs BOP to perform Actions of Condition C of 20.109.02.

Form 3.3-2 Required Operator Actions

Op Test No.: **Fermi 2023**	Scenario No.: **1**	Page **10** of **19**

Time	Position	Applicant's Actions or Behavior
	BOP	Acknowledges direction and directs/coordinates with NO/STA to perform Actions of Condition C of 20.109.02. Relays information (status) of Reactor Pressure Regulator indications from the RR.
	Role Play	**NO/STA:** IF directed to the RR: ☐ **WAIT 3 minutes;** Then **REPORT** the lamp test on all 3 alarm modules was sat. The Press. Ref. light is lit on the Pressure Control Module. No other alarm lights are lit.
	SRO	Directs Actions of Condition D of 20.109.02. May conduct follow-up brief.

Form 3.3-2 Required Operator Actions

Op Test No.: **Fermi 2023**	Scenario No.: **1**	Page **11** of **19**

Event 6	HPCI Steam Leak to MSO	**Type:**	MAJ

Event Description: Steam leaking from the HPCI system will cause the crew to enter 20.000.02, Abnormal Release of Radioactive Material and 29.100.01 Sheet 5, Secondary Containment Control. Attempts to isolate the steam leak will be unsuccessful and HPCI room temperatures will approach the Maximum Safe Operating (MSO) value.

Symptoms/Cues: 16D27, FIRE ALARM, with no automatic start of the Electric or Diesel Fire Pumps. Temperature and radiation levels in the HPCI Room will indicate a steam leak rather than a fire.

Time	Position	Applicant's Actions or Behavior
T_0 +75 min	**Booth Action**	Trigger **Event 6** to initiate Unisolable HPCI Steam Leak.
	BOP	Responds to alarm 16D27, Fire Alarm, monitors for start of fire pumps and report to CRS. ☐ Recognizes and reports fire alarm is from Zone 4, HPCI Quad. ☐ Monitors and reports no Auto Start of EFP/DFP. ☐ Monitors for and reports rising temperatures and radiation levels in the HPCI Quad. ☐ May recommend entering AOP for Abnormal Release of Radioactive Material. May recommend isolating the HPCI System.
	SRO	Enters EOP 20.000.02 Sheet 5, Abnormal Release of Radioactive Material with a crew update. May direct RO to attempt to isolate HPCI. Sounds plant area alarm and announces steam leak over the Hi-Com.
	BOP	Responds to 1D66, Steam Leak Detection Ambient Temperature High and 1D70, Steam Leak Detection Diff Temp High alarms. Responds to 3D34, Sec Contm Temp High-High EOP Entry. Directs an operator to the Steam Leak Detection Panel. Recognizes and reports EOP entry condition on high HPCI Room Temp.
	Role Play	**NO:** IF directed to Steam Leak Detection Panel (RR): ☐ **WAIT 5 minutes;** Then REFER to IPCS in the Booth ☐ **REPORT** room temperatures as directed by the LNO.
	SRO	Enters 29.100.01 Sh 5, Secondary Containment Control, on high HPCI room temperature. Directs isolating the HPCI System.

Form 3.3-2 Required Operator Actions

Time	Position	Applicant's Actions or Behavior
	BOP	Attempts to isolate the HPCI system as directed ☐ Recognizes and reports inability to isolate HPCI. ☐ May respond to 2D73, HPCI MOVs Overload, and direct NO to investigate 2PB-1-11B. Recognizes and reports HPCI Room Temperature still rising and approaching Max Safe Operating (MSO) Value of 210°F.
	Role Play	**NO:** IF directed to investigate 2PB1 Pos 11B: ☐ **WAIT 5 minutes;** Then **REPORT** "*2PB1-11B is tripped on Thermal Overload and there is an acrid odor in the area of the MCC.*"

Form 3.3-2 Required Operator Actions

Op Test No.: **Fermi 2023**	Scenario No.: **1**	Page **13** of **19**

Event 7	HPCI>MSO, Mode Switch fails, RPS push buttons work, Div 2 CS Pump area temp rising	**Type:**	C, MC

Event Description: With HPCI room temperatures approaching MSO, the SRO should direct the Mode Switch taken to Shutdown BEFORE the MSO is reached (***CT-1, SC-SCRAM***).

When the Mode Switch is taken to Shutdown, the crew will be informed that the watertight door to the HPCI room is open and unable to be closed. This will cause rising temperatures in the Div 2 Core Spray Pump Room area

Symptoms/Cues: HPCI room temperature approaches MSO, requiring shutdown.

Time	Position	Applicant's Actions or Behavior
T_0 +75 min	**Note**	**Event 7/8** will automatically trigger when MS is taken to shutdown. **Be ready to give Role Play in Event 8** after the MS is taken to Shutdown.
	SRO	Directs Mode Switch to S/D prior to 210°F. Enters EOP 20.000.02 Sheet 1, RPV Control for scram (from SH 5) Announces events over the Hi-Com Requests scram reports
	ATC	Places Mode Switch in S/D when directed. Recognizes Failure to Scram and pushes manual scram push buttons. Recognizes all rods are inserted. ***CT-1, SC-SCRAM*** *- With reactor at power and with a primary system discharging into the secondary containment, MANUALLY SCRAM the reactor before any area exceeds any Maximum Safe Operating (MSO) value.* Inserts IRMs and SRMs as Immediate Action. Provides scram reports, including failure of the Mode Switch, when directed.
	BOP	Provides scram reports when directed.
	SRO	Acknowledges scram reports from panel operators. Directs reports for isolations and actuations for Level as they occur. Directs 173-214" level band. Directs 500-700 psig pressure band. Directs entry into/actions from the AOP 20.000.21, Reactor Scram. Directs monitoring for second area temperature rise and assigns as critical parameter.

Form 3.3-2 Required Operator Actions

Op Test No.: **Fermi 2023**	Scenario No.: **1**	Page **14** of **19**

Event 8	Anticipate ED, Both BPVs fail, 2 areas > MSO, ED	**Type:**	C

Event Description: With the HPCI watertight door unable to be closed, the crew will attempt to anticipate emergency depressurization by opening Main Turbine Bypass Valves. Both BPVs will fail to operate.

Div 2 CSS Pump Room temperature will begin to rise and eventually exceed Maximum Safe Operating temperature of 210F. This will prompt the crew to emergency depressurize the plant using 5 SRVs, ADS preferred (***CT-2, SC-ED***).

Symptoms/Cues: Console operator will deliver Role Play following MS being taken to shutdown. Temperature in Div 2 CSS Pump Room will begin to rise.

Time	Position	Applicant's Actions or Behavior
T_0 +75 min	**Role Play**	**CALL** on the radio and **REPORT** as RB Rounds: "*I was in the Reactor Building Southeast Sub-Basement. I heard a loud bang and saw a cloud of steam. I tried to close the watertight door to the HPCI area, but the door WOULD NOT close. I have left the area and am exiting the RB.*".
	BOP	Acknowledges report from RB rounds, relays information to CRS. Attempts to lower pressure using the Bypass Valves. Recognizes / reports failure of the East & West BPVs. Recognizes / reports rising temperature in Div 2 CSS Pump Room. Recognizes / reports when Div 2 CSS Pump Room > MSO temperature (210°F).
	SRO	Directs actions to Anticipate ED by fully opening MT BPVs (if above failure not yet detected). Acknowledges report of Bypass Valve failure. Directs monitoring for 2 areas >MSO temperature. Transitions to ED leg when 2 areas >MSO. Directs opening 5 SRVs, ADS preferred. Directs bypassing and restoring Drywell Pneumatics.
	BOP/ATC	Opens 5 ADS SRVs and reports to CRS. ***CT-2, 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.* Bypasses and restores Drywell Pneumatics per 23.406 Encl. C (attached hardcard) and reports to CRS. Recognizes and reports EOP Entry Condition on High TWT and High TWL

Form 3.3-2 Required Operator Actions

Time	Position	Applicant's Actions or Behavior
	SRO	Enters 29.100.01 Sheet 2, Primary Containment Control on High TWT/TWL with Crew Update. Directs RO to place RHR in Torus Cooling, with cooling maximized. Directs RO to lower TWL, using TWMS, defeating interlocks if necessary, using 29.ESP.21.
	BOP/ATC	Places RHR in Torus Cooling and maximizes cooling per 23.205 Encl. A (attached hardcard). Places RHRSW in operation per 23.208 Encl. B (attached hardcard). Evaluates RHRSW Temperature and places MDCT fans in service as applicable. Refers to 29.ESP.21 to lower Torus Water Level.
	Lead Evaluator	Scenario is terminated following ED when plant is stable and Torus Cooling has been established, at the discretion of the Lead Evaluator.

5.6 Bypassing The CRD Suction Pressure Controller

CAUTION

While CRD Suction Pressure Controller is bypassed, CRD suction pressure is susceptible to large pressure changes due to plant uses of Condensate or Condensate Header Pressure change. Such pressure change could cause the secondary supply CST check valve to open or the running CRD pump to trip if the secondary CST supply is isolated.

5.6.1 Prerequisites

1. CRD Suction Pressure Controller is in service.

5.6.2 Detailed Procedure

1. Open C1100-F031, Drive Water Pump Suction Reducing Station Bypass Isolation Valve, two to three turns.

2. Throttle open the Gauge Isolation Vlv for C11-R017A (B), East (West) CRD Pump Suction Pressure Indicator (CRD Pump Room).

3. Perform the following steps concurrently to maintain suction pressure to CRD Pumps at 30 to 40 psig:

   - Slowly close C1100-F028, PCV F412 Inlet Isolation Valve.

   - Throttle C1100-F031, Drive Water Pump Suction Reducing Station Bypass Isolation Valve. ***Trigger step 4a***

4. Close C1100-F029, PCV F412 Outlet Isolation Valve.

5. Close the Gauge Isolation Vlv for C11-R017A (B), East (West) CRD Pump Suction Pressure Indicator (CRD Pump Room).

END OF SECTION

23.406
Enclosure C, Page 1 of 1
020422

RESTORE DRYWELL PNEUMATICS PER EOPS (H11-P808 AND H11-P817)

NOTE (1): A copy of this enclosure is located at panel H11-P817.

NOTE (2): Division 1 or 2 can be aligned in either order.

1.0 Restore Primary Containment Pneumatic Supply system as follows:

1. Div 1 (H11-P808):

   a. If isolation signal is present (Hi DW press, or <L2), place Div 1 Drywell Pneumatic Supply Isolation Bypass Keylock switch in ON.

   b. Verify open or open T4901-F466, Div 1 DW Pneumatics N2 Supply Valve.

   c. Open T4901-F465, Div 1 DW Pneumatics Sply Otbd Iso Vlv.

   d. Open T4901-F601, Div 1 DW Pneumatics Sply Inbd Iso Vlv.

2. Div 2 (H11-P817):

   a. If isolation signal is present (Hi DW press, or <L2), place Div 2 Drywell Pneumatic Supply Isolation Bypass Keylock switch in ON.

   b. Verify open or open T4901-F469, Div 2 DW Pneumatics N2 Supply Valve.

   c. Open T4901-F468, Div 2 DW Pneumatics Sply Otbd Iso Vlv.

   d. Open T4901-F602, Div 2 DW Pneumatics Sply Inbd Iso Vlv.

3. Verify proper system response per section 6.0.

23.205
Enclosure A, Page 1 of 1
020921

RHR CONTAINMENT COOLING MODES OPERATION
(COP H11-P601 & COP H11-P602)

NOTE: Copies of this enclosure are located at panels H11-P601 and H11-P602

☐ 1. **IF** High Drywell Pressure or RPV Level 1 exist, **THEN** place the Containment Spray Mode Select switch in MANUAL.

☐ 2. **IF** RPV level is below Level 0, **THEN** place selected division Containment Spray 2/3 Core Height Override keylock switch in MANUAL OVERRIDE.

3. **IF** initiating **Torus Cooling Mode**, **THEN** perform the following:

☐ a. Place keylock switch for E1150-F028A (B), Div 1 (2) RHR Torus Iso Vlv in OPER.

☐ b. Open E1150-F028A (B), Div 1 (2) RHR Torus Iso Vlv.

☐ c. Start or verify running one RHR Pump.

☐ d. Throttle E1150-F024A (B), Div 1 (2) RHR Torus Clg Iso, to desired flow.

☐ e. When flow is > 6900 gpm, verify E1150-F007A (B), Div 1 (2) RHR Pmps Min Flow Vlv, closes.

☐ f. Start RHR Service Water System. (RHRSW may be delayed until after Torus Spray is established.)

☐ g. To increase cooldown rate, if both RHR pumps are running, stop one RHR pump.

☐ h. To increase cooldown rate, throttle closed E1150-F048A (B), Div 1 (2) RHR Hx Bypass Vlv.

4. **IF** initiating **Torus Spray Mode**, **THEN** perform the following:

☐ a. Verify RHR is in LPCI or Torus Cooling Mode. (RHRSW may be delayed until after Torus Spray is established.)

☐ b. Verify or place keylock switch for E1150-F028A (B), Div 1 (2) RHR Torus Iso Vlv in OPER.

☐ c. Verify open or open E1150-F028A (B), Div 1 (2) RHR Torus Iso Vlv.

☐ d. Open E1150-F027A (B), Div 1 (2) RHR Torus Spray Iso.

☐ e. Verify RHR flow increases by approximately 500 gpm.

5. **IF** initiating **Drywell Spray Mode**, **THEN** perform the following:

☐ a. Open E1150-F021A (B), Div 1 (2) RHR DW Spray Inbd Iso Vlv.

☐ b. Start or verify started RHR Pump A or C (B or D).

☐ c. **IF** a second RHR pump is available, **THEN** verify or open E1150-F048A(B), Div 1 (2) RHR Hx Bypass Vlv and start second RHR pump.

☐ d. Unlock and throttle open E1150-F016A (B), Div 1 (2) RHR DW Spray Otbd Iso Vlv, and ensure that RHR flow does not exceed 14,000 gpm per RHR Pump, 13,000 gpm for RHR pump D.

☐ 6. Perform or verify complete the following sections of 23.205 as applicable:

- Torus Cooling Mode, Emergency Operation
- Torus Spray Mode
- Drywell Spray Mode

☐ 7. Verify complete RHRSW Manual Operation, Enclosure B of 23.208, RHR Complex Service Water Systems.

23.208
Enclosure B, Page 1 of 1
013020

RHRSW MANUAL OPERATION
(H11-P601 & H11-P602)

STARTUP

- ☐ 1. **IF** a LOCA signal exists, place keylock switch for RHRSW Pumps to MANUAL OVERRD.
- ☐ 2. Depress and hold, OPEN pushbutton for E1150-F068A (B), Div 1 (2) RHR Hx Serv Wtr Outlet FCV.
- ☐ 3. Five seconds after observing dual indication, start an RHRSW Pump.
- ☐ 4. Release open pushbutton for E1150-F068A (B) when 5400 gpm to 6300 gpm is seen on E11-R602A (B), Div 1 (2) RHR Hx Serv Wtr Flow Ind.
- ☐ 5. Start a second RHRSW Pump.
- ☐ 6. Fully open E1150-F068A (B), Div 1 (2) RHR Hx Serv Wtr Outlet FCV.
- 7. Monitor RHRSW:
  - ☐ a. Place D11-K801A (B), Div 1 (2) RHR Service Water Radiation Monitor in operation in accordance with 23.626, "Process Liquid Radiation Monitoring."

  OR

  - ☐ b. Notify Chemistry to sample RHRSW in accordance with CHS-AUX-12.
- ☐ 8. **IF** a LOCA signal exists and RHR Cooling Towers are in service, **THEN** when power is available reset and start MDCT Fans.

SHUTDOWN

- ☐ 1. Stop the RHRSW Radiation Monitor Sample Pump locally at Rack D11-P291 (D11-P292) (RB2-B15 [RB2-B10]).
- ☐ 2. Stop running RHRSW pumps by placing their CMC switches in OFF-RESET.
- ☐ 3. Verify fully closed E1150-F068A (B), Div 1 (2) RHR Hx Serv Wtr Outlet FCV.

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RPA - FOR TRAINING USE ONLY!

Date/Time	Pwr%	Flw%	Mflcpr	Mflpd	Maprat	Pcrat	Rod Line	Xe/Rated	Keff	Delta-T	Comment	Qual
Nightshift / 0600	67.0	70.0	0.734	0.805	0.675	0.908	84.70	0.923	1.00725	1.50	Raise flow to 70%	0001FTNP
Dayshift / 0830	69.2	70.0	0.746	0.799	0.687	0.916	87.27	0.945	1.00746	0.30	Withdraw Group 10/1 from 00 to 12	0002FTNP
Dayshift / 0840	71.4	70.0	0.829	0.782	0.692	0.882	90.85	0.953	1.00746	0.30	Withdraw Group 10/1 from 12 to 20	0003FTNP
Dayshift / 0850	73.7	70.0	0.912	0.823	0.708	0.957	93.27	1.064	1.00746	0.30	Withdraw Group 10/1 from 20 to 30	0004FTNP
Dayshift / 0900	76.0	70.0	0.922	0.806	0.712	0.966	95.82	0.946	1.00752	0.30	Withdraw Group 10/1 from 30 to 48	0005FTNP
Dayshift / 0910	79.0	70.0	0.946	0.802	0.720	0.994	99.26	0.939	1.00753	0.30	Withdraw Group 10/2 from 00 to 10	0006FTNP
Dayshift / 0930	82.0	75.5	0.911	0.860	0.760	1.112	99.42	0.914	1.00748	1.00	Ramp at 3% power per hour	0007FTNF
Dayshift / 1030	85.0	80.3	0.902	0.873	0.772	1.151	99.56	0.905	1.00754	1.00	Ramp at 3% power per hour	0008FTNF
Dayshift / 1130	88.0	84.5	0.898	0.885	0.783	1.190	99.72	0.895	1.00754	1.00	Ramp at 3% power per hour	0009FTNF
Dayshift / 1230	91.0	89.0	0.892	0.897	0.794	1.229	99.92	0.886	1.00752	1.00	Ramp at 3% power per hour	0010FTNF
Dayshift / 1330	94.0	93.7	0.886	0.908	0.804	1.267	100.17	0.877	1.00750	1.00	Ramp at 3% power per hour	0011FTNF
Dayshift / 1430	97.0	98.4	0.880	0.918	0.813	1.306	101.13	0.870	1.00750	1.00	Ramp at 3% power per hour	0012FTNF
Dayshift / 1530	100.0	103.2	0.875	0.928	0.822	1.345	101.28	0.864	1.00751	1.00	Ramp at 3% power per hour	0013FTNF

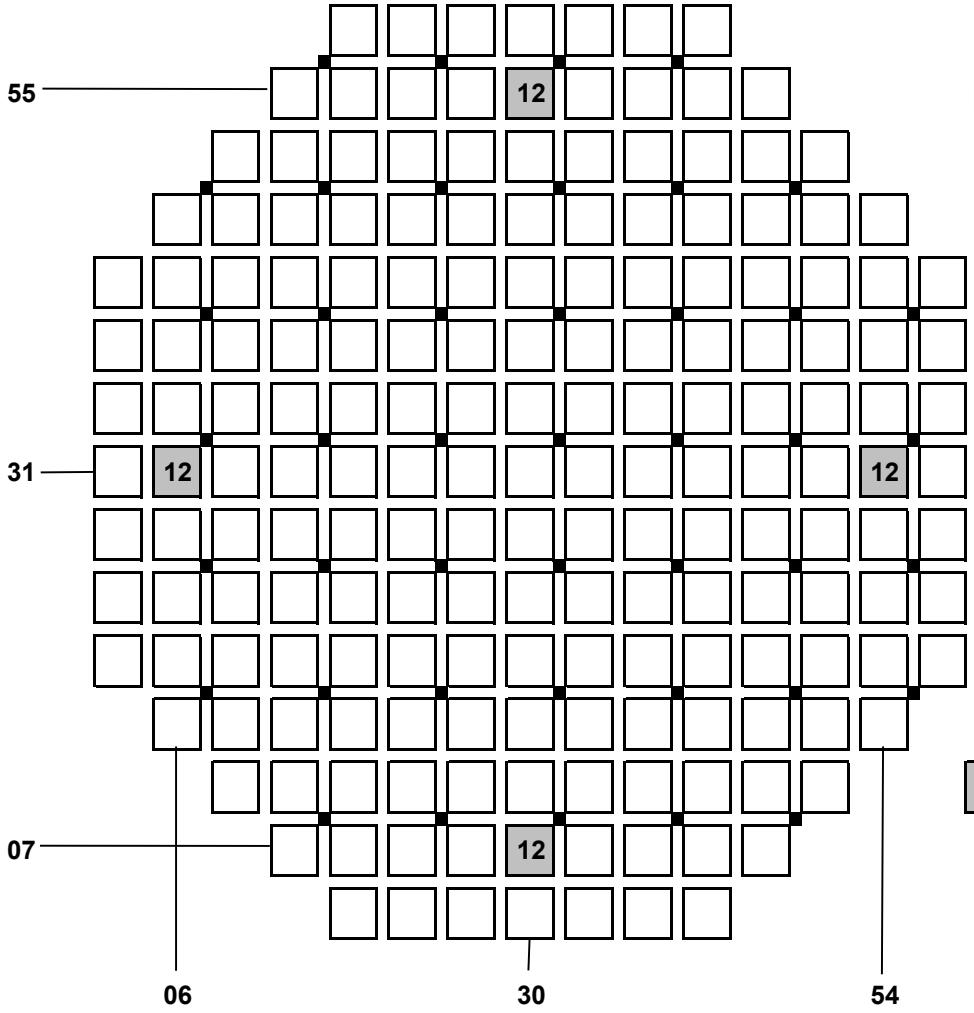
Prepared By: John Smith #21654789
X Station Nuclear Engineer (Qual #42001413)

Reviewed By: Bill Wallace Jr. #46985431
X Station Nuclear Engineer (Qual #42001413)

Approved By: Mike McScrugginsby 5/10/2023
Supervisor - RXE

Ops Review:

REACTIVITY MANEUVERING PLAN STEP SHEET



Page _____ of _____

Group: 10/1

ROD	FROM	TO	P603 Initials	Verifier Initials	Notes
30-55	00	12			
30-07	00	12			
54-31	00	12			
06-31	00	12			

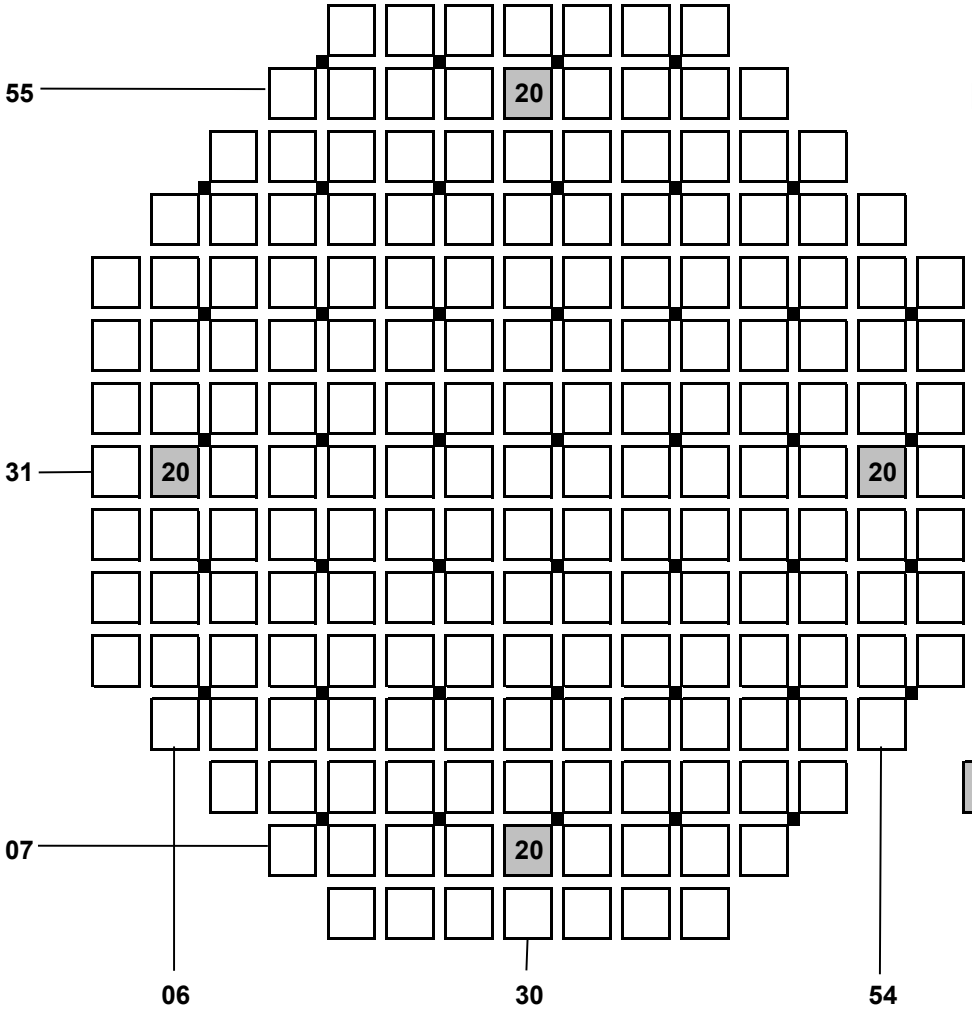
Prepared: _____ / Today
☐ Certified SNE Date

Reviewed: _____ / Today
☐ Certified SNE / STA Date

Approved: _____ Today
☐ Licensed SRO Date

File: RMP Step Sheets. FOR TRAINING USE ONLY

REACTIVITY MANEUVERING PLAN STEP SHEET



Page _____ of _____

Group: 10/1

ROD	FROM	TO	P603 Initials	Verifier Initials	Notes
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30-07	12	20			
54-31	12	20			
06-31	12	20			

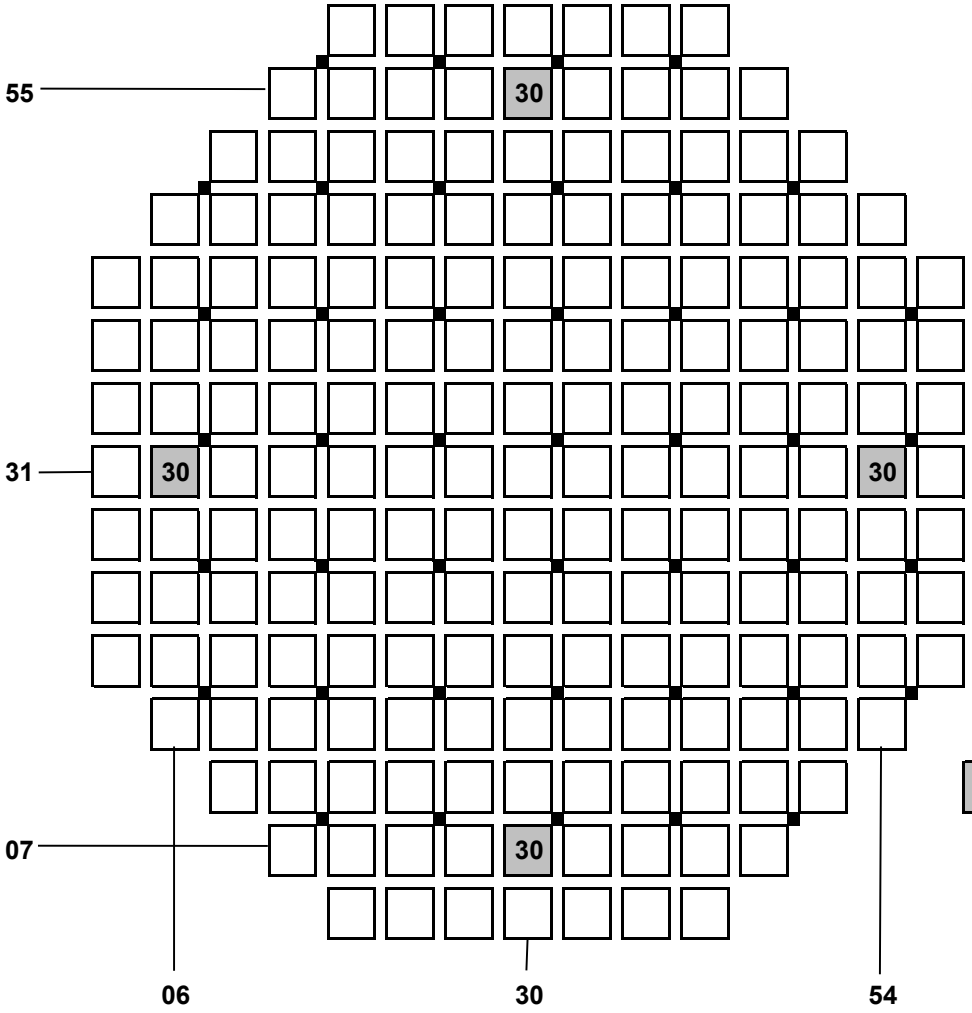
Prepared: _____ / Today
☐ Certified SNE Date

Reviewed: _____ / Today
☐ Certified SNE / STA Date

Approved: _____ Today
☐ Licensed SRO Date

File: RMP Step Sheets. FOR TRAINING USE ONLY

REACTIVITY MANEUVERING PLAN STEP SHEET



Page _____ of _____

Group: 10/1

ROD	FROM	TO	P603 Initials	Verifier Initials	Notes
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30-07	20	30			
54-31	20	30			
06-31	20	30			

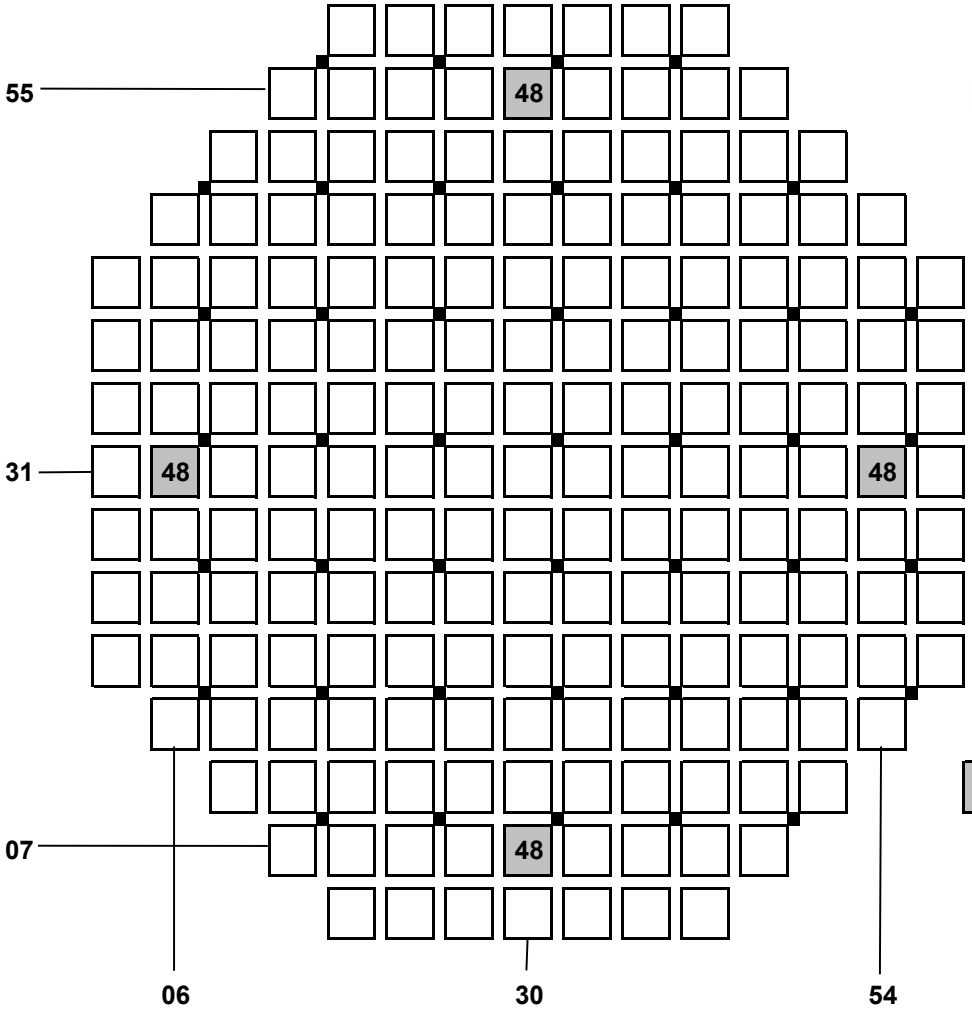
Prepared: _____ / Today
☐ Certified SNE Date

Reviewed: _____ / Today
☐ Certified SNE / STA Date

Approved: _____ / Today
☐ Licensed SRO Date

File: RMP Step Sheets. FOR TRAINING USE ONLY

REACTIVITY MANEUVERING PLAN STEP SHEET



Page _____ of _____

Group: 10/1

ROD	FROM	TO	P603 Initials	Verifier Initials	Notes
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30-07	30	48			
54-31	30	48			
06-31	30	48			

Prepared: _____ / Today
☐ Certified SNE Date

Reviewed: _____ / Today
☐ Certified SNE / STA Date

Approved: _____ / Today
☐ Licensed SRO Date

File: RMP Step Sheets. FOR TRAINING USE ONLY

Standing Reactivity Maneuvering Plan

Major Downpower to Support Maintenance
Revision 2

List of steps in 57.000.22 that are N/A for this evolution:

57.000.22 (Reactivity Maneuvering Plan Development) steps 7.2.7 thru 7.2.11, and 7.3.4 do not apply to this Standing RMP.

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Station Nuclear Engineer

Approved By 00112628 per TMFR-18-0089 10/21/18
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Operations Engineer

Activated By	/
Shift Manager	/ Date

Deviations from this plan require approval from the Supervisor, Reactor Engineering and the Shift Manager

Standing Reactivity Maneuvering Plan

1.0 Purpose

1.1 This Reactivity Maneuver Plan (RMP) is used in conjunction with MOP19, GOP 22.000.03, “Power Operation 25% to 100% to 25%”, and the current CRAM/Sequence array to change Core Thermal Power (CTP) to support maintenance activities.

1.2 The purpose of this RMP is to guide planned entry to or planned recovery from reduced power operation that is necessary for performing maintenance work.

1.3 For significantly low power levels (less than 35% CTP), actuation of the standing RMP, “Reactor Shutdown” should be considered.

2.0 Prerequisites

2.1 The starting conditions of the Maneuver are within the range of the conditions described in section 3.0, *Initial Conditions*.

2.2 For the duration of this maneuver, Reactor Power will be maintained above 35% Core Thermal Power.

2.3 For the duration of this maneuver, the Main Unit Generator will be synchronized to the grid.

3.0 Initial Conditions

3.1 The reactor is in Mode 1 and operating above the Low Power Setpoint.

3.2 The reactor is in Dual Loop Operation.

3.3 The power level required to support maintenance activities has been determined and communicated to Operations and Reactor Engineering.

4.0 Assumptions

4.1 Immediate impact of low power operation has been analyzed by Operations and Reactor Engineering. Strategies for mitigating any identified issues will be implemented in conjunction with this RMP and discussed in a Pre-Job Brief.

4.2 Real-time look-ahead predictors will be performed on shift.

4.3 An Augur/Predictor study has been performed for restoring power after maintenance has been completed.

4.4 Reference the Augur/Predictor study for the intermediate rod pattern (if applicable). During the maneuver, the intermediate rod pattern may be adjusted by the Station Nuclear Engineer as needed to manage current and upcoming margins for power, thermal limits, fuel conditioning, and rodline.

Standing Reactivity Maneuver Plan

5.0 General Statements and Expectations

5.1 This Reactivity Maneuver Plan (RMP) provides guidance regarding the sequence and coordination of activities. Steps are performed in accordance with MOP19, GOP 22.000.03, and other applicable plant procedures.

5.2 This document meets the definition of a Standing RMP (per 57.000.22, *Reactivity Maneuvering Plan Development*). This RMP can be re-used to implement major downpowers to support maintenance activities.

5.3 Per 57.000.22, Reactor Engineering will provide just-in-time predictor analyses and RMP Step Sheets to confirm adequate fuel conditioning, thermal limit, and rod line margins. Reactivity manipulations directed by RMP Step Sheets are within the parameters of this RMP.

5.4 Reactor Engineering will compare core monitor results to predictor cases to assess validity of assumed uncertainties. Significant deviation from predicted results indicates a need to re-analyze.

5.5 Power ascension ramp rates are determined by Reactor Engineering and may be delivered through RMP Step Sheets and Reactor Engineering Night Orders.

5.6 Reactivity changes caused by manual core flow adjustments are considered gradual reactivity changes, and therefore, do not require blocking the core monitor.

5.7 SNEs may break shift in accordance with Section 8.0, *Prerequisites to Break Shift Checklist*.

5.8 Chemistry sampling will occur if power changes greater than 15% occur during the course of this RMP per 22.000.03, or as required in Chemistry Night Orders and applicable ODMI's.

5.9 The following power level constrains apply to Section 7.1, *Achieve Low Power Operation*.

5.9.1 Power shall not be decreased below 35% CTP.

5.9.2 Rod line is limited to 110.0% (as shown on the power-to-flow map) in predictor analysis to account for differences in core flow indication sources.

5.10 Section 7.2, *Restore Normal Operation* may be performed at the discretion of the on-shift SNE in order to achieve desirable plant conditions.

5.11 The following power level constrains apply to Section 7.2, *Restore Normal Operation*:

5.11.1 Rod line is limited to 110.0% (as shown on the power-to-flow map) in predictor analysis to account for differences in core flow indication sources.

5.11.2 Upon reaching 3486 MWth and 105% core flow, a RR speed reduction to achieve 3430 MWth while maintaining 105% core flow will be necessary to stay within the Power-to-Flow map during coast down.

5.12 APRMs are expected to diverge from % CTP during rod adjustments, and it is possible that the Tech Spec LCO will be entered. This is therefore a "planned" entry. With one APRM exceeding 2% Tech Spec requirement, if a second APRM reaches 1.5% then calibration will be performed at completion of the current group step. (Note that APRM evaluation should occur when CTP is “stable” – that is, at least 2 minutes following a power change).

6.0 Fuel Conditioning Expectations

6.1 Fuel conditioning guidelines are prescribed in 57.000.13, “Fuel Preconditioning Guidelines/Operating Strategies” and the current Fuel Conditioning Guidelines found in the Reactor Engineering Databook.

6.2 The following guidelines apply for ramping power by using flow through the Reactor Recirc speed oscillation region.

6.2.1 Raise power with flow to obtain 49% RRMG set speeds.

6.2.2 Raise power with flow to obtain 54% RRMG set speed. Traverse the Speed Oscillation Region (SOR) one pump at a time with a hold between pumps. Minimum duration of hold (in hours) equals the power increase (in Δ% CTP) from moving the first MG set through the SOR divided by the ramp rate (in % CTP per hour).

$$\text{Min Hold (hours)} = \frac{\Delta\ \%\ \text{CTP Increase (from 1 MG Set through the SOR)}}{\text{Ramp Rate (in \% CTP per hour)}}$$

6.3 The following applies to operation with a fuel failure.

6.3.1 A Pre-Job Brief shall be conducted for all SNEs.

6.3.2 Power ascension using flow shall be maintained within the Fuel Conditioning Guidelines for operation with failed fuel.

Standing Reactivity Maneuver Plan

Note (1): Individually large power changes should include a 3-minute wait to allow for an observable plant response.

Note (2): Core Monitors are demanded at each bank step, following a 2 minute wait for stable data.

7.0 Reactivity Manipulations

Note (1): Power level constraints are in effect per Section 5.0 step 5.9 of this RMP.

Note (2): The intent of this section is to define the script for a power decrease to support maintenance activities. This section may be used multiple times as necessary to adapt the holding power level to changing plant conditions.

7.1 **Achieve Low Power Operation**

7.1.1 If not completed, inhibit the Core Monitor.

Note (1): It may be necessary to follow a downpower sequence that diverges from the CRAM array in order to avoid extended periods of operation at certain operating regions (RR Speed Oscillation Region, near MELLLA boundary, etc.).

7.1.2 Decrease power to desired power level by following the CRAM/Sequence array **OR** by following RMP Step Sheets provided by the on-shift Station Nuclear Engineer.

7.1.3 Restore the Core Monitor.

7.1.4 Maintain power through the following xenon transient using Core Flow and/or Control Rod movements per RMP Step Sheets.

7.1.5 When maintenance is completed, continue to Section 7.2, *Restore Normal Operation*.

Standing Reactivity Maneuver Plan

Note (1): Power level constraints are in effect per Section 5.0 step 5.11 of this RMP.

Note (2): The intent of this section is to define the script for a power increase following maintenance activities and subsequent downpowers needed to obtain the interim or target rod pattern. This section may be used multiple times as necessary.

7.2 **Restore Normal Operation**

7.2.1 If not already done, inhibit the Core Monitor.

7.2.2 If necessary, establish the desired rod pattern.

1. Verify correct Target Rod Pattern with the Core Follow Engineer.

2. Establish a Core Power level using Core Flow to achieve conditions to begin control rod movements as determined by Reactor Engineering.

3. Perform rod movements per RMP Step Sheets.

   a. Fuel conditioning is performed per Section 6.0 of this RMP and applicable Reactor Engineering Standing Orders (RXESOs).

   b. Monitor APRMs.

   c. Power may be changed using Core Flow with Operations and Reactor Engineering concurrence to provide more margin to fuel conditioning limits, thermal limits, OPRM enabled region, or other operational constraints if the change in power does not cause a significant deviation to the analyzed sequence.

   d. If necessary, perform a Heat Balance Validation at 50% CTP.

   e. If necessary, perform a Heat Balance Validation at 75% CTP.

   f. If necessary, perform a Heat Balance Validation at 95% CTP.

4. Restore the Core Monitor.

7.2.3 After the desired rod pattern (interim or target) has been established, achieve desired power level using Core Flow.

1. Increase power using Core Flow until the desired power level or maximum Core Flow is reached, whichever comes first.

a. Fuel conditioning is performed per Section 6.0 of this RMP and applicable Reactor Engineering Standing Orders (RXESOs).

b. Monitor APRMs.

c. If necessary, guidelines for ramping power by using flow through the RR speed oscillation region are contained in Section 6.0 of this RMP.

d. If necessary, perform a Heat Balance Validation at 75% CTP.

e. If necessary, perform a Heat Balance Validation at 95% CTP.

Note: The "Prerequisites to Break Shift Checklist" section is generic and some steps not applicable. It is up to the SNE breaking shift to evaluate the need for each item.

8.0 Prerequisites to Break Shift Checklist

8.1 Interim (or target) Rod Pattern established.

8.2 Augur/predictor study completed for subsequent rod adjustment, if not at target.

8.3 New CRAM and Sequence Arrays issued. Red CRAM rod tape in place.

8.4 Automatic Core Monitor enabled, OPS shift informed and log in SNE log.

8.5 Face-to-face turnover with the CRS and SM.

8.6 RXE night order issued. Potential items to include:

8.6.1 Core monitoring requirements (e.g., run a core monitor at least hourly during current xenon transient).

8.6.2 Expected power/flow conditions while holding/maintaining power that may impact the plant (e.g., APRM GAFs, RR flow changes).

8.6.3 APRMs are expected to diverge from %CTP as power shape changes. Perform APRM Calibration as needed.

8.6.4 Plans for subsequent rod adjustments, if not at target.

Standing Reactivity Maneuver Plan

Note: Procedures listed below may or may not be used during the course of this Maneuver.

9.0 References

1. MOP19, “Reactivity Management”
2. MOP19-100, “Reactivity Management Implementation”
3. 22.000.03, “Power Operation 25% to 100% to 25%”
4. 23.623, “Reactor Manual Control System”
5. 54.000.06, “APRM Calibration”
6. 24.605, “APRM Calibration Above 25% Power”
7. 54.000.07, “Core Performance Parameter Check”
8. 57.000.22, “Reactivity Maneuvering Plan Development”
9. Fuel Conditioning Guidelines from RXE Data Book
10. Reactor Engineering Standing Orders (RXESOs)

END

Simulator Scenario Summary

NRC Form 3.3-1 Scenario Outline

Facility:	**Fermi 2**	Scenario #:	**3**	Source:	**New**	Op Test #	**2023 ILT**

Examiners:		Applicants/ Operators:	
Validating Operators:	A. Snowberger (CRS)		J. Walters (ATC)
	D. Roberts (BOP)		J. Holdwick (CRS)
	S. Erickson (BOP)		G. Pezzino (ATC)

Initial Conditions:	**100%, South RFP West Lube Oil Pump B OOS for motor replacement**
Turnover:	**After the crew takes the shift, the operating Steam Tunnel Cooler will be shifted from North to South due to High Vibes for North cooler**
Critical Tasks:	**CT-1, 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. **CT-2, ATWS-T&P:** During an ATWS with conditions met to perform power/level control TERMINATE AND PREVENT INJECTION into the RPV until conditions are met to re-establish injection.

Event No.	Malf No.	Event Type* / Position		Event Description
1	N/A	N	BOP/SRO	The crew will perform the normal evolution of shifting the in-service Steam Tunnel Cooler, from the North to the South, in accordance with 23.414, Steam Tunnel Cooling.
2	C11MF0741	C TS	ATC/SRO SRO	Control Rod 38-31 will drift out of the core requiring operators to enter AOP 20.106.07 and perform immediate actions to insert the drifting control rod. Operators will then disarm the control rod. The CRS will evaluate the impact on TS and determine that TS 3.1.3 is applicable.
3	T41MF0004	C TS	BOP/SRO SRO	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.

Simulator Scenario Summary

Event No.	Malf No.	Event Type* / Position		Event Description
4	P50MF0014 P502PSE_N415TFASIS	C MC	BOP/SRO BOP	The unloader valve will fail for the in-service (West) Station Air Compressor (SAC) and the standby (Center) SAC will not auto start. The crew will recognize this failure and act, either directly or upon entry into AOP 20.129.01, Loss of Station and Control Air, to start the standby SAC to restore air system parameters.
5	NB06N2102C002_PBTVBRVIB NB06N2102C015_TB_BTVTBGVIB NB06N2102C015_TB_CTVTBGVIB	C	BOP/SRO	High Vibration on the South Reactor Feedwater Pump (RFP) Pump and Turbine will cause the crew to evaluate alarms and indications. The BOP trips the pump per ARP 5D28 due to exceeding 6 mils for more than 15 seconds.
6	B31RF0031 B31RF0033	C MC	ATC/SRO ATC	North (A) Recirculation pump fails to run back when the crew trips the South RFP. ATC should recognize the failure and manually run back the RRMG set.
7	N/A	R	ATC	The ATC will plot position on the P/F Map and insert the CRAM Rods to restore operation outside of the Stability Awareness Region.
8	C11MF0393 C11MF0207	C	ATC/SRO	Multiple rod drifts will require a reactor scram per immediate actions of 20.106.07.
9	EOPRF0011/12/13/14	M	ALL	When the Mode Switch is taken to Shutdown, RPS will fail to actuate requiring performance of ATWS Actions. ARI will also fail to initiate, resulting in an electronic ATWS. Per the EOPs, the crew will prevent Automatic ADS Initiation (**CT-1, ATWS-ADS**). Manual rod insertion will be successful. Control rod insertion will occur when either the scram fuses are pulled or the scram air header is vented. BOP controls RPV water level and ATC steps through ESP to insert rods manually (**CT-2, ATWS-T&P**)
10	P603_A019(20/21/22)_3 0 C71MF0006 C41MF0002	C	ATC/SRO	Operators inject SLC and determine failure to start. Crew will then start the opposite SLC pump and SLC will inject.

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor, (TS)Tech Spec, (MC)Manual Control

Simulator Scenario Summary

A. INITIAL CONDITIONS / PRE-SHIFT BRIEFING:

The plant is at 100% Power with the South RFPT West Lube Oil Pump B tagged out for motor replacement. Expected return to service is 36 hours.

After the crew takes the shift, the operating Steam Tunnel Cooler will be shifted from North to South per SOP 23.414.

No additional equipment is out of service.

All licensed operators are in the Main Control Room (MCR).

Normal shift complement of non-licensed operators are available.

Simulator Scenario Summary

B. SUMMARY OF EVENTS

Event 1:	**Steam Tunnel Cooler shift**
The crew will perform the normal evolution of shifting the in-service Steam Tunnel Cooler, from the North to the South, in accordance with 23.414, Steam Tunnel Cooling.	

Event 2:	**CR 38-31 drifts out of core**
Control Rod 38-31 will drift out of the core requiring operators to enter AOP 20.106.07 and perform immediate actions to insert the drifting control rod. Operators will then disarm the control rod. The CRS will evaluate the impact on TS and determine that TS 3.1.3 is applicable.	

Event 3:	**Div 1 CCHVAC Return Fan trip**
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 4:	**West SAC unloads and Center SAC fails to auto start**
The unloader valve will fail for the in-service (West) Station Air Compressor (SAC) and the standby (Center) SAC will not auto start. The crew will recognize this failure and act, either directly or upon entry into AOP 20.129.01, Loss of Station and Control Air, to start the standby SAC to restore air system parameters.	

Event 5:	**RFP High Vibes, RFP fails to trip**
High Vibration on the South Reactor Feedwater Pump (RFP) Pump and Turbine will cause the crew to evaluate alarms and indications. The BOP trips the pump per ARP 5D28 due to exceeding 6 mils for more than 15 seconds.	

Event 6:	**North RRMG Set auto runback failure**
Event 7:	**Evaluate P/F Map and insert CRAM array**
North (A) Recirculation pump fails to run back when the crew trips the South RFP. ATC should recognize the failure and manually run back the RRMG set. The ATC will plot position on the P/F Map and insert the CRAM Rods to restore operation outside of the Stability Awareness Region	

Simulator Scenario Summary

Event 8:	**Multiple rods drift, place the Mode Switch in Shutdown**
Event 9:	**Electric ATWS**
Event 10:	**SLC fails to start**

When the Mode Switch is taken to Shutdown, RPS will fail to actuate requiring performance of ATWS Actions. ARI will also fail to initiate, resulting in an electronic ATWS. Operators inject SLC and determine failure to start. Crew will then start the opposite SLC pump and SLC will inject. Per the EOPs, the crew will prevent Automatic ADS Initiation **(CT-1, ATWS-ADS)**

Manual rod insertion will be successful. Control rod insertion will occur when either the scram fuses are pulled or the scram air header is vented. BOP controls RPV water level and ATC steps through ESP to insert rods manually **(CT-2, ATWS-Power)**

Termination Criteria
Scenario is terminated after all rods have been inserted or at the discretion of the Lead Evaluator.

Simulator Scenario Summary

C. SIMULATOR SETUP

SCENARIO SPECIFIC SETUP:

1. Initialize the simulator to **IC-20**
2. **PLACE** the simulator in **RUN**.
3. **OPEN** lesson **ILT 2023 Scenario 3.lsn**.
4. **EXECUTE** the lesson.
5. **ENSURE** the CMC Switch for **South RFPT West Lube Oil Pump B** is in OFF-RESET.
6. **PLACE** an RT DOT next to the CMC for the **South RFPT West Lube Oil Pump B**.
7. **PLACE** the CMC switch for **South RFPT East Lube Oil Pump A** in RUN
8. **TRIGGER Setup** step to:
   a. Remove **South RFPT West Lube Oil Pump B** from service
   b. Place **South RFPT East Lube Oil Pump A** in service
   c. Insert ATWS malfunctions
9. Verify the CRAM array book is correct and free from marks.

GENERIC SETUP:

1. **PROVIDE** crew a list of available NOs
2. **ENSURE** that all annunciators are acknowledged and the plant is stable
3. **ACKNOWLDGE** DCS alarms
4. **VERIFY** GSW placard is in place and indicates INTERMITTENT.
5. **VERIFY** CFD placard has current dates (within the last 14 days is acceptable).
6. **COMPLETE** Attachment 1 of NTWI 5.12
7. **ALLOW** the operators to enter the room, provide them with a turnover in accordance with Section E, and allow them to walk down the panels
8. **ENSURE** simulator alarms are NOT silenced
9. **TRIGGER** steps as directed by the guide/Lead Evaluator
10. **START** Simulator data recorder
11. **RECORD** communications with crew members on NTWI 5.12 Attachment 3

Simulator Scenario Summary

D. CRITICAL TASKS

CRITICAL TASK EVALUATION CRITERIA	SAT	UNSAT	NA
CT-1, 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.*			

Safety Significance: 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.

Failure Criteria reasoning: Candidate will fail if ADS is NOT inhibited within the 105 second time delay. If an automatic depressurization occurs without sufficient preparation, a severe thermal transient will occur.

Initiating Cue: ATWS, prevent an uncontrolled RPV depressurization.

Measurable Performance Standard: Inhibit ADS.

Performance Feedback: ADS inhibited white lights and alarm window.

Expected action: Inhibit ADS.

Simulator Scenario Summary

CRITICAL TASK EVALUATION CRITERIA	SAT	UNSAT	NA
CT-2, ATWS-T&P: *During an ATWS with conditions met to perform power/level control TERMINATE AND PREVENT INJECTION into the RPV until conditions are met to re-establish injection.*			

Safety Significance: To prevent or mitigate the consequences of any large irregular neutron flux oscillations induced by neutronic/thermal-hydraulic instabilities, RPV water level is lowered sufficiently below the elevation of the feedwater sparger nozzles. This places the feedwater spargers in the steam space providing effective heating of the relatively cold feedwater and eliminating the potential for high core inlet subcooling.

Failure Criteria reasoning: Candidate will fail if feedwater is not completely terminated, or if injection is restored inappropriately, either of which would increase the time until water level is lowered sufficiently below the elevation of the feedwater sparger nozzles (114”), increasing the likelihood of large irregular flux oscillations.

Initiating Cue: Reactor power is above 3% and RPV water level is above 114”.

Measurable Performance Standard: RPV injection is terminated, as indicated by all Feedwater Check Valves going closed, and prevented until RPV water level is reduced below 114”.

Performance Feedback: Feedwater flow drops to zero, Feedwater System Injection Check Valves close, and RPV Water Level drops.

Expected action: Perform ATWS Actions of 29.ESP.01 to terminate injection, until RPV Water Level drops below 114”, at which time injection can be re-established.

Simulator Scenario Summary

E. LIST OF MALFUNCTIONS

The following malfunctions and/or remote functions are to be active/activated as indicated in the time line:

MF/RF/PO/LBL	Description	Target Value	Step No.	Ramp	Delay
EOPRF0011	Electric ATWS	DEFEAT	S1		
EOPRF0012		DEFEAT			
EOPRF0013		DEFEAT			
EOPRF0014		DEFEAT			
EOPRF0041		DEFEAT			
EOPRF0042		DEFEAT			
EOPRF0043		DEFEAT			
EOPRF0044		DEFEAT			
P603_A019_3		0			
P603_A020_3		0			
P603_A021_3		0			
P603_A022_3		0			
C41MF0003	SLC Pump A Trip (P603_B002_1 EQ 1 and C41MF0004 NE 1)	Active	S3		30
C41MF0004	SLC Pump B Trip (P603_B002_3 EQ 1 and C41MF0003 NE 1)	Active	S4		30
R11RF0321	S. RFP West LO Pump	OFF	S2		
C11MF0741	CR 38-31 Drifts OUT	ACTIVE	2		
C11MF0741	Disarm CR 38-31	CLEAR	2a		
T41MF0002	Trip Div 1 CCHVAC Return Fan	1	3		
P50MF0014	West SAC Unloader Failure	1.0	4		

Simulator Scenario Summary

MF/RF/PO/LBL	Description	Target Value	Step No.	Ramp	Delay
P502PSE_N415T FASIS	Stby SAC Fails to Start	TRUE			
NB06N2102C015 _TB_BTVTBGVIB	Turb Vibe MFs to 0.7 = 3.2 mils => above alarm	0.7	5	300	
NB06N2102C015 _TB_CTVTBGVIB		0.7		320	
NB06N2102C015 _TB_BTVTBGVIB	Turb Vibe MF to 1.0 = 4.4 mils -- NOT enough to TRIP	1.0	5a	100	
NB06N2102C015 _TB_CTVTBGVIB		1.0		100	
NB06N2102C015 _TB_CZCTBGVIB	Vibration Failure Intensity - To Trip	5.8		150	
NB06N2102C002 _PBTVBRVIB	Pump vibe MF to 0.7 = 3.0 mils	0.7		150	
cd='P805_B028_2 EQ 1 AND P805_B028_3 EQ 1'	Removes High Vibes AFTER Trip				
NB06N2102C015 _TB_BTVTBGVIB		0.1		30	
NB06N2102C015 _TB_CTVTBGVIB		0.2		20	
NB06N2102C015 _TB_CZCTBGVIB		0.0		30	
NB06N2102C002 _PBTVBRVIB		0.0		10	
B31RF0031	Set #2 and #3 Limiters to 64.79 for North RRMG	64.79	6		
B31RF0033		64.79			
C11MF0055	Multiple rod drifts	ACTIVE	8		

Simulator Scenario Summary

MF/RF/PO/LBL	Description	Target Value	Step No.	Ramp	Delay
C11MF0219		ACTIVE			
C11MF0549		ACTIVE			
cd='P603_A048_1 eq 1'					
C11MF0055	Clears Rod Drifts when MS in Shutdown	CLEAR			
C11MF0219		CLEAR			
C11MF0549		CLEAR			
EOPRF0007	29.ESP.11	defeat	8a		
EOPRF0010		defeat			
EOPRF0048	Remove Scram Fuses	1	8b		0
EOPRF0050		1			10
EOPRF0049		1			20
EOPRF0051		1			30
EOPRF0052		1			70
EOPRF0053		1			90
EOPRF0054		1			100
EOPRF0055		1			130
EOPRF0048	Install Scram Fuses	2	8b1		0
EOPRF0050		2			10
EOPRF0049		2			20
EOPRF0051		2			30
EOPRF0052		2			70
EOPRF0053		2			90

Simulator Scenario Summary

MF/RF/PO/LBL	Description	Target Value	Step No.	Ramp	Delay
EOPRF0054		2			100
EOPRF0055		2			130
C103ANA_COND _C11GAIN	Vent Scram Air Header	0	8c		

Simulator Scenario Summary

REFERENCES

The following is a list of expected Procedure References used in this scenario:

✓	PROCEDURE	TITLE
☐	3D18	IPCS MONITORED INPUTS ABNORMAL
☐	3D80	CONTROL ROD DRIFT
☐	3D110	RBM DOWNSCALE
☐	3D113	CONTROL ROD WITHDRAWAL BLOCK
☐	5D28	SOUTH RFP/RFPT SHAFT TROUBLE
☐	5D85	LOSS OF HEATER DRAINS
☐	7D53	STATION AIR HEADER PRESSURE LOW
☐	7D48	AUX BOILER CONTROL AIR PRESSURE LOW
☐	7D50	DIV I/II CONTROL AIR COMPRESSOR AUTO START
☐	7D57	STATION AIR ISOLATION VALVE CLOSED
☐	7D59	CONTROL AIR ISOLATION VALVE CLOSED
☐	7D60	RHR COMPLEX CONTROL AIR PRESSURE LOW
☐	7D72	MOTOR TRIPPED
☐	7D56	INTERRUPTIBLE CONTROL AIR DRYER TROUBLE
☐	8D5	DIV I CONTROL ROOM A/C TROUBLE
☐	8D72	MOTOR TRIPPED
☐	8D10	DIV I MCR BUILDING PRESSURE HIGH/LOW
☐	17D27	DIV II CONTROL ROOM A/C TROUBLE
☐	17D55	DIV II MCR BUILDING PRESSURE HI/LO
☐	20.106.07	CONTROL ROD DRIFT
☐	20.107.01	LOSS OF FEEDWATER OR FEEDWATER CONTROL
☐	20.107.02	LOSS OF FEEDWATER HEATING
☐	20.413.01	CONTROL CENTER HVAC SYSTEM FAILURE
☐	20.129.01	LOSS OF STATION/CONTROL AIR
☐	23.413	CONTROL CENTER HVAC
☐	23.414	STEAM TUNNEL COOLING

Simulator Scenario Summary

✓	PROCEDURE	TITLE
☐	29.ESP.03	ALTERNATE CONTROL ROD INSERTION METHODS
☐	29.ESP.11	DEFEAT OF RPV MSIV LEVEL 1 AND OFFGAS HIGH RAD ISOLATION SIGNALS
☐	29.ESP.10	DEFEAT OF ARI LOGIC TRIPS
☐	TS 3.1.3	Control Rod OPERABILITY
☐	TS 3.7.3	Control Room Emergency Filtration (CREF) System
☐	TS 3.7.4	Control Center Air Conditioning (AC) System

Form 3.3-2 Required Operator Actions

Op Test No.: **Fermi ILT 2023**	Scenario No.: **3**	Page **1** of **18**

Event 1	Steam Tunnel Cooler shift	**Type:**	N

Event Description: The crew will perform the normal evolution of shifting the in-service Steam Tunnel Cooler, from the North to the South, in accordance with 23.414, Steam Tunnel Cooling.

Symptoms/Cues: This will be included with the initial conditions for this scenario.

Time	Position	Applicant's Actions or Behavior
T_0 min	**Booth Action**	None
T_0 +5 min	**BOP**	May conduct a short brief of the evolution. Shifts In-Service Steam Tunnel Coolers IAW 23.414, Section 5.0: ☐ Verifies open P4200-F603, S Stm Tnl Clr RBCCW Outlet Iso. ☐ Opens P4200-F602 S Stm Tnl Clr RBCCW Inlet Iso. ☐ Starts T4100-B023B, Steam Tunnel Cooler B, by placing its CMC switch in RUN. ☐ Shuts down T4100-B023A, Steam Tunnel Cooler A, by placing its CMC switch in OFF/RESET. ☐ Closes P4200-F600, N Stm Tnl Clr RBCCW Inlet Iso. ☐ Maintains open P4200-F601, N Stm Tnl Clr RBCCW Outlet Iso to allow for thermal expansion. Informs CRS of completion of Steam Tunnel Cooler shift.
	CRS	Monitors and provides oversight of evolution.
	ATC	May provide peer check of evolution.

Form 3.3-2 Required Operator Actions

Op Test No.: **Fermi ILT 2023**	Scenario No.: **3**	Page **2** of **18**

Event 2	CR 38-31 drifts out of core	**Type:**	C, TS

Event Description: Control Rod 38-31 will drift out of the core requiring operators to enter AOP 20.106.07 and perform immediate actions to insert the drifting control rod. Operators will then disarm the control rod. The CRS will evaluate the impact on TS and determine that TS 3.1.3 is applicable.

Symptoms/Cues: 3D80, Control Rod Drift Alarm with accompanying indication that Control Rod 38-31 is drifting out of the core.

<table>
<tr><th>Time</th><th>Position</th><th colspan="3">Applicant's Actions or Behavior</th></tr>
<tr><td>T_0 +10 min</td><td>Booth Action</td><td colspan="3">Trigger Event 2 to initiate Control Rod 38-31 drifting out of the core.</td></tr>
<tr><td></td><td>ATC</td><td colspan="3">Responds to 3D80, Control Rod Drift and reports to CRS.
Turns on rod select power and selects the drifting rod.
Fully inserts CR 38-31 by holding Rod Out Notch Override Switch (RONOR) in EMER ROD IN (IMMEDIATE ACTION).
Reports status of CR 38-31 when fully inserted, with Reactor Power, to CRS.
Dispatches operator to HCU for CR 38-31.</td></tr>
<tr><td></td><td>BOP</td><td colspan="3">May assist ATC with detecting drifting Control Rod.
May handle communications to rounds operators for ATC.</td></tr>
<tr><td></td><td>SRO</td><td colspan="3">Enters 20.106.07, Control Rod Drift AOP with a Crew Update.
Ensures Immediate Actions are carried out.
Makes plant announcement.
Assigns critical parameter for 2nd Rod Drift.
Directs actions of 20.106.07, Condition B.
Evaluates LCO 3.1.3 for CR 38-31.</td></tr>
<tr><td></td><td rowspan="3">TS Impact</td><td colspan="3">TS 3.1.3, Control Rod Operability:
Each control rod shall be OPERABLE</td></tr>
<tr><td>CONDITION</td><td>REQUIRED ACTION</td><td>COMPLETION TIME</td></tr>
<tr><td>C. One or more control rods inoperable for reasons other than Condition A or B.</td><td>C.1 Fully insert 38-31
AND
C.2 Disarm 38-31</td><td>3 hours

4 hours</td></tr>
</table>

Form 3.3-2 Required Operator Actions

Op Test No.: **Fermi ILT 2023**	Scenario No.: **3**	Page **3** of **18**

Time	Position	Applicant's Actions or Behavior
	ATC/BOP	For HCU 38-31, Directs NO to close (in this order): ☐ C11-F103. ☐ C11-F105. Releases ROD Out Notch Override Switch (H11-P603) and verifies rod stays at desired position. Informs CRS of status of rod 38-31. Places ROD DRIFT ALARM switch in RESET and verifies alarm clears.
	Role Play	**NO:** When sent to HCU 38-31: ☐ **WAIT 3 minutes** ☐ **REPORT** "*On station at HCU for CR 38-31*" ☐ **RESPOND** to directions to close C11- F103/F105 at HCU 38-31. ☐ **TRIGGER Step #2a** to clear rod drift to simulate rod settling at "00" when the F103 is closed. ☐ **REPORT** "*C11- F103/F105 are closed for HCU 38-31*"
	SRO	Conducts AOP Follow-up brief. Briefs impact of CR 38-31 drifting on Tech Specs. May contact RTC to direct tagging HCU for CR 38-31.

Form 3.3-2 Required Operator Actions

Op Test No.: **Fermi ILT 2023**	Scenario No.: **3**	Page **4** of **18**

Event 3	Div 1 CCHVAC Return Fan trip	**Type:**	C, TS

Event Description: 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.

Symptoms/Cues: Various alarms on H11-P808 with Tripped light lit on T4100-C031, Div 1 CCHVAC Return Air Fan.

Time	Position	Applicant's Actions or Behavior
T_0 +20 min	**Booth Action**	Trigger **Event 3** to initiate a trip of Div 1 CCHVAC Return Air Fan.
	BOP	Identify 8D5, 8D72, 8D10, 17D55, and Division 1 CCHVAC Return Fan tripped and report to CRS Dispatch operator to investigate Trip of Div 1 CCHVAC Return Fan Dispatch operator to check Division 1 CCHVAC Return Fan breaker for a cause of trip.
	Role Play	**NO:** When dispatched to Investigate trip of Division 1 CCHVAC Return Fan, ☐ **WAIT 3 minutes** ☐ **REPORT** "*hot bearing on D1 CCHVAC Return Fan*" When dispatched to investigate Division 1 CCHVAC Return Fan Breaker at 72C-2A Pos 1B, ☐ **WAIT 3 minutes** ☐ **REPORT** "*thermal overload trip of 72C-2A Pos 1B*"
	SRO	Acknowledge report from RO. Enter AOP 20.413.01, Control Center HVAC System Failure. Direct Actions of AOP 20.413.01 Condition A. Announce event over Hi-Com. Review impact on Technical Specifications.

<table>
<tr><th>Time</th><th>Position</th><th>Applicant's Actions or Behavior</th></tr>
<tr><td></td><td rowspan="5">TS Impact</td><td>TS 3.7.3, CREF System:
The CREF System shall be OPERABLE.
<table><tr><th>CONDITION</th><th>REQUIRED ACTION</th><th>COMPLETION TIME</th></tr><tr><td>A. One CREF subsystem inoperable for reasons other than Condition B</td><td>A.1 Restore CREF subsystem to OPERABLE status.</td><td>7 days</td></tr></table></td></tr>
<tr><td>TS 3.7.4, Control Center Air Conditioning (AC) System:
Two control center AC subsystems shall be OPERABLE.
<table><tr><th>CONDITION</th><th>REQUIRED ACTION</th><th>COMPLETION TIME</th></tr><tr><td>A. One control center AC subsystem inoperable.</td><td>A.1 Restore control center AC subsystem to OPERABLE</td><td>30 days</td></tr></table></td></tr>
<tr><td></td><td>ATC</td><td>Monitors reactor parameters.
May assist BOP with communications to NOs.</td></tr>
<tr><td></td><td>BOP</td><td>Inform RB of starting Division 2 CCHVAC
Start Division 2 CCHVAC using AOP 20.413.01 Condition A:
☐ Shutdown the malfunctioning division of CCHVAC by placing the Mode Select Switch in ALL STOP.
☐ Start the standby Division of CCHVAC by placing the Mode Select Switch in ALL AUTO.
Report Division 2 CCHVAC is running to CRS.
Monitor for correct operation of CCHVAC IAW 23.413 Section 5.3.</td></tr>
</table>

Form 3.3-2 Required Operator Actions

Op Test No.: **Fermi ILT 2023**	Scenario No.: **3**	Page **6** of **18**

Time	Position	Applicant's Actions or Behavior
	Role Play	**NO**: IF contacted to walkdown Div 2 CCHVAC Rad Monitor: ☐ **WAIT 5 minutes** ☐ **REPORT** "*Rad Monitor walkdown is complete. No abnormalities noted.*" If contacted to verify good start of Div 2 CCHVAC: ☐ **WAIT 2 minutes** ☐ **REPORT** "*Good start of Div 2 CCHVAC"* If asked to check parameters IAW 23.413: ☐ **WAIT 3 minutes** ☐ **REPORT** "*All parameters are in band."*
	SRO	Monitors actions by panel operators. Acknowledges status of Div 2 CCHVAC when started. Conducts follow-up brief, including impact on Tech Specs. May contact RTC for follow-up actions like troubleshooting, writing a CARD, etc.

Form 3.3-2 Required Operator Actions

Op Test No.: **Fermi ILT 2023**	Scenario No.: **3**	Page **7** of **18**

Event 4	West SAC unloads and Center SAC fails to auto start	**Type:**	C, MC

Event Description: The unloader valve will fail for the in-service (West) Station Air Compressor (SAC) and the standby (Center) SAC will not auto start. The crew will recognize this failure and act, either directly or upon entry into AOP 20.129.01, Loss of Station and Control Air, to start the standby SAC to restore air system parameters.

Symptoms/Cues: 7D53, Station Air Header Pressure Low, low amps on the running (West) SAC and lowering air header pressures.

Time	Position	Applicant's Actions or Behavior
T_0 +35 min	**Booth Action**	Trigger **Event 4** to fail the in-service (West) Station Air Compressor Unloader valve AND cause an Auto-Start failure of the standby (Center) Station Air Compressor (P50MF0014, P502PSE_N415TFASIS). **NOTE**: Triggering Event 4 also starts the ramp to increase vibrations on the S. RFP Pump and Turbine, for added realism.
	BOP	Responds to 7D53 and reports to CRS. Recognizes and reports lowering air header pressures. Recognizes and reports lower than normal amps on the running (West) SAC. Recognizes and reports failure of the standby (Center) SAC to auto start. May inform SRO of start failure and manually start the Center SAC. May direct NO to walkdown West SAC.
	SRO	Acknowledges reports from LNO. Enters AOP 20.129.01, Loss of Station and Control Air with a Crew Update. Makes a plant announcement using the Hi-Com. Directs LNO to start any available SAC IAW 20.129.01 Condition A. If Station Air Pressure lowers to 85 psig, orders 20.129.01 Condition B and C. Monitors actions taken by the LNO and provides oversight.
	BOP	Manually starts the standby (Center) SAC by placing its CMC Switch in RUN. May start the East SAC by placing its CMC to RUN. If directed to complete conditions B and C of 20.129.01: ☐ Verifies P5000-F401 closed. ☐ Verifies auto start of Div 1 / Div 2 Control Air Compressors. ☐ Verifies closed P5000-F402, P5000-F440, and P5000-F441. Observes air system parameters and reports status to the CRS.

Form 3.3-2 Required Operator Actions

Time	Position	Applicant's Actions or Behavior
	SRO	Monitors actions by the LNO. Acknowledges status of air system parameters and status. Conducts follow-up brief including: ☐ Assigning Overrides to the ATC to monitor for degradation of the station and control air systems. ☐ Assigning further actions that may be necessary, depending on air system status, due to how low pressure got before it was recovered. May contact RTC for follow-up actions like troubleshooting, writing a CARD, etc.
	Role Plays	**NO:** If directed to walkdown West SAC: ☐ **WAIT 3 minutes** ☐ **REPORT** *"Walkdown of West SAC is complete. Everything looks normal"* **WWM:** ☐ Acknowledge reports/orders from MCR ☐ No further action required

Form 3.3-2 Required Operator Actions

Op Test No.: **Fermi ILT 2023**	Scenario No.: **3**	Page **9** of **18**

Event 5	RFP High Vibes, RFP fails to trip	**Type:**	C

Event Description: High Vibration on the South Reactor Feedwater Pump (RFP) Pump and Turbine will cause the crew to evaluate alarms and indications. The BOP trips the pump per ARP 5D28 due to exceeding 6 mils for more than 15 seconds.

Symptoms/Cues: 5D28, South RFP/RFPT Shaft Trouble, and rising vibration for the S. RFP Turbine and Pump on N21-R837B, SRFP/RFPT Vib Mon Sys Chart Recorder.

Time	Position	Applicant's Actions or Behavior
T_0 +50 min	**Booth Action**	Trigger **Event 5** to cause vibration on the S. RFP Pump and Turbine to rise above the alarm setpoint.
	BOP	Responds to ARP 5D28, South RFP/RFPT Shaft Trouble. Verifies on N21-R837B, SRFP/RFPT Vib Mon Sys Chart Recorder: ☐ S RFP Turbine Vibes are >3 mils. ☐ S RFP Pump Vibes are <4 mils. Reports vibration data to the CRS. Informs CRS of ARP guidance to trip South RFP if vibes >6 mils or an unusual noise develops. May direct NO to outside of RFP rooms to listen for unusual noise.
	Role Play	**NO**: If dispatched to the South RFP: ☐ **WAIT 2 minutes.** ☐ **REPORT** *"I am outside of the South RFP room and nothing sounds abnormal."*
	SRO	Acknowledges report from LNO. Conducts brief to cover contingency actions, critical parameters, etc. Assigns critical parameter and actions following brief.
	Booth Action	**AFTER** brief and contingency monitoring / actions have been assigned (and with concurrence of the Lead Evaluator): ☐ Trigger **Step #5a** to cause South RFPT Vibes ramp above 6 mils.
	BOP	Identifies and reports rising vibrations on S. RFP and RFPT. Recognizes and reports when >6 mils. Trips the South RFP.

Form 3.3-2 Required Operator Actions

Op Test No.: **Fermi ILT 2023**	Scenario No.: **3**	Page **10** of **18**

Time	Position	Applicant's Actions or Behavior
	SRO	Monitors actions and ensures S. RFP is tripped. Enters AOP 20.107.01, with Crew Update. Makes plant announcement. Verifies RO carries out Immediate Actions

Form 3.3-2 Required Operator Actions

Op Test No.: **Fermi ILT 2023**	Scenario No.: **3**	Page **11** of **18**

Event 6	North RRMG Set auto runback failure	**Type:**	C, MC
Event 7	Evaluate P/F Map and insert CRAM array	**Type:**	R

Event Description: The North RRMG Set fails to run back to Limiter 3 following trip of the S. RFP. The ATC will recognize this failure and manually run back the RRMG set. The ATC will check rod line and insert the cram rods to lower rod line < 80%.

Symptoms/Cues: Trip of RFP with RRMG set failing to run back automatically. Insert CRAM array to < 80% rod line.

Time	Position	Applicant's Actions or Behavior
T_0 +60 min	**Booth Action**	**NOTE:** This event automatically triggers with Event 5 above, preventing the N. RRMG Set from running back to the #2 Limiter when the S. RFP is tripped.
	ATC	Verifies #2 limiter is enforcing and monitors RRMG sets for runback. Recognizes / reports that North RRMG Set failed to run back to the #2 Limiter. Manually runs back the North RRMG Set. Verifies the N. RFP restores Reactor Water Level to the normal band. After runback, checks rod line. Determines that the rod line is > 80%. Informs CRS and inserts CRAM Array to reduce rod line < 80%.
	SRO	Conducts brief for RFP Trip. Assigns panel operator(s) to perform 20.107.01 overrides and immediate actions with monitoring criteria.
	BOP	Recognizes and reports loss of Heater Drains.
	SRO	When CRAM array is inserted directs Subsequent Actions D of AOP 20.107.01: ☐ Monitor Core Thermal Limits and notify SNE Enters 20.107.02, loss of Feedwater Heating. Directs verification of Feedwater temperature reduction
	BOP	Verifies Reactor Power ≤ 65%. Shuts down or verifies SBFW shutdown. Verifies feedwater temperature reduction is consistent with the power reduction, per 20.107.02, loss of Feedwater Heating and informs CRS.
	SRO	Conducts follow-up brief.

Form 3.3-2 Required Operator Actions

Op Test No.: **Fermi ILT 2023**	Scenario No.: **3**	Page **12** of **18**

Event 8	Multiple rods drift, place the Mode Switch in Shutdown	**Type:**	C
Event 9	Electric ATWS,	**Type:**	MAJ
Event 10	SLC fails to start	**Type:**	C

Event Description: When the Mode Switch is taken to Shutdown, RPS will fail to actuate requiring performance of ATWS Actions (***CT-2, ATWS-T&P***). ARI will also fail to initiate, resulting in an electronic ATWS. Operators inject SLC and determine failure to start. Crew will then start the opposite SLC pump and SLC will inject. Per the EOPs, the crew will prevent Automatic ADS Initiation (***CT-1, ATWS-ADS***).

Manual rod insertion will be successful. Control rod insertion will occur when either the scram fuses are pulled or the scram air header is vented. BOP controls RPV water level and ATC steps through ESP to insert rods manually

Symptoms/Cues: 3D80, Control Rod Drift Alarm with accompanying indication that multiple (3) Control Rods are drifting out of the core. RPS failure is indicated by 8 blue lights remaining lit and the Scram Air Header remaining pressurized.

Time	Position	Applicant's Actions or Behavior
T_0 +75 min	**Booth Action**	Trigger **Event 8** to initiate multiple Control Rod Drifts with an electric (failure of RPS and ARI) ATWS. **Events 9 and 10** were inserted as part of Setup Steps.
	ATC	Recognizes and reports multiple Control Rod Drifts. Places Mode Switch in Shutdown. Recognizes failure of RPS to actuate and depresses manual scram pushbuttons. Reports Failure to Scram to CRS, with Reactor Power.
	SRO	When multiple control rod drifts are reported, directs ATC to place Mode Switch in Shutdown. Acknowledges failure to scram and enters EOP 29.100.01 Sheet 1A, RPV Control - ATWS. Directs ATWS Actions. Announces event over the Hi-Com. Provides oversight of ATWS Actions.

Form 3.3-2 Required Operator Actions

Op Test No.: **Fermi ILT 2023**	Scenario No.: **3**	Page **13** of **18**

Time	Position	Applicant's Actions or Behavior
	BOP	Acknowledges ATWS Actions order. Performs CRLNO ATWS Actions: ☐ Takes RFP Controllers to Manual ☐ Lowers Speed to STOP feed flow. ☐ Reports when RPV level <114". Re-establishes injection and maintains RPV Water level as directed. ***CT-2, ATWS-T&P:*** *During an ATWS with conditions met to perform power/level control TERMINATE AND PREVENT INJECTION into the RPV until conditions are met to re-establish injection.*
	SRO	Acknowledges BOP ATWS Actions report and: ☐ When <114", directs RPV Level Band 50-100". ☐ Directs RPV Pressure Band 900-1050 psig. Directs confirm Isolations and Actuations for level as they occur
	ATC	Acknowledges ATWS Actions order. Performs ATC ATWS Actions: ☐ Starts SLC pump ☐ Identifies that first SLC pump failed to start and starts other SLC pump ☐ Verifies SLC system parameters and determines SLC is injecting ☐ Verifies RWCU isolation ☐ Informs CRS of SLC injecting, SLC tank level, and SLC pump failure ☐ Inhibits ADS ***CT-1, 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.* ☐ Completes SLC Hard Card, 23.139 Enclosure A. ☐ Orders out 29.ESP.11 ☐ Bypasses/Restores Drywell Pneumatics ☐ Takes the following actions: o HPCI Aux Oil Pump to OFF o SBFW CMC switches to OFF o Div 1&2 CS pumps to OFF o Div 1&2 RHR pumps to OFF ☐ When RPV Level is <Level 2: o Recognizes ARI failure to initiate. o Arms and initiates ARI manually. o Trips RR Pumps. o Reports FSQ 1-8 is complete, with current Reactor Power.

Form 3.3-2 Required Operator Actions

Op Test No.: **Fermi ILT 2023**	Scenario No.: **3**	Page **14** of **18**

Time	Position	Applicant's Actions or Behavior
	Role Play	**NO/RTC:** When directed to Perform 29.ESP.11: ☐ **WAIT 10 minutes** ☐ **TRIGGER Step 8a**. ☐ **REPORT** "*29.ESP.11 field actions are complete.*"
	SRO	Acknowledges ATC ATWS Actions report Enters 29.100.01 SH1A and directs: ☐ Confirm isolations and actuations for level as they occur. ☐ Verifies ADS Inhibited. (May have already been reported) ☐ Pressure Band of 900-1050 psig Directs order out 29.ESP.10 and insert Control Rods per 29.ESP.03. Acknowledges report of SLC failure, subsequent success with 2nd SLC pump, SLC tank level and RWCU isolation status. Identifies EAL flag and reports to Shift Manager.
	BOP	Acknowledges direction to Confirm Isolations and Actuations for Level. Verifies Isolations and Actuations for Level and reports completion to CRS. Controls pressure using the MT Bypass Valves by depressing Low-Low Set logic Reset Pushbuttons as required by Pressure Control Leg of EOPs and ARP 1D38. Verifies SRV(s) close and pressure is being controlled by Bypass Valves. May report status of Low-Low set logic and Bypass Valves to CRS.

Time	Position	Applicant's Actions or Behavior
	ATC	Directs 29.ESP.10. Recognizes failure of RPS and ARI to actuate. Correctly transition 29.ESP.03 flowchart and directs: ☐ 29.ESP.03, Section 5.0 – De-energize Scram Solenoids AND/OR ☐ 29.ESP.03, Section 7.0 – Vent Scram Air Header. Attempts to drift control rods IAW 29.ESP.03, Section 2.0 - Increase CRD Cooling Water Differential Pressure ☐ Place C11-K612, CRD Flow Controller, in MANUAL. ☐ Start standby Control Rod Drive pump. ☐ Open Flow Control Valve using C11-K612, CRD Flow Controller. ☐ Open C1152-F003, CRD Drive/Clg Water PCV, to maximize cooling water flow (Control Rods may drift in by virtue of increased pressure on the underside of the drive piston). Aligns CRD and manually inserts Control Rods using 29.ESP.03, Section 3.0 – Manual Control Rod Insertion. ☐ Place C11-K612, CRD Flow Controller, in MANUAL. ☐ Start both CRD pumps. ☐ If no CRD pump can be started, exit this method of Alternate Control Rod Insertion. ☐ As necessary, throttle C1152-F003, CRD Drive/Clg Water PCV, to maintain sufficient drive water D/P for rod motion. ☐ As necessary, adjust C11-K612, CRD Flow Controller, to maintain sufficient drive water D/P for rod motion. ☐ Place the Rod Worth Minimizer keylock switch in BYPASS.CAUTION Higher than normal radiation levels may be present while executing the following step ☐ If unable to maintain sufficient drive water D/P with C1152-F003 and C11-K612, send an Operator to close C1100-F034, CRD Charging Water Header Isolation Valve (RB1-G10). ☐ Insert the Cram Array using EMERGENCY IN. ☐ When the Cram Array has been inserted, attempt to achieve a checkerboard control rod pattern using EMERGENCY IN as follows: o Select and fully insert control rods in a spiral out from center pattern, other concurrent actions may preclude obtaining an actual checkerboard pattern. ☐ Continue to fully insert all remaining control rods using EMERGENCY IN as follows: o Select and fully insert control rods in a spiral out from center pattern Reports status of Control Rod insertion to CRS.

Form 3.3-2 Required Operator Actions

Op Test No.: **Fermi ILT 2023**	Scenario No.: **3**	Page **16** of **18**

Time	Position	Applicant's Actions or Behavior
	Role Play	**NO:** When directed to Perform 29.ESP.10: ☐ **ACKNOWLEDGE** order. ☐ No Simulator actions required IF directed to perform 29.ESP.03 section 5.0 - De-energize Scram Solenoids: ☐ **WAIT 6 minutes** ☐ **TRIGGER Step 8b** to De-energize Scram Solenoids. ☐ When all fuses have been pulled (use **Instructor Actions Summary**, 130 seconds for last fuse), **REPORT:** "*29.ESP.03 Section 5 is complete, all scram fuses are removed*". IF directed to re-install scram fuses: ☐ **WAIT 2 minutes.** ☐ **TRIGGER Step 8b1.** ☐ When all fuses have been installed (use **Instructor Actions Summary**, 130 seconds for last fuse), **REPORT:** "*Scram fuses are installed*". IF directed to perform 29.ESP.03 section 7.0 - Vent Scram Air Header: ☐ **WAIT 5 minutes** ☐ **TRGIGER Step 8c** to Vent Scram Air Header. ☐ **REPORT:** "*29.ESP.03 Section 7 is complete, and you are venting the scram air header*".
	BOP	Recognizes when power < 25% and transitions to the SULCV using 23.107 Enclosure F (attached hardcard). Maintains RPV Level using SBFW, HPCI or FW on the SULCV. Monitors and reports RPV pressure. Recognizes and reports when power <3%.

Form 3.3-2 Required Operator Actions

Time	Position	Applicant's Actions or Behavior
	ATC	IF 29.ESP.03 Section 5.0 being performed: ☐ Places C1100-M018, SDV Iso Vlvs Switch, in TEST to close the SDV Vent and Drain Valves. ☐ As scram fuses are being pulled, recognizes and reports control rod insertion. ☐ When rod motion stops, directs scram fuses to be re-installed. ☐ Places C1100-M018, SDV Iso Vlvs Switch, in NORMAL to open the SDV Vent and Drain Valves. IF 29.ESP.03 Section 7.0 being performed: ☐ As air header is being vented, recognizes and reports control rod insertion. Verifies all rods in with RWM and full core display. Informs CRS or Crew Update:" All rods inserted". May direct NO to re-install Scram Fuses per 29.ESP.03, Section 5.
	SRO	After all rods in, direct shutdown of SLC. Transition to 29.100.01 Sheet 1. Direct RO to restore and maintain RPV water level 173 to 214 inches. Direct entry/performance of Scram AOP actions.
	BOP	Shuts down SLC. Restores RPV Level to 173 to 214". Performs Scram AOP actions as directed
	Lead Evaluator	Scenario is terminated after all rods have been inserted or at the discretion of the Lead Evaluator.

23.107
Enclosure F, Page 1 of 1
091213

TRANSFER OF FEEDWATER TO STARTUP LEVEL CONTROL VALVE (ATWS) (H11-P603)

1. Verify or place the following in MANUAL

   - C32-R616A, N Reactor Feed Pump Controller
   - C32-R616B, S Reactor Feed Pump Controller

2. Adjust RFP speed as necessary to control water level.

3. When power is within the capability of the Startup Level Control Valve (~25% power), perform the following:

   a. Close the following valves:

      - N2100-F607, N RFP Discharge Line Isolation Valve
      - N2100-F608, S RFP Discharge Line Isolation Valve

      OR

      - N2100-F045A, N RFP Disch Hyd Stop Valve
      - N2100-F045B, S RFP Disch Hyd Stop Valve

   b. Place RPV Startup LCV Mode Switch in START.

   c. Place C32-R620, N21-F403 Startup LCV Controller, in MANUAL.

   d. Adjust C32-R620, N21-F403 Startup LCV Controller, as needed to maintain desired level.

NOTE: Copy of this enclosure is located at panel H11-P603