Facility: **Crystal River #3** Scenario No.: #1 (NRC 2009) Op-Test No.: 1

Examiners: _____ Operators: _____

_____ _____

_____ _____

Initial Conditions: The plant is at approximately 30% power.

Turnover: The following equipment is OOS: DHP-1A (12 hours); MUP-1A (12 hours); RWP-1 (24 hours); FWP-7 (32 hours). An emergency need for power exists.

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	R (RO)	Manual power escalation. (OP-204)
2	1	C (RO or BOP)	FW-223/224-TE trend up. Requires startup of FWP-1B and shutdown of FWP-1A. (OP-605)
3	2	C (BOP) C (SRO)	OPT major alarm. (OP-703) SRO TS determination. (TS 3.8.1)
4	N/A	N (BOP)	Perform SP-321, Page 1 of Enclosure 1. (SP-321)
5	3	I (BOP)	RM-A5G fails high. (AP-250)
6	4	I (RO) I (SRO)	RC-1-LT1 fails low. (OP-501) SRO TS determination. (TS 3.3.17 & 3.4.8)
7	5	M (ALL)	PZR steam space leak, RPS fails to actuate. **[CT]** (EOP-2)
8	6	C (RO or BOP)	MUV-586 fails closed, MUV-25 fails to open. **[CT]** (EOP-3, EOP-13 Rules 1, 2 & 3)
9	7	C (RO or BOP)	RCP-1D breaker will not open. **[CT]** (AI-505)

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

* 2 crews Tripped Rx during ~~EVENT~~ 2, On those crews EVENTS 3,4,5,6 Were not Run. - Spare Scenario was used

The plant is at ≈30% power following initial loading of the main generator. The OAC/BOP will continue in OP-204 from step 4.1.26.

After power has risen (5 to 10%) FW temperature elements on the running FWBP rise. The other booster pump should be started, the running booster pump shutdown and maintenance called to investigate.

After FWP-1A is secured an OPT major alarm will be received. The "A" ES 4160 bus will be transferred to the BEST. Two seconds after the transfer the OPT breaker will trip open. The SRO may direct the transfer from memory or may utilize OP-703, Plant Distribution System. Either way is acceptable. TS 3.8.1, Condition A, will be entered for one offsite circuit inoperable. The BOP will perform SP-321, Enclosure 1.

When SP-321 is completed RM-A5G will fail high. Entry conditions for AP-250, Radiation Monitor Actuation, are met. Only the monitor/meter has failed high. No automatic actions occur. The Control Complex will be isolated and CC Emergency Recirc initiated.

While the BOP is performing actions of AP-250 RC-1-LT1 (PZR level control) transmitter will fail low. This will require the OAC to take manual control of MUV-31 and utilize OP-501 to select a good instrument. TS 3.3.17 will be entered for loss of PAM instrumentation.

Following selection of RC-1-LT3 for PZR level control a PZR steam space leak occurs. RPS will **not** actuate on low pressure and the OAC must manually trip the reactor **[CT]**. The reactor trip will cause a larger leak that will lead to an ISCM event.

When HPI actuates MUV-586 (HPI cross-tie valve) fails closed, MUV-25 will not open due to a normal source power failure. Alternate power source will be selected during the performance of EOP-3 **[CT]**. Since MUP-1C will experience a sheared shaft on start this action is critical to ensure sufficient HPI flow to the RCS. Entry into an "Alert" is required due to the loss of SCM.

When the loss of SCM occurs RCPs must be tripped within 1 minute **[CT]**. RCP-1D breaker will not open when commanded and the OAC/BOP must open breaker 3104 ("B" 6900V Rx Aux Bus feeder breaker).

This scenario may be terminated when Step 3.9 in EOP-03 is completed.

Procedures used: (ARs not listed)

OP-204	AP-250	EOP-2
OP-605	AP-520	EOP-3
OP-501	AI-505	EOP-13
OP-703		EOP-14
	SP-321	

Target Quantitative Attributes – Scenario #1 – NRC 2009	Actual Attributes
1. Total Malfunctions (5-8)	7
2. Malfunctions after EOP entry (1-2)	2
3. Abnormal Events (2-4)	2
4. Major Transients (1-2)	1
5. EOPs entered requiring substantive actions (1-2)	2
6. EOP contingencies requiring substantive actions (0-2)	1
7. Critical Task (2-3)	3

SHIFT TURNOVER

A. Initial Conditions:

1. Time in core life – 300 EFPD
2. Shift: [X] Day [ ] Night
3. Rx power and power history – Power escalation in progress with power at 30%. Previously shutdown for 3 days
4. Boron concentration – 1055 PPMB
5. Xenon – See Saxon
6. RCS Activity - See Status Board
7. EOOS Condition: Yellow
8. Protected Train - B

B. Tech. Spec. Action requirement(s) in effect:

- TS 3.5.2, Condition A, for DHP-1A. Condition entered 12 hours ago.
- TS 3.3.17, Condition A, Function 23, for LPI Pump Run Status lights. Condition entered 12 hours ago.
- CP-500, FWP-7
- Fire Protection Plan, Table 6.9A, for MUP-1A

C. Clearances in effect:

- DHP-1A for breaker fuse block replacement. Expected return to service in 4 hours.
- MUP-1A shaft replacement due to high vibration. Expected return to service in 24 hours.
- RWP-1 for impeller replacement. Expected return to service in 4 hours.
- FWP-7 motor bearing replacement. Expected return to service in 12 hours.

D. Significant problems/abnormalities:

- Grid Condition is RED
- An emergency need for power exists due to other generating facilities being unavailable.

E. Evolutions/maintenance for the on-coming shift:

- Continue power escalation per OP-204 at step 4.1.26.
- Dispatcher has requested power escalation as fast as possible. Reactor engineering has approved up to a 30%/hour power escalation.
- Calculations are in progress for additional RCS water additions.
- Maintenance to continue work on DHP-1A, MUP-1A, RWP-1 and FWP-7.

F. CRS – Instruct the ROs to walk down the main control board.

G. Required Emergency Plan Implementation

[ ] Full Implementation, including all required notifications.
[ ] Initial/upgrade classifications - internal notifications.
[X] None

INITIAL CONDITIONS

A. *"Restore" the simulator to IC #__**170**__ developed for this SES.*

B. "Unfreeze" the simulator and ensure the following configuration is setup:

1. RWP-2A running
2. Approximately 30% power
3. AULD Nozzle and LEFM quality OFF
4. AULD Alerts Acknowledged

C. "Freeze" the simulator and enter "Exam 4" lesson plan directory.

1. "Start" Lesson Plan SES #1 NRC-2009

D. "Unfreeze" the simulator and "Trigger" Setup Step(s) which will:

See Simulator lesson plan

E. Tag out the following equipment:

#	Component	Placed	Removed
1	Place CIT on DHP-1A C/S in Normal After Stop		
2	Place CIT on MUP-1A C/S in Normal After Stop		
3	Place CIT on MUP-2A C/S in Normal After Stop		
4	Place CIT on MUP-3A C/S in Pull To Lock		
5	Place CIT on MUP-4A C/S in Stop		
6	Place CIT on MUP-5A C/S in Stop		
7	Place CIT on RWP-1 C/S in Normal After Stop		
8	Place CIT on FWP-7 C/S in Normal After Stop		

F. Additional Modifications required to the IC.

1. Ensure SPDS selected to NORM/IMB and history traces cleared and history trace selected. Also ensure "A" and "B" SPDS are properly selected for RCS Loops and Primary instruments selected.

2. Ensure SPDS on CNO/SSO/STA computers displaying correct data for IC.

3. Ensure Group 59 indicative of current reactor power.

4. Acknowledge computer and annunciator alarms.

5. Ensure proper PICS groups displayed on overhead screens with **correct scaling**.

6. Ensure Annunciator Log cleared and restarted.

7. **Consumable copies of OP-501, OP-504, OP-703 and SP-321.**

G. **Ensure copy of OP-204 available and signed off up to step 4.1.26.**
Ensure copy of OP-605 available with appropriate steps signed off to step 4.4.9.

START DATA RECORDER

NRCEXAM.DRD

A. EVENT #1 - Normal Evolution – Manual power increase

B. EVENT #2

When directed insert FWP-1A temperature element malfunctions.
[Trigger Step #1: FW-223/224-TE (FWP-1A) trend up slowly]

Role Play: If contacted as the SPO to check FWP-1A bearing temperatures wait about 2 minutes and report that the bearings are hotter than normal and seem to be heating up further. State that oil levels are normal and you don't know why they are heating up.

Role Play: When contacted as the SPO to partially open FWV-7 wait about two minutes and notify the control room that the valve is about 40% open.
[Trigger Step #2: FWV-7 stroke to 40% open]

Remove FW-223/224-TE failures when FWP-1A is secured.

C. EVENT #3

When directed insert the OPT failure.
[Trigger Step #3: OPT Major Alarm]

D. EVENT #4 - Normal Evolution – Perform SP-321

Role Play: When contacted as the System Dispatcher state that switchyard voltage is 240kv.

Role Play: When contacted as SPO to perform steps 1.9, 1.10 and 1.11 of SP-321 wait about 2 minutes then report back completion of steps.

E. EVENT #5

When directed insert the RM-A5G failure.
[Trigger Step #4: RM-A5G Fail High]

F. EVENT #6

When directed insert the PZR level transmitter failure.
[Trigger Step #5: PZR Level Transmitter Fail Low]

G. EVENT #7

When directed insert the PZR steam space leak.
[Trigger Step #6: PZR steam space leak]

H. EVENT #'s 8 & 9

The remaining malfunctions are conditional based on expected plant parameters.

Role Play: If contacted as the SPO to perform EOP-14 Enclosure 1 wait ~23 minutes and report completion.
[Open Lesson Plan: Misc\Enc_1.lsn, execute and trigger]

Role Play: If contacted as the PPO to perform EOP-14 Enclosure 2 wait ~15 minutes and report completion.
[Open Lesson Plan: Misc\Enc_2.lsn, execute and trigger]

Op-Test No.: 1 Scenario No.: 1 Event No.: 1 Rev.: 2

Event Description: Manual power increase. Emergency need for power exists.

Time	Position	Applicant's Actions or Behavior
	RO	• Increase load with the ULD Station • Adjusts load rate to 0.5% • Monitor plant parameters
	SRO	• Direct power escalation at 30% per hour

Op-Test No.: 1 Scenario No.: 1 Event No.: 2 Rev.: 2

Event Description: (Examiner Cue) After a 5% to 10% power escalation FW-223 & 224-TEs trend up indicating bearing problems on FWP-1A **(MALF)**. This will require startup of FWP-1B (FW Booster pump) and shutdown of FWP-1A (FW Booster pump).

Time	Position	Applicant's Actions or Behavior
	RO/BOP	• Recognize temperature rise on FWP-1A (FW Booster pp) o Computer alarms only • Direct SPO to investigate temperature rise
	BOP	• Using OP-605 direct the OAC in the startup of FWP-1B and shutdown of FWP-1A (FW Booster pps)
	RO	• Startup FWP-1B (FW Booster pp) using OP-605, Section 4.4 o Procedure signed off up to Step 4.4.9 o Ensure flow path exists: - FWV-7 (disch vlv) closed - FWV-2 (suction vlv) open - FWV-48 (recirc vlv) open o Verify permit lights - Lube Oil Press - Valve Permit o Start FWP-1B o Direct SPO to locally stroke FWV-7 30% to 50% open o Open FWV-7 (disch vlv) o Stop FWP-6B (lube oil pp) o Select FWV-48 (recirc vlv) to AUTO • Secure FWP-1A using OP-605, Section 4.5 o Start FWP-6A (lube oil pp) o Open FWV-47 (recirc vlv) o Close FWV-8 (disch vlv) o Stop FWP-1A
	SRO	• Direct OAC to stop power escalation • Direct startup of FWP-1B and shutdown of FWP-1A (FW Booster pps) • Notify maintenance to investigate temperature rise

Op-Test No.: 1 Scenario No.: 1 Event No.: 3/4 Rev.: 2

Event Description: (Examiner Cue) After FWP-1A is secured an OPT major alarm will be received **[MALF]**. The "A" ES 4160 bus will be transferred to the BEST. Two seconds after the transfer the OPT breaker will trip open. The SRO may direct the transfer from memory or may utilize OP-703, Plant Distribution System. Either way is acceptable. TS 3.8.1, Condition A, will be entered.

Time	Position	Applicant's Actions or Behavior
	BOP	• Announce/acknowledge alarm o (Q-8-3) "Offsite Pwr Source XFMR Major Alarm" (powers "A" ES 4160V bus) • Reviews AR-702 • Notifies SRO of malfunction • Recommends reducing the load on the transformer per AR directions
	SRO	• Direct BOP actions from memory or per OP-703, Section 4.13 o Select "Sync 3205" to ON position o Close breaker 3205 (B/U ES Xformer – BEST) o Open breaker 3211 (Offsite Pwr Xformer – OPT) o Select "Sync 3205" to OFF position • Enters TS 3.8.1, Condition A, for one required Offsite circuit inoperable (restore OPT in $\leq$ 72 hours) o Recognizes SP-321 is required to be completed within 1 hour o Directs BOP to perform Enclosure 1, Page 1
	RO	• Assists BOP in diagnosing the failure • Verifies the plant is stable
	BOP	• Selects Sync switch to ON for breaker 3205 • Closes breaker 3205 (B/U ES Xformer – BEST) • Matches target on breaker 3211 (Offsite Pwr Xformer – OPT) • Selects Sync switch to OFF and removes • Performs SP-321, Enclosure 1, Page 1 (Steps 1.5a & 1.5b noted) o See next page

DATA SHEET I
OFF-SITE TO ON-SITE BREAKER/POWER VERIFICATION

1.0 Mode 1 thru 4 Alignment (This Section does NOT apply in Modes 5 or 6) (NOCS 62810)

NOTE
Testing of the batteries in the Switchyard is performed by Substation Maintenance. Batteries are considered operable unless CR-3 is notified otherwise.

			(√)
1.1	CONTACT System Dispatcher and VERIFY 230kv switchyard voltage is between 238kv and 242kv		_____
1.2	VERIFY that only one of the following ES "A" 4160v feeder breakers is CLOSED and supplying power: • 3205 Backup ES Transformer to ES "A" 4160v Bus OR • 3211 Off-Site Power Source Transformer to ES "A" 4160v Bus (Preferred)		_____
1.3	VERIFY that only one of the following ES "B" 4160v feeder breakers is CLOSED and supplying power: • 3206 Backup ES Transformer to ES "B" 4160v Bus (Preferred) OR • 3212 Off-Site Power Source Transformer to 4160v ES "B" Bus		_____
1.4	UTILIZING the Synch Scope, VERIFY power is available to ES 4160v Bus Supply Breakers: a. 3205 Backup ES transformer to ES "A" 4160v Bus b. 3206 Backup ES transformer to ES "B" 4160v Bus		_____ _____
1.5	UTILIZING the Synch Scope, VERIFY power is available to ES 4160v Bus Supply Breakers: a. 3211 Off-Site Power Source Transformer to ES "A" 4160v Bus b. 3212 Off-Site Power Source Transformer to ES "B" 4160v Bus		_____ _____
1.6	VERIFY at least one 6900v Reactor Aux. Bus is energized a. VERIFY "A" 6900v Bus Breaker 3101 or 3103 is closed and supplying power OR b. VERIFY "B" 6900v Bus Breaker 3102 or 3104 is closed and supplying power		_____
1.7	VERIFY BEST Differential Relaying ES Buses CT Isolation switch closed		_____
1.8	VERIFY BEST Ground Differential Relaying ES Buses CT Isolation switch closed		_____
1.9	VERIFY 4160v Best Aux Bus Breaker 3237 is racked out	(TB 119)	_____
1.10	VERIFY 4160v Best Aux Bus Breaker 3239 is closed	(TB 119)	_____
1.11	VERIFY 4160v Best Aux Bus Breaker 3239 Control Power Disconnect Breaker off	(TB 119)	_____

Section 1.0 Performed By: _____ Date: _____ Time: _____

Op-Test No.: 1 Scenario No.: 1 Event No.: 5 Rev.: 2

Event Description: (Examiner Cue) When SP-321 is completed RM-A5G (Control Complex (CC) Rad Monitor – Gas will fail high **[MALF]**. Entry conditions for AP-250, Radiation Monitor Actuation, are met. The monitor has failed high. No automatic actions occur. The Control Complex will be isolated and CC Emergency Recirc initiated.

Time	Position	Applicant's Actions or Behavior
	CREW	• Recognize RM-A5G failure high alarms & indications o (H-2-1) "Atmospheric Radiation High" o (H-2-2) "Atmospheric Monitor Warning" • Radiation Monitor Panel indication
	BOP	• Observe RM-A5G radiation monitor • Report to SRO that the monitor appears to be failed high

Op-Test No.: 1 Scenario No.: 1 Event No.: 5 Rev.: 2

Event Description: (Examiner Cue) When SP-321 is completed RM-A5G (Control Complex (CC) Rad Monitor – Gas will fail high **[MALF]**. Entry conditions for AP-250, Radiation Monitor Actuation, are met. The monitor has failed high. No automatic actions occur. The Control Complex will be isolated and CC Emergency Recirc initiated.

Time	Position	Applicant's Actions or Behavior
	SRO	• Directs BOP actions per AP-250, Radiation Monitor Actuation o Ensure Auto actions for affected radiation monitors ▪ The following dampers closed: • AHD-17 • AHD-22 • AHD-12 • AHD-12D • AHD-2C • AHD-2E • AHD-1C • AHD-1E ▪ The following damper opens: • AHD-3 ▪ The following fans stopped: • AHF-19A (CC Return Air) • AHF-19B • AHD-17A (CC Normal Supply) • AHF-17B ▪ The following fans stopped or slow speed: • AHF-20A (CC Access Area Exhaust) • AHF-20B ▪ IF AHF-20A and 20B are stopped THEN ensure stopped: • AHF-44A (Sample Rm Exhaust) • AHF-44B • AHF-30 (Chem Lab Supply) o Notify personnel of entry into AP-250 o Ensure proper radiation monitor operation o Notify HP and Chemistry o If alarm is not valid then perform corrective actions ▪ Depress "Horn Silence" ▪ Initiate repair efforts ▪ GO TO Enclosure 5

Op-Test No.: 1 Scenario No.: 1 Event No.: 5 Rev.: 2

Event Description: (Examiner Cue) When SP-321 is completed RM-A5G (Control Complex (CC) Rad Monitor – Gas will fail high **[MALF]**. Entry conditions for AP-250, Radiation Monitor Actuation, are met. The monitor has failed high. No automatic actions occur. The Control Complex will be isolated and CC Emergency Recirc initiated.

Time	Position	Applicant's Actions or Behavior
	BOP	• Execute AP actions in accordance with SRO directions o Ensure Auto actions for of affected radiation monitors ▪ *Use of the "Control Complex HVAC Isolate/Reset" switches will be used to reposition the dampers* ▪ The following dampers closed: • AHD-17 • AHD-22 • AHD-12 • AHD-12D • AHD-2C • AHD-2E • AHD-1C • AHD-1E ▪ The following damper opens: • AHD-3 ▪ The following fans stopped: • AHF-19A (CC Return Air) • AHF-19B • AHD-17A (CC Normal Supply) • AHF-17B ▪ The following fans stopped or slow speed: • AHF-20A (CC Access Area Exhaust) • AHF-20B ▪ IF AHF-20A and 20B are stopped THEN ensure stopped: • AHF-44A (Sample Rm Exhaust) • AHF-44B • AHF-30 (Chem Lab Supply) o Notify personnel of entry into AP-250 o Ensure proper radiation monitor operation ▪ Ensure monitor energized ▪ Ensure switch in OPERATE position ▪ Ensure high alarm setpoint is set correctly ▪ Ensure Range switch is set to "1M" ▪ Observe trends on other monitors o Notify HP and Chemistry

Op-Test No.: 1 Scenario No.: 1 Event No.: 5 Rev.: 2

Event Description: (Examiner Cue) When SP-321 is completed RM-A5G (Control Complex (CC) Rad Monitor – Gas will fail high **[MALF]**. Entry conditions for AP-250, Radiation Monitor Actuation, are met. The monitor has failed high. No automatic actions occur. The Control Complex will be isolated and CC Emergency Recirc initiated.

Time	Position	Applicant's Actions or Behavior
	BOP	○ If alarm is not valid then perform corrective actions ▪ Depress "Horn Silence" ▪ Initiate repair efforts ▪ GO TO Enclosure 5
	SRO	• Directs BOP actions per Enclosure 5 of AP-250, Radiation Monitor Actuation

Op-Test No.: 1 Scenario No.: 1 Event No.: 5 Rev.: 2

Event Description: (Examiner Cue) When SP-321 is completed RM-A5G (Control Complex (CC) Rad Monitor – Gas will fail high **[MALF]**. Entry conditions for AP-250, Radiation Monitor Actuation, are met. The monitor has failed high. No automatic actions occur. The Control Complex will be isolated and CC Emergency Recirc initiated.

Time	Position	Applicant's Actions or Behavior
	BOP	• Execute AP actions (Enclosure 5) in accordance with SRO directions o IF alarm is NOT valid, AND radiation monitor can be reset, THEN reset monitor. ▪ Alarm monitor CANNOT be reset. o Verify proper CC cooling. ▪ Perform EOP-14, Enclosure 17 • Establish CC Emergency Recirculation: o Verify ES MCC 3AB is energized o If CC ventilation will be powered from a diesel, verify load is acceptable (Step is N/A) o Align CC ventilation recirc: ▪ Select A and B Train Control Complex HVAC Isolate/Reset switches to "ISO" o Verify CC isolation dampers are closed: ▪ AHD-12 and AHD-12D ▪ AHD-2C and AHD-2E ▪ AHD-1C and AHD-1E o Ensure CC ventilation fans shutdown: ▪ AHF-19A and AHF-19B (CC Return Air) ▪ AHF-17A and AHF-17B (CC Normal Supply) o Start 1 train of CC ventilation in emergency (starting B Train would be acceptable, but would complicate the restoration): ▪ Start AHF-18A (CC Emergency Supply) ▪ Start AHF-19A (CC Return Air) o Verify AHF-54A still running (EFIC Rm Fan) o Establish chemistry sampling ventilation: ▪ Start AHF-20A in slow (CC Access Area Exhaust) ▪ Start AHF-44A (Sample Rm Exhaust) ▪ Start AHF-30 (Chem Lab Supply) o Assuming A Train was started, exit the enclosure

Op-Test No.: 1 Scenario No.: 1 Event No.: 6 Rev.: 2

Event Description: (Examiner Cue) During the performance of AP-250 the selected PZR level transmitter will fail low **[MALF]**. Manual control of MUV-31 (Makeup Control vlv) will be required and a good instrument will be selected using OP-501. TS 3.3.17 will be entered for loss of PAM instrumentation.

Time	Position	Applicant's Actions or Behavior
	RO	• Announce/acknowledge alarms o (K-3-2) "SASS Mismatch" o (I-8-1) "Pressurizer Level Low" will reflash o Reviews AR-501 and AR-503 • Monitors plant conditions o MUV-31 (Makeup Control vlv) opens fully o PZR SCR heater (variable heaters) demand stations lock up (red and white lights on) • Selects MUV-31 control station to manual and lowers demand • May direct BOP to monitor alternate PZR level indication (RIP or computer)
	SRO	• Assists the RO in diagnosing failure • Approves selection of MUV-31 control station to hand, if requested • Enters TS 3.3.17, Condition A, for one PZR level channel inoperable (restore channel in $\leq$ 30 days) • Enters TS 3.4.8, Condition B, due to lost pressurizer heaters (restore heater capability in $\leq$ 72 hours) • Contacts work controls to initiate repair efforts
	BOP	• Assists RO in diagnosing the failure • Assists RO in verifying the plant is stable • Reviews alarms

Op-Test No.: 1 Scenario No.: 1 Event No.: 6 Rev.: 2

Event Description: (Examiner Cue) During the performance of AP-250 the selected PZR level transmitter will fail low **[MALF]**. Manual control of MUV-31 (Makeup Control vlv) will be required and a good instrument will be selected using OP-501. TS 3.3.17 will be entered for loss of PAM instrumentation.

Time	Position	Applicant's Actions or Behavior
	SRO	• Directs RO to transfer PZR level signal to unaffected channel per OP-501, Step 4.7.2 o Determine proper operating channel o Select control switch to proper operating channel o Generate a work request o Notify Reactor Engineer to consider impact on plant heat balance • May review SRO checklist for unplanned equipment status change
	RO	• Executes actions per SRO and OP-501 to select alternate signal source • Step 4.7.2 o Determines proper operating channel o Selects control switch to proper operating channel ▪ Selects RC-1-MS to LT3-Y o Generates a work request (BOP) o Notifies Reactor Engineer to consider impact on plant heat balance (BOP) • Returns MUV-31 (Makeup Control vlv) to automatic • Returns PZR heater demand station to automatic control
	BOP	• BOP may assist with OP-501

Op-Test No.: 1 Scenario No.: 1 Event No.: 7 Rev.: 2

Event Description: (Examiner Cue) Following selection of RC-1-LT3 for PZR level control a PZR steam space leak occurs **[MT].** AP-520 may be entered but there will be little time to perform any actions. RPS will not actuate on low pressure and the RO must manually trip the reactor **[CT]**. The reactor trip will cause the steam leak to rise and will lead to an ISCM event.

Time	Position	Applicant's Actions or Behavior
	RO	• Diagnose RCS leak o RCS pressure lowering o All heaters energized o (H-1-1) "Gamma Radiation High" o (H-1-2) "Gamma Monitor Warning" o (H-2-1) "Atmospheric Radiation High" o (H-2-2) "Atmospheric Monitor Warning" • If Rx trip criteria is given by SRO, notifies SRO when trip criteria is reached and **Trips the Rx [CT]** • When the Rx is tripped, performs EOP-02 Immediate Actions o Depress Rx Trip pushbutton o Verifies CRD groups 1 thru 7 fully inserted o Verifies NIs indicate Rx is shutdown o Depress Turbine Trip pushbutton o Verifies all TVs and GVs are closed • Re-performs EOP-02 Immediate Actions as directed by SRO • When EOP-02 Immediate Actions are completed performs symptom scan along with BOP and SRO.

Op-Test No.: 1 Scenario No.: 1 Event No.: 7 Rev.: 2

Event Description: (Examiner Cue) Following selection of RC-1-LT3 for PZR level control a PZR steam space leak occurs **[MT].** AP-520 may be entered but there will be little time to perform any actions. RPS will not actuate on low pressure and the RO must manually trip the reactor **[CT]**. The reactor trip will cause the steam leak to rise and will lead to an ISCM event.

Time	Position	Applicant's Actions or Behavior
	SRO	• Assists the RO/BOP in diagnosing failure • Direct RO/BOP to quantify the leakage • Should provide RO with Rx trip criteria based upon RCS and/or RB pressure • TS 3.4.12, Condition A, is now applicable (reduce leakage to within limits in $\leq$ 4 hours) • Enters and directs actions of AP-520, Loss of RCS Coolant or Pressure • Should direct manual Reactor trip due to uncontrolled lowering of RCS pressure • When Rx is tripped, enters EOP-02 and ensures RO performs EOP-02 Immediate Actions. • Verifies EOP-02, Immediate Actions • Directs formal Symptom Scan with RO and BOP o Check for Station Black Out o Check for Inadequate Sub Cooling Margin o Check for Inadequate Heat Transfer o Check for Excessive Heat Transfer o Check for OTSG Tube Rupture

Op-Test No.: 1 Scenario No.: 1 Event No.: 7 Rev.: 2

Event Description: (Examiner Cue) Following selection of RC-1-LT3 for PZR level control a PZR steam space leak occurs **[MT].** AP-520 may be entered but there will be little time to perform any actions. RPS will not actuate on low pressure and the RO must manually trip the reactor **[CT]**. The reactor trip will cause the steam leak to rise and will lead to an ISCM event.

Time	Position	Applicant's Actions or Behavior

	BOP	• Attempts to quantify leak rate
		• Perform actions of AP-520 as directed by SRO
		  o Notify Personnel
		  ▪ PA announcement
		  ▪ SPO/PPO contacted via radio
		  o Verify OTSG leakage has not increased
		  ▪ Checks RM-A12 (Condenser Vacuum pp Exhaust Monitor)
		  ▪ Checks RM-G25, RM-G26, RM-G27, & RM-G28 for increase (OTSG RAD Monitors)
		  o Concurs significant increase in RCS leakage exists
		  o Assist in determination of leak location
		• When the Rx is tripped, depresses the global alarm silence pushbutton.
		• When EOP-02 Immediate Actions are completed, performs symptom scan along with RO and SRO.

Op-Test No.: 1 Scenario No.: 1 Event No.: 8 Rev.: 2

Event Description: (Automatic Parameter Cue) Following the reactor trip the PZR steam space leak rises. HPI will automatically actuate. MUV-25 (HPI iso vlv) normal source power failure occurs concurrent with MUV-586 (HPI Crosstie vlv) failing as is **[MALF]**. Alternate power source must be selected **[CT]**.

Time	Position	Applicant's Actions or Behavior
	CREW	• Steam space leak will depressurize the RCS outside the post trip window. o RCS pressure will lower and cause an ES actuation o EFW actuation o Loss of adequate SCM

Op-Test No.: 1 Scenario No.: 1 Event No.: 8 Rev.: 2

Event Description: (Automatic Parameter Cue) Following the reactor trip the PZR steam space leak rises. HPI will automatically actuate. MUV-25 (HPI iso vlv) normal source power failure occurs concurrent with MUV-586 (HPI Crosstie vlv) failing as is **[MALF]**. Alternate power source must be selected **[CT]**.

Time	Position	Applicant's Actions or Behavior
	SRO	• Directs BOP/RO to perform EOP-13, Rule 1 o When RCP-1D breaker doesn't open, ensures 6900 V Aux Bus 3B is de-energized (Bkr 3104) o Direct actions of EOP-3, Loss of SCM Perform Rule 1 ▪ Stop all RCPs within 1 minute ▪ Manually actuate ES ▪ Depress "ISCM" (Inadequate SCM) pushbuttons for EFIC (EFW Initiation and Control) channels ▪ Ensure Tincore is selected on SPDS o Notify personnel of entry into EOP-3 o Directs RO/BOP to notify PPO to perform EOP-14 Enclosure 2 o Verify proper HPI discharge flowpath exists ▪ Verifies MUV-23, MUV-24, MUV-25, MUV-26, (HPI Iso vlvs) MUV-586, and MUV-587 (HPI Crosstie vlvs) open ▪ Select the "B" source for MUV-25 to ON o Ensure at least 1 HPI train is properly aligned ▪ Verifies MUV-73 and MUV-58 are open (MUP BWST Suction vlvs) ▪ Verifies at least 1 MUP running with required cooling pumps ▪ Verifies MUP recirc valves MUV-53 and MUV-257 are closed ▪ Verifies all HPI recirc to sump valves MUV-543, MUV-544, MUV-545 and MUV-546 closed ▪ Verifies Makeup and Seal Injection isolation valves MUV-596, MUV-18 and MUV-27 closed o Ensure at least 1 letdown isolation valve is closed, MUV-567 or MUV-49 o Ensure DHV-3 is closed (Decay Heat Removal suction) o Verify EFW is operating and flow is controlled • Recognizes Emergency Plan entry (not required to classify)

Op-Test No.: 1 Scenario No.: 1 Event No.: 8 Rev.: 2

Event Description: (Automatic Parameter Cue) Following the reactor trip the PZR steam space leak rises. HPI will automatically actuate. MUV-25 (HPI iso vlv) normal source power failure occurs concurrent with MUV-586 (HPI Crosstie vlv) failing as is **[MALF]**. Alternate power source must be selected **[CT]**.

Time	Position	Applicant's Actions or Behavior
	BOP/RO	• Ensures ES equipment is properly aligned • Performs EOP-13, Rule 1, ISCM o Trip RCPs in less than 1 minute since loss of ASCM • When RCP-1D breaker doesn't open, opens (ensures open) breaker 3104 to de-energize the 6900 V Aux Bus 3B o Depress "HPI MAN ACT" push buttons on Trains A and B o Depress "RB ISO MAN ACTUATION" push buttons on Trains A and B o Depress "ISCM" (Inadequate SCM) push buttons for EFIC (EFW Initiation and Control) channels A and B o Ensure Tincore is selected on SPDS • Verifies all ES components are operating via the actuation light indications (green) for ES actuated equipment. o Recognizes MUV-586 (HPI Crosstie) still closed. o Attempt to open MUV-586 (not successful) o Recognizes loss of power to MUV-25 (HPI iso vlv) o Notifies SRO of malfunction with MUV-586 and MUV-25 o Notify personnel of entry into EOP-3 o Directs RO/BOP to notify PPO to perform EOP-14 Enclosure 2 o Verify proper HPI discharge flowpath exists ▪ Verifies MUV-23, MUV-24, MUV-25, MUV-26, (HPI iso vlvs) MUV-586, and MUV 587 HPI Crosstie vlvs) open ▪ **Selects the "B" power source for MUV-25 to ON (CT) (CT due to sheared shaft on MUP-1C)** o Ensures at least 1 HPI train is properly aligned ▪ Verifies MUV-73 and MUV-58 are open MUP BWST suction vlvs). ▪ Verifies at least 1 MUP running with required cooling pumps ▪ Verifies MUP recirc valves MUV-53 and MUV-257 are closed ▪ Verifies all HPI recirc to sump valves MUV-543, MUV-544, MUV-545 and MUV-546 closed (Continued on next page)

Op-Test No.: 1 Scenario No.: 1 Event No.: 8 Rev.: 2

Event Description: (Automatic Parameter Cue) Following the reactor trip the PZR steam space leak rises. HPI will automatically actuate. MUV-25 (HPI iso vlv) normal source power failure occurs concurrent with MUV-586 (HPI Crosstie vlv) failing as is **[MALF]**. Alternate power source must be selected **[CT]**.

Time	Position	Applicant's Actions or Behavior
	BOP/RO	▪ Verifies at least 1 letdown isolation valve is closed, MUV-567 or MUV-49 ▪ Verifies Makeup and Seal Injection isolation valves MUV-596, MUV-18 and MUV-27 closed o Ensures DHV-3 (Decay Heat Removal suction) is closed o Verifies EFW is operating and flow is controlled ▪ Uses EOP-13, Rule 3

Op-Test No.: 1 Scenario No.: 1 Event No.: 9 Rev.: 2

Event Description: (Automatic Parameter Cue) RCP-1D will not trip (**MALF**) on the loss of SCM. The 6900V bus must be de-energized. **(CT)**

Time	Position	Applicant's Actions or Behavior
	RO/BOP	• Loss of SCM o Trip all RCPs o RCP-1D will not trip o Breaker closed light "LIT" (red)
	SRO	• May direct the RO to perform actions to stop RCP-1D
	RO/BOP	• Secures RCP-1D o Opens breaker 3104 to de-energize 6900V Aux Bus 3B. o RCP-1D de-energizes o **All RCPs tripped within 1 minute from the loss of adequate SCM (CT)**

Scenario may be terminated anytime after Step 3.9 in EOP-03 is completed.

RULE 1, LOSS OF SCM

- ___ IF < 1 min has elapsed since losing adequate SCM, THEN immediately stop all RCPs.

- ___ IF RCPs were NOT stopped within 1 min, THEN ensure all operating RCPs remain running until any of the following exist:

  ___ SCM is restored

  ___ LPI flow > 1400 gpm in each injection line.

- ___ Progress toward a maximum allowable plant cooldown to achieve CFT and LPI flow as soon as possible.

- ___ Manually actuate ES.

- ___ Depress "HPI MAN ACT" push buttons on Trains A and B.

- ___ Depress "RB ISO MAN ACTUATION" push buttons on Trains A and B.

- ___ IF LPI has NOT actuated, AND RCS PRESS ≤ 300 psig, THEN depress "LPI MAN ACT" push buttons on Trains A and B.

- ___ Depress "ISCM" push buttons for EFIC channels A and B.

- ___ Ensure Tincore is selected on SPDS.

RULE 2, HPI CONTROL

- ___ IF HPI has actuated, THEN bypass or reset ES actuation.

1 ___ Obtain SRO concurrence to bypass or reset ES.

2 Bypass or reset ES actuation:

___ Auto

___ Manual

- ___ Open MUP recirc prior to throttling HPI flow < 200 gpm/pump.

- ___ IF recirc to MUT is desired, THEN open MUP recirc to MUT valves:

___ MUV-53	___ MUV-257

- ___ IF recirc to RB sump is desired, THEN open HPI recirc to sump valves:

___ MUV-543	___MUV-544
___ MUV-545	___ MUV-546

- ___ IF adequate SCM exists based, on Tincore, THEN throttle HPI to maintain required conditions.

- ___ Prevent exceeding NDT limit
- ___ IF OTSG isolated for TRACC, THEN maintain RCS PRESS <1000 psig.
- ___ IF PTS, SGTR, or dry OTSG exists, THEN maintain minimum adequate SCM.

- ___ IF adequate SCM can be maintained with 1 HPI pump, AND stopping second HPI pump is desired, THEN stop 1 HPI pump.

- ___ Ensure running HPI pump is aligned to MUT.

RULE 3, EFW/AFW CONTROL

- ___ Ensure available OTSGs are at or trending toward required level.

"LLL"	> 20 in
"NAT CIRC"	> 70%
"ISCM"	> 90%

- ___ IF manual control of EFW flow is desired,
  THEN establish manual EFIC control.

1 ___ Obtain SRO concurrence to place EFIC in manual.

2 ___ Control EFW to maintain required EFW flow and OTSG level.

3 ___ IF EFW flow is NOT controlled,
THEN depress EFIC channels A and B "MANUAL PERMISSIVE" push buttons and close affected EFW block valve.

- ___ IF adequate SCM does NOT exist,
  AND level in available OTSGs is NOT at or trending toward "ISCM" level,
  THEN establish manual required flow.

EFW	2 OTSGs	> 280 gpm in 1 line to each OTSG
	1 OTSG	> 470 gpm in 1 line to 1 OTSG
AFW	2 OTSGs	> 250 gpm to < 300 gpm/OTSG
	1 OTSG	> 450 gpm to < 600 gpm

- ___ IF adequate SCM exists,
  THEN throttle flow to prevent OTSG PRESS from lowering > 100 psig below desired PRESS.

- Do not allow OTSG level to lower.

RULE 4, PTS

- ___ IF any of the following exist:

  ___ Tincore < 400°F,
  AND cooldown rate
  exceeds ITS limit

  ___ RCPs off,
  AND HPI flow exists

  THEN perform required PTS actions.

- ___ Throttle HPI flow to minimize adequate SCM.
- ___ Throttle LPI flow to minimize adequate SCM.
- ___ PTS is applicable until an Engineering evaluation has been completed.

RULE 7, PZR LEVEL CONTROL

1 ___ IF PZR level is < PZR level band,
THEN restore PZR level.

PZR Level Band	
Rx at power > 20%	200 in to 240 in
Rx at power ≤ 20%	120 in to 200 in
Rx tripped	50 in to 120 in

- Cycle appropriate BWST to MUP valve to maintain MUT level ≥ 55 in:

___ MUV-73	___ MUV-58

- ___ Close MUV-49

---

2 ___ IF PZR level does NOT recover,
THEN establish manual HPI flow.

1 ___ Open MUV-24

2 ___ Notify SSO to evaluate Emergency Plan entry.

3 ___ IF PZR level does NOT recover,
THEN start second MUP and required cooling pumps.

[Rule 5, Diesel Load Control]

4 ___ IF PZR level does NOT recover,
THEN open additional HPI valves.

5 ___ IF PZR level does NOT recover,
THEN close MUP to MUT recircs:

___ MUV-53	___ MUV-257

---

3 ___ IF PZR level recovers,
THEN restore normal PZR conditions.

[Rule 2, HPI Control]

- ___ IF adequate SCM exists,
AND letdown is desired,
THEN **CONCURRENTLY PERFORM** EOP-14, Enclosure 4, Letdown Recovery (if accessible).

Facility: **Crystal River #3** Scenario No.: #3 (NRC 2009) Op-Test No.: 1

Examiners: _____ Operators: _____

_____ _____

_____ _____

Initial Conditions: The plant is at ≈ 90% power.

Turnover: The following equipment is OOS: MUP-1B (12 hours); FWP-7 (4 hours); MSV-55 (8 hours). "A" RPS channel in bypass due to the failure low of RC-4A-TE2 (2 hours).

Event No.	Malf. No.	Event Type*	Event Description
1	1	C (BOP) C (SRO)	CIV-34 fails partially closed (air failure). (OP-417) SRO TS determination. (TS 3.6.3)
2	2	TS (SRO)	EF-98-LT fails low. SRO TS determination. (TS 3.3.17)
3	3	C (RO)	CDP-1A magnetic coupling failure. Power reduction to approximately 65%. (AP-510, OP-603)
4	4	C (BOP)	Turbine automatic control failure at ≈ 80%. (AP-510)
5	5	M (ALL)	"B" OTSG steam leak. (EOP-2, AI-505)
6	6	C (BOP)	MFLI trips both MFWPs. (EOP-13, Rule 3)
7	7	C (BOP)	DCP-1B fails to start. (AI-505) **[CT]**
8	8	C (RO or BOP)	Loss of all feedwater. Initiate HPI/PORV cooling. (EOP-4) **[CT]**
9	N/A	C (RO or BOP)	Loss of ASCM. Secure Reactor Coolant Pumps. (EOP-13, Rule 1) **[CT]**

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

Plant is initialized at 90% power for turbine valve testing. MUP-1B, FWP-7 and MSV-55 are OOS. RPS Channel "A" is bypassed due to the failure of RC-4A-TE2.

Soon after turnover CIV-34 will fail closed. Actions to secure CIP-3A, starting CIP-3B and swapping Cavity Cooling fans are required. TS 3.6.3, Condition C, should be addressed with actions to isolate the flowpath within 4 hours.

Once TS actions are completed EF-98-LT (EFT level) fails low and TS 3.3.17 is addressed. Condition A should be entered with the action to restore the channel to operable status within 30 days.

Following the failure of EF-98-LT the magnetic coupling on CDP-1A experiences a control circuit failure. Power must be lowered quickly so that MFW booster pump suction is not lost. AP-510, Rapid Power Reduction, will be entered and power reduced to about 65%. At about 80% power automatic control of the turbine will be lost. The crew must recognize this failure and take manual control of the turbine for the remainder of the down power.

After the plant is stabilized the "B" OTSG develops a steam leak. Plant shutdown is started with the Turbine in manual. SG/Rx Master station may also be taken to manual. After the reactor is tripped the steam leak increases and "B" OTSG is isolated. When "B" MFLI is actuated both the "A" and "B" MFWPs will trip due to a failure of the EFIC FWP trip logic circuitry.

DCP-1B fails to start when HPI is initiated resulting in a loss of cooling to DHP-1B, RWP-3B and MUP-1C. The "B" train DC cooled equipment must be secured and MUP-1C either secured or placed on SW cooling **[CT]**.

EFP-2 will stop supplying EFW when the "B" OTSG depressurizes. EFP-3 will trip due to a mechanical failure. EFP-1 breaker will not close when demanded. EOP-4, Inadequate Heat Transfer, will be entered based on symptoms of inadequate primary to secondary heat transfer or loss of all main and emergency feedwater. HPI/PORV cooling must be established **[CT]**. An ALERT condition will exist when HPI/PORV cooling is started.

If a loss of ASCM condition exists the RCPs must be secured within 1 minute **[CT]**.

This scenario may be terminated when HPI/PORV cooling is established and incore temperatures are starting to lower.

Procedures used: (ARs not listed)

OP-417	AP-510	EOP-2
OP-603		EOP-4
	AI-505	EOP-13
		EOP-14

Target Quantitative Attributes – Scenario 3 – NRC 2009	Actual Attributes
1. Total Malfunctions (5-8)	8
2. Malfunctions after EOP entry (1-2)	2
3. Abnormal Events (2-4)	2
4. Major Transients (1-2)	1
5. EOPs entered requiring substantive actions (1-2)	2
6. EOP contingencies requiring substantive actions (0-2)	0
7. Critical Task (2-3)	3

SHIFT TURNOVER

A. Initial Conditions:

1. Time in core life – 300 EFPD
2. Shift: [X] Day [ ] Night
3. Rx power and power history – 90% for 1 hour. Previously 100% for 40 days.
4. Boron concentration – 976 ppmb
5. Xenon – See Saxon
6. RCS Activity - See Status Board
7. EOOS Condition: Green
8. Protected Train – "A" Train

B. Tech. Spec. Action requirement(s) or other administrative requirement(s) in effect:

- TS 3.7.5, Condition A, MSV-55. Condition entered 8 hours ago.
- TS 3.3.1, Condition A, RC-4A-TE2. Condition entered 2 hours ago.
- CP-500, FWP-7
- Fire Protection Plan, Table 6.9A, MUP-1B and MSV-55

C. Clearances in effect:

- FWP-7 for bearing replacement. Expected return to service in 24 hours.
- MUP-1B for wet alignment. Expected return to service in 4 hours.
- MSV-55 for MOV inspection. Expected return to service in 12 hours.

D. Significant problems/abnormalities:

- (Management decision) Startup Transformer is supplying the Unit buses due to the scheduled turbine valve testing.

E. Evolutions/maintenance for the on-coming shift:

- Maintenance to continue work on MUP-1B, MSV-55 and RC-4A-TE2 (failed low).
- Plant currently at 90% power for turbine valve testing. Testing is scheduled to start when the oncoming crew returns from the pre-job briefing.

F. CRS – Instruct the ROs to walk down the main control board.

G. Required Emergency Plan Implementation

[ ] Full Implementation, including all required notifications.
[ ] Initial/upgrade classifications - internal notifications.
[X] None

Examination Setup/Execution
Scenario 3

INITIAL CONDITIONS

A. "Restore" the simulator to IC#___**172**___ in Exam 4 directory.

B. "Unfreeze" the simulator and ensure the following configuration is setup:

1. MUP-1B in Normal-After-Stop
2. MUP-1A running
3. RPS Channel "A" in manual bypass.
4. MSV-55 selected closed
5. Unit buses on Startup transformer
6. AULD Nozzle and LEFM quality OFF
7. AULD Alerts acknowledged

C. "Freeze" the simulator and enter 'Exam 4' lesson plan directory:

1. "Start" Lesson Plan SES #3 NRC 2009

D. "Unfreeze" the simulator and "Trigger" Setup Step(s) which will:

See Simulator lesson plan

E. Tag out the following equipment:

1. Place CIT on FWP-7 C/S in Normal-After-Stop
2. Place CIT on MUP-1B C/S in Normal-After-Stop / "A" side
3. Place CIT on MUP-1B C/S in Normal-After-Stop / "B" side
4. Place CIT on MSV-55 in close position
5. Place Protected Train sign on the "A" Train

F. Additional Modifications required to the IC.

1. Ensure SPDS selected to NORM/IMB and history traces cleared and history trace selected. Also ensure "A" and "B" SPDS are properly selected for RCS Loops and Primary instruments selected.

2. Ensure SPDS on CNO/SSO/STA computers displaying correct data for IC.

3. Ensure Group 59 indicative of current reactor power.

4. Acknowledge computer and annunciator alarms.

5. Ensure proper PICS groups displayed on overhead screens.

6. **Consumable copy of OP-417. Copy of PT-325 is NOT required.**

7. **Copy of OP-204 signed thru Step 4.4.4 with note on Step 4.4.5.**

START DATA RECORDER

A. **EVENT #1**
When directed input the CIV-34 failure.
[Trigger Step #1: CIV-34 fail partially closed]

Role Play: If contacted as PPO to check out CIV-34 wait about 2 minutes then report that CIV-34 is about ½ open.

B. **EVENT #2**
When directed input the EF-98-LT failure.
[Trigger Step #2: EF-98-LT fail low]

C. **EVENT #3**
When directed input CDP-1A control pot failure.
[Trigger Step #3: CDP-1A Output Control Pot Fail Low – Ramped over 3 minutes]

D. **EVENT #4**
Turbine automatic control circuit failure.
[Failure included in setup step. Activated at 80% power.]

E. **EVENT #5**
When directed input "B" OTSG steam leak.
[Trigger Step #4: "B" OTSG Steam Leak - Ramped over 5 minutes]

Role Play: If contacted as SPO to check out the IB fire alert wait 2 minutes then report steam coming out of the scuppers from the IB.

F. **EVENTs #6, 7, 8 & 9**
Loss of both MFWPs, DCP-1B failure, EFP-1 and EFP-3 failures.
[Failures included in setup step]

Role Play: If the crew decides to place MUP-1C on SW then trigger the step and report back in 5 minutes that SW cooling is aligned. Do NOT align cooling until after SCM has been lost.
[Trigger Step #5: SWAP MUP-1C TO SW COOLING]

Role Play: If contacted as the SPO to perform EOP-14, Enclosure 1, wait ~23 minutes and report completion.
[Open Lesson Plan: Misc\Enc_1.lsn, execute and trigger]

Role Play: If contacted as the PPO to perform EOP-14, Enclosure 2, wait ~15 minutes and report completion.
[Open Lesson Plan: Misc\Enc_2.lsn, execute and trigger]

Op-Test No.: 1 Scenario No.: 3 Event No.: 1 Rev.: 1

Event Description: (Examiner Cue) Soon after turnover CIV-34 will fail partially closed **[MALF]**. Actions to secure CIP-3A, starting CIP-3B and swapping Cavity Cooling fans are required. TS 3.6.3, Condition C should be addressed with actions to isolate the flowpath within 4 hours.

Time	Position	Applicant's Actions or Behavior
	BOP	• Announce/acknowledge alarm: o (C-2-14) "SW ISO Valve Air Failure" • Reviews AR-303 • Diagnoses failure o CIV-34 green light ON (AHHE-14A in) • Informs SRO of air failure to CIV-34 • Recommends swapping Cavity Cooling fans and pumps
	SRO	• Assists BOP in diagnosing CIV-34 failure • Directs the BOP to swap Cavity Cooling fans and pumps IAW OP-417 • Enters TS 3.6.3, Condition C (4 hours to isolate flowpath) • Contacts Work Control to initiate repair efforts • May review the SRO checklist for unplanned equipment status changes
	BOP	• Swaps Cavity Cooling fans and pumps IAW OP-417, Section 4.9.2 o Stops AHF-2A (Cavity Cooling fan) o Stops CIP-3A (Cavity Cooling pump) o Closes CIV-35(AHHE-14A out) o Opens CIV-40 (AHHE-14B out) o Opens CIV-41 (AHHE-14B in) o Starts CIP-3B (Cavity Cooling pump) o Starts AHF-2B (Cavity Cooling fan)

Op-Test No.: 1 Scenario No.: 3 Event No.: 2 Rev.: 1

Event Description: (Examiner Cue) EF-98-LT (EF tank level) fails low. **(MALF)** TS 3.3.17 entry required.

Time	Position	Applicant's Actions or Behavior
	RO/BOP	• Announce/acknowledge alarm o (H-7-1) "EF Tank Level Low-Low" o Reviews AR-403 o Notes that EF-98-LI1 is failed low while EF-99-LI1 still indicates proper EFT level o Informs SRO of instrument failure o May dispatch SPO to ensure no leak at EFT-2
	SRO	• Evaluates TS 3.3.17 for applicability. Enters Condition A, restore in 30 days. (has to use Basis to determine) • May evaluate TS 3.3.18 for applicability. No entry required. (has to use Basis to determine.) • Contacts Work Control to initiate repair efforts • May review SRO checklist for unplanned equipment status change

Op-Test No.: 1 Scenario No.: 3 Event No.: 3/4 Rev.: 1

Event Description: (Examiner Cue) After TS determination the magnetic coupling on CDP-1A experiences a control circuit failure. **[MALF]**. Power must be decreased quickly so that MFW booster pump suction is not lost. AP-510, Rapid Power Reduction, will be entered and power reduced to about 65%. At about 80% power automatic control of the turbine will be lost. **[MALF]**. The crew must recognize this failure and take manual control of the turbine for the remainder of the power decrease.

Time	Position	Applicant's Actions or Behavior
	RO/BOP	• Announce/acknowledge alarms o (N-2-2) "Cond Pump A Uncoupled" o (N-1-5) "Hotwell Level High/Low" • Diagnoses failure o Large decrease in condensate flow o DFT level lowering o Low motor current on CDP-1A • May attempt to increase demand on CDP-1A • Reviews AR-602 • Notifies SRO of malfunction • Recommends reducing power
	SRO	• Acknowledges receipt of alarms • Assists RO/BOP in diagnosing CDP failure • Enters AP-510, Rapid Power Reduction • Directs RO/BOP actions per AP-510 o Adjust Load Rate to desired setpoint o Set Unit Load Demand to "10" o Notify personnel of entry into AP-510 o Maintain PZR level (Rule 7, attached) o Notify Chemistry of power change o Verify Imbalance within limits o When power is < 80% notify SPO to ensure MS is supplying AS o Maintain DFT level between 8 and 11 feet o If MBVs close, then ensure MBVs remain closed o Verify Aux Transformer is not supplying any bus

Op-Test No.: 1 Scenario No.: 3 Event No.: 3/4 Rev.: 1

Event Description: (Examiner Cue) After TS determination the magnetic coupling on CDP-1A experiences a control circuit failure. **[MALF]**. Power must be decreased quickly so that MFW booster pump suction is not lost. AP-510, Rapid Power Reduction, will be entered and power reduced to about 65%. At about 80% power automatic control of the turbine will be lost. **[MALF]**. The crew must recognize this failure and take manual control of the turbine for the remainder of the power decrease.

Time	Position	Applicant's Actions or Behavior
	RO	• Perform actions as directed by the SRO per AP-510 o Adjust Load Rate to desired setpoint o Set Unit Load Demand to "10" o Verify Imbalance within limits o Maintain DFT level between 8 and 11 feet o If MBVs close, then ensure MBVs remain closed
	BOP	• Perform actions as directed by the SRO per AP-510 o Notify personnel of entry into AP-510 o Maintain PZR level (Rule 7, attached) o Notify Chemistry of power change o When power is < 80% notify SPO to ensure MS is supplying AS o Maintain DFT level between 8 and 11 feet o Verify Aux Transformer is not supplying any bus
	SRO	• Assists RO/BOP in diagnosing turbine failure • Directs BOP to take manual control of the turbine and maintain header pressure as power lowers • Directs the RO to continue the down power (may use SG/RX Master and Turbine or just Turbine) • Directs RO/BOP to stabilize plant parameters at approximately 65% • Contacts Work Control to initiate repair efforts • May review SRO checklist for unplanned equipment status change

Op-Test No.: 1 Scenario No.: 3 Event No.: 3/4 Rev.: 1

Event Description: (Examiner Cue) After TS determination the magnetic coupling on CDP-1A experiences a control circuit failure. **[MALF]**. Power must be decreased quickly so that MFW booster pump suction is not lost. AP-510, Rapid Power Reduction, will be entered and power reduced to about 65%. At about 80% power automatic control of the turbine will be lost. **[MALF]**. The crew must recognize this failure and take manual control of the turbine for the remainder of the power decrease.

Time	Position	Applicant's Actions or Behavior
	BOP	• Recognizes turbine failure to lower demand • Announce/acknowledge alarms o (O-3-4) "Turb Throttle Press High/Low" (possible) o (N-6-4) "Turb EHC on Manual" o (K-6-2) "Unit Master In Track" • Manually reduces turbine to maintain header pressure (may use OPER Man or OPER Auto) • Continues manual control until power reduction is completed (approximately 65%) • Stabilizes plant parameters
	RO	• Recognizes turbine failure to lower demand • May take manual control of the SG/RX Master station • Continues power reduction with the Turbine and/or SG/RX Master station(s) in Manual • Stops power decrease at 60% to 70% power • Monitors DFT level • Stabilizes plant parameters

Op-Test No.: 1 Scenario No.: 3 Event No.: 5/6 Rev.: 1

Event Description: (Examiner Cue) After the plant is stabilized the "B" OTSG develops a steam leak **[MT]**. Plant shutdown is started with the Turbine and/or SG/Rx Master stations in manual. After the reactor is tripped the steam leak rises and the "B" OTSG is isolated. When MFLI is actuated both the "A" and "B" MFWPs will trip due to a failure of the EFIC FWP trip logic circuitry **[MALF]**.

Time	Position	Applicant's Actions or Behavior
	CREW	• Recognize indications of a steam leak in the IB
	BOP	• Announce/acknowledge alarms o (F-3-2) Aux Bldg Fire Alert • Reviews AR-401 • Notifies SRO of failure • Directs SPO to investigate

	SRO	• Assists the RO/BOP in diagnosing the failure
		• May re-enter AP-510, Rapid Power Reduction
		• May direct RO/BOP actions per AP-510
		  o Adjust Load Rate to desired setpoint
		  o Set Unit Load Demand to "10" (should N/A)
		  ▪ Should direct RO to use SG/Rx master station and BOP to use the turbine or BOP to use the turbine only
		  o Notify personnel of entry into AP-510
		  o Maintain PZR level (Rule 7, attached)
		  o Notify Chemistry of power change
		  o Maintain Imbalance within limits
		  o When power is < 80% ensure MS is supplying AS (N/A)
		• Maintain DFT level between 8 and 11 feet

	RO	• Assist in diagnosing alarms • Starts plant shutdown • Perform additional actions as directed by the SRO
	BOP	• Maintains header pressure with Turbine in Manual • Perform additional actions as directed by the SRO

Op-Test No.: 1 Scenario No.: 3 Event No.: 5/6 Rev.: 1

Event Description: (Examiner Cue) After the plant is stabilized the "B" OTSG develops a steam leak **[MT]**. Plant shutdown is started with the Turbine and/or SG/Rx Master stations in manual. After the reactor is tripped the steam leak rises and the "B" OTSG is isolated. When MFLI is actuated both the "A" and "B" MFWPs will trip due to a failure of the EFIC FWP trip logic circuitry **[MALF]**.

Time	Position	Applicant's Actions or Behavior
	RO	• Trips the reactor when directed • Perform first pass of EOP-2 Immediate Actions from memory o Depress the Rx trip pushbutton o Verify CRD groups 1 through 7 are fully inserted o Verify NIs indicate Rx is shutdown o Depress Main Turbine trip pushbutton o Verify TVs and GVs are closed • Perform second pass of EOP-2 Immediate Actions with SRO direction
	SRO	• Direct RO actions per EOP-2 o Depress the Rx trip pushbutton o Verify CRD groups 1 through 7 are fully inserted o Verify NIs indicate Rx is shutdown o Depress Main Turbine trip pushbutton o Verify TVs and GVs are closed • Directs BOP to determine failed OTSG and isolate
	BOP	• Depresses Global Silence pushbutton • Isolates the "B" OTSG (STM Gen B MFLI and MSLI isolation pushbuttons) • Recognizes that both MFWPs tripped when MFLI was actuated • Notifies SRO of loss of both MFWPs

Op-Test No.: 1 Scenario No.: 3 Event No.: 5/6 Rev.: 1

Event Description: (Examiner Cue) After the plant is stabilized the "B" OTSG develops a steam leak **[MT]**. Plant shutdown is started with the Turbine and/or SG/Rx Master stations in manual. After the reactor is tripped the steam leak rises and the "B" OTSG is isolated. When MFLI is actuated both the "A" and "B" MFWPs will trip due to a failure of the EFIC FWP trip logic circuitry **[MALF]**.

Time	Position	Applicant's Actions or Behavior
	CREW	• Perform symptom scan o Station Blackout o Inadequate SCM o Inadequate Heat Transfer o Excessive Heat Transfer o SG Tube Rupture • Determine that no symptoms are evident, continue in EOP-2 • Rule 3, EFW Control are in effect (attached)
	RO/BOP	• Perform actions as directed by the SRO

Op-Test No.: 1 Scenario No.: 3 Event No.: 7 Rev.: 1

Event Description: (Automatic Parameter Cue) DCP-1B fails to start **[MALF]** when HPIg is initiated resulting in a loss of cooling to DHP-1B, RWP-3B. MUP-1C must be secured or placed on SW cooling **[CT]**. DHP-1B and RWP-3B may also be secured.

Time	Position	Applicant's Actions or Behavior
	BOP	• Perform Rule 2, HPI Control (attached) o Bypass or Reset ES actuation o Open MUP recirc valves prior to throttling < 200 gpm/pump • Determine that DCP-1B failed to start o (D-5-6) "BS/DH Pump B DC Flow Low" o Amber light remains on for DCP-1B on "B" ES Status Panel • Attempt to start DCP-1B • Notify SRO of failure o **Secures MUP-1C OR places on SW cooling [CT]** o *S*ecures RWP-3B and DHP-1B • May note time when RCPs must be secured
	SRO	• Directs BOP to: o Attempt start of DCP-1B o Secure DC cooled equipment o Shutdown MUP-1C or place on SW o Stop RCPs within 30 minutes due to loss of CBO flow

Op-Test No.: 1 Scenario No.: 3 Event No.: 8/9 Rev.: 1

Event Description: (Automatic Parameter Cue) EFP-2 will stop supplying EFW when the "B" OTSG depressurizes. EFP-3 will trip due to a mechanical failure **[MALF]**. EFP-1 breaker will not close when demanded. EOP-4, Inadequate Heat Transfer, will be entered based on symptoms of inadequate primary to secondary heat transfer or loss of all main and emergency feedwater. HPI/PORV cooling must be established **[CT]**. An ALERT should be declared when HPI/PORV cooling is started. Once adequate SCM is lost RCPs must be secured within 1 minute **[CT]**.

Time	Position	Applicant's Actions or Behavior
	RO/BOP	• Perform Rule 3, EFW Control (attached) • Recognize EFP-2 flow decrease (isolation of "B" OTSG) • Recognize loss of EFP-3 o (H-8-3) "EFP 3 Start Failure" o No EFW flow o Green light on control handle • Notifies SRO of malfunction

Op-Test No.: 1 Scenario No.: 3 Event No.: 8/9 Rev.: 1

Event Description: (Automatic Parameter Cue) EFP-2 will stop supplying EFW when the "B" OTSG depressurizes. EFP-3 will trip due to a mechanical failure **[MALF]**. EFP-1 breaker will not close when demanded. EOP-4, Inadequate Heat Transfer, will be entered based on symptoms of inadequate primary to secondary heat transfer or loss of all main and emergency feedwater. HPI/PORV cooling must be established **[CT]**. An ALERT should be declared when HPI/PORV cooling is started. Once adequate SCM is lost RCPs must be secured within 1 minute **[CT]**.

Time	Position	Applicant's Actions or Behavior
	SRO	• Enters EOP-4 and directs RO/BOP actions o Notify personnel o Verify EFW or AFW pumps running ▪ Directs closure of EFIC and AFW control valves ▪ Directs RO or BOP to concurrently perform EOP-14, Enclosure 7 o Notify PPO to perform EOP-14, Enclosure 2 o Adjust MUV-31 setpoint to 100 inches (use Rule 7) o Record initial Tincore temp o Minimize RCS pressure rise ▪ PZR spray, PZR heaters, HPI flow o Reduce running RCPs to 1 per loop o Waits at step 3.13 until any of the following occur: ▪ RCS pressure approaches NDT limit ▪ PORV automatically opens ▪ RCS pressure is $\geq$ 2400 psig o Determines HPI/PORV cooling is required o Actuates HPI ▪ If MUP-1C cooling water has not been swapped to SW then MUP-1C must be secured o Ensure proper HPI alignment o Ensure HPI recirc valves to sump closed o Establish HPI PORV cooling ▪ Ensure RCV-11 is open and open PORV o Select all PZR heaters to OFF o Reduces RCPs to only 1 running o Ensure PZR spray valve in AUTO • Should recognize entry into an Alert condition. • Directs RCP shutdown based on either of the following: [CT] o Within 1 minute of Loss of ASCM o If incore temp rises $\geq$ 50° F above initial value in EOP-4 • Goes to EOP-8B, HPI Cooldown

Op-Test No.: 1 Scenario No.: 3 Event No.: 8/9 Rev.: 1

Event Description: (Automatic Parameter Cue) EFP-2 will stop supplying EFW when the "B" OTSG depressurizes. EFP-3 will trip due to a mechanical failure **[MALF]**. EFP-1 breaker will not close when demanded. EOP-4, Inadequate Heat Transfer, will be entered based on symptoms of inadequate primary to secondary heat transfer or loss of all main and emergency feedwater. HPI/PORV cooling must be established **[CT]**. An ALERT should be declared when HPI/PORV cooling is started. Once adequate SCM is lost RCPs must be secured within 1 minute **[CT]**.

Time	Position	Applicant's Actions or Behavior
	RO/BOP	• Performs actions directed by the SRO o Notify personnel o Verify EFW or AFW pumps running ▪ Closes EFIC and AFW control valves ▪ Concurrently performs EOP-14, Enclosure 7 o Notify PPO to perform EOP-14, Enclosure 2 o Adjust MUV-31 setpoint to 100 inches o Record initial Tincore temp o Minimize RCS pressure rise ▪ PZR spray, PZR heaters, HPI flow o Reduce running RCPs to 1 per loop o Waits at step 3.13 until any of the following occur: ▪ RCS pressure approaches NDT limit ▪ PORV automatically opens ▪ RCS pressure is ≥ 2400 psig o Concurs that HPI/PORV cooling is required o Actuates HPI ▪ If MUP-1C cooling water has not been swapped to SW then MUP-1C must be secured o Ensures at least 1 train of HPI is properly aligned o Ensures HPI recirc valves to sump closed o **When at least 1 train of HPI flow is established opens PORV *[CT]*** o Selects all PZR heaters to OFF o Reduces RCPs to one o Ensures PZR spray valve in AUTO • **Performs RCP shutdown based on either of the following: [CT]** o Within 1 minute of Loss of ASCM o If incore temp rises ≥ 50° F above initial value in EOP-4

Op-Test No.: 1 Scenario No.: 3 Event No.: 8/9 Rev.: 1

Event Description: (Automatic Parameter Cue) EFP-2 will stop supplying EFW when the "B" OTSG depressurizes. EFP-3 will trip due to a mechanical failure **[MALF]**. EFP-1 breaker will not close when demanded. EOP-4, Inadequate Heat Transfer, will be entered based on symptoms of inadequate primary to secondary heat transfer or loss of all main and emergency feedwater. HPI/PORV cooling must be established **[CT]**. An ALERT should be declared when HPI/PORV cooling is started. Once adequate SCM is lost RCPs must be secured within 1 minute **[CT]**.

Time	Position	Applicant's Actions or Behavior
	RO/BOP	• Performs EOP-14, Enclosure 7 o Verifies EFP-3 is not running and goes to Step 7.6 o Verifies EFP-2 is not running and goes to Step 7.8 o Verifies EDG A is not supplying A ES bus o Verifies EFP-1 is available o Ensures EFP-1 is running • Notifies SRO of EFP-1 failure to start per Enclosure 7

Scenario may be terminated when HPI/PORV cooling is established and incore temperatures are lowering.

RULE 1, LOSS OF SCM

- ___ IF < 1 min has elapsed since losing adequate SCM, THEN immediately stop all RCPs.

- ___ IF RCPs were NOT stopped within 1 min, THEN ensure all operating RCPs remain running until any of the following exist:

  ___ SCM is restored

  ___ LPI flow > 1400 gpm in each injection line.

- ___ Progress toward a maximum plant cooldown to achieve CFT and LPI flow as soon as possible.

- ___ Manually actuate ES.

- ___ Depress "HPI MAN ACT" push buttons on Trains A and B.

- ___ Depress "RB ISO MAN ACTUATION" push buttons on Trains A and B.

- ___ IF LPI has NOT actuated, AND RCS PRESS ≤ 300 psig, THEN depress "LPI MAN ACT" push buttons on Trains A and B.

- ___ Depress "ISCM" push buttons for EFIC channels A and B.

- ___ Ensure Tincore is selected on SPDS.

RULE 2, HPI CONTROL

- ___ IF HPI has actuated, THEN bypass or reset ES actuation.

1 ___ Obtain SRO concurrence to bypass or reset ES.

2 Bypass or reset ES actuation:

___ Auto

___ Manual

- ___ Open MUP recirc prior to throttling HPI flow < 200 gpm/pump.

- ___ IF recirc to MUT is desired, THEN open MUP recirc to MUT valves:

___ MUV-53	___ MUV-257

- ___ IF recirc to RB sump is desired, THEN open HPI recirc to sump valves:

___ MUV-543	___MUV-544
___ MUV-545	___ MUV-546

- ___ IF adequate SCM exists based, on Tincore, THEN throttle HPI to maintain required conditions.

- ___ Prevent exceeding NDT limit
- ___ IF OTSG isolated for TRACC, THEN maintain RCS PRESS <1000 psig.
- ___ IF PTS, SGTR, or dry OTSG exists, THEN maintain minimum adequate SCM.

- ___ IF adequate SCM can be maintained with 1 HPI pump, AND stopping second HPI pump is desired, THEN stop 1 HPI pump.

- ___ Ensure running HPI pump is aligned to MUT.

RULE 3, EFW/AFW CONTROL

- ___ Ensure available OTSGs are at or trending toward required level.

"LLL"	> 20 in
"NAT CIRC"	> 70%
"ISCM"	> 90%

- ___ IF manual control of EFW flow is desired,
  THEN establish manual EFIC control.

1 ___ Obtain SRO concurrence to place EFIC in manual.

2 ___ Control EFW to maintain required EFW flow and OTSG level.

3 ___ IF EFW flow is NOT controlled,
THEN depress EFIC channels A and B "MANUAL PERMISSIVE" push buttons and close affected EFW block valve.

- ___ IF adequate SCM does NOT exist,
  AND level in available OTSGs is NOT at or trending toward "ISCM" level,
  THEN establish manual required flow.

EFW	2 OTSGs	> 280 gpm in 1 line to each OTSG
	1 OTSG	> 470 gpm in 1 line to 1 OTSG
AFW	2 OTSGs	> 250 gpm to < 300 gpm/OTSG
	1 OTSG	> 450 gpm to < 600 gpm

- ___ IF adequate SCM exists,
  THEN throttle flow to prevent OTSG PRESS from lowering > 100 psig below desired PRESS.

- Do not allow OTSG level to lower.

RULE 4, PTS

- ___ IF any of the following exist:

  ___ Tincore < 400°F,
  AND cooldown rate
  exceeds ITS limit

  ___ RCPs off,
  AND HPI flow exists

  THEN perform required PTS actions.

- ___ Throttle HPI flow to minimize adequate SCM.
- ___ Throttle LPI flow to minimize adequate SCM.
- ___ PTS is applicable until an Engineering evaluation has been completed.

RULE 7, PZR LEVEL CONTROL

1 ___ IF PZR level is < PZR level band,
THEN restore PZR level.

PZR Level Band	
Rx at power > 20%	200 in to 240 in
Rx at power ≤ 20%	120 in to 200 in
Rx tripped	50 in to 120 in

- Cycle appropriate BWST to MUP valve to maintain MUT level ≥ 55 in:

___ MUV-73	___ MUV-58

- ___ Close MUV-49

---

2 ___ IF PZR level does NOT recover,
THEN establish manual HPI flow.

1 ___ Open MUV-24

2 ___ Notify SSO to evaluate Emergency Plan entry.

3 ___ IF PZR level does NOT recover,
THEN start second MUP and required cooling pumps.

[Rule 5, Diesel Load Control]

4 ___ IF PZR level does NOT recover,
THEN open additional HPI valves.

5 ___ IF PZR level does NOT recover,
THEN close MUP to MUT recircs:

___ MUV-53	___ MUV-257

---

3 ___ IF PZR level recovers,
THEN restore normal PZR conditions.

[Rule 2, HPI Control]

- ___ IF letdown is desired,
THEN **CONCURRENTLY PERFORM** EOP-14, Enclosure 4, Letdown Recovery (if accessible).

ENCLOSURE 7 EFWP MANAGEMENT

ACTIONS DETAILS

STATUS
EFW required.

7.1 ___ Verify EFP-3 is running.

___ IF EFP-3 is NOT running, THEN **GO TO** Step 7.6 in this enclosure.

7.2 ___ IF MFW is NOT available, THEN ensure MFW remains isolated.

- Select MBV to "MAN" and select all FW isolation valves to "CLOSE".

FW valve	A OTSG	B OTSG
LLBV	___ FWV-31	___ FWV-32
MBV toggle	___ "MAN"	___ "MAN"
MBV	___ FWV-30	___ FWV-29
SUBV	___ FWV-36	___ FWV-33
Cross-tie	___ FWV-28	___ FWV-28
Suction	___ FWV-14	___ FWV-15

ENCLOSURE 7 EFWP MANAGEMENT (CONT'D)

	ACTIONS	DETAILS
7.3 ___	Verify EFP-2 is running.	
___	IF EFP-2 is NOT running, THEN **EXIT** this enclosure.	

7.4 ___	WHEN available OTSGs are at required level, THEN stop EFP-2	1 ___ Ensure available OTSGs are at required level. See Table 1 2 ___ Depress "MANUAL PERMISSIVE" or "TEST RESULTS/RESET" push button on EFIC channel B. (as required) 3 Ensure EFP-2 steam supply valves are closed: ___ ASV-204 ___ ASV-5

7.5 ___	WHEN EFP-2 is shutdown, THEN **EXIT** this enclosure.	

ENCLOSURE 7 EFWP MANAGEMENT (CONT'D)

ACTIONS	DETAILS

STATUS

EFP-3 not running.

7.6 ___ Verify EFP-2 is running.

___ IF EFP-2 is NOT running, THEN **GO TO** Step 7.8 in this enclosure.

7.7 ___ IF OTSG PRESS is ≤ 200 psig, AND adequate primary to secondary heat transfer exists, THEN stop RCS cooldown.

- Control OTSG PRESS using TBVs and ADVs.

7.8 ___ IF EDG A is supplying power to A ES 4160V Bus, THEN **GO TO** Step7.15 in this enclosure.

7.9 ___ Verify EFP-1 is available.

___ IF EFP-1 is NOT available, THEN **GO TO** Step 7.15 in this enclosure.

ENCLOSURE 7 EFWP MANAGEMENT (CONT'D)

ACTIONS DETAILS

STATUS
EFP-1 available.

7.10 ___ Ensure EFP-1 is running.

1 ___ Depress "MANUAL PERMISSIVE" or "TEST RESULTS/RESET" push buttons on EFIC channel A and B. (as required).

2 Ensure EFP-1 EFIC control valves to OTSGs are closed:

A OTSG	B OTSG
___ EFV-58	___ EFV-57

3 Ensure EFP-1 EFW block valves to available OTSGs are open:

A OTSG	B OTSG
___ EFV-14	___ EFV-33

4 ___ Ensure EFP-3 is in "PULL TO LOCK".

5 ___ Start EFP-1

ENCLOSURE 7 EFWP MANAGEMENT (CONT'D)

ACTIONS	DETAILS
7.11 ___ Establish EFW flow to each available OTSG.	• ___ IF adequate SCM exists, AND OTSG level is ≤ 12½ in, THEN feed each available dry OTSG with continuous EFW flow to 1 line within the following limits: ___ Cooldown rate minimized See Table 2

EFW or AFW Flow Limit	
Any RCP running	≤ 390 gpm
No RCPs running	≤ 200 gpm

• ___ IF adequate SCM exists, AND OTSG level is > 12½ in, THEN ensure EFW flow is controlled.

[Rule 3, EFW/AFW Control]

• ___ IF adequate SCM does NOT exist, THEN feed available OTSGs at inadequate SCM flow rate.

[Rule 3, EFW/AFW Control]

ENCLOSURE 7 EFWP MANAGEMENT (CONT'D)

ACTIONS	DETAILS
7.12 ___ IF EFP-2 is running, THEN stop EFP-2	1 ___ WHEN available OTSGs are at required level, THEN ensure EFP-2 steam supply valves are closed: ___ ASV-204 ___ ASV-5 See Table 1 2 ___ Depress "EFW INITIATE" push buttons on EFIC channel A.

7.13 ___ IF MFW is NOT available, THEN ensure MFW remains isolated.

- Select MBV to "MAN" and select all FW isolation valves to "CLOSE".

FW valve	A OTSG	B OTSG
LLBV	___ FWV-31	___ FWV-32
MBV toggle	___ "MAN"	___ "MAN"
MBV	___ FWV-30	___ FWV-29
SUBV	___ FWV-36	___ FWV-33
Cross-tie	___ FWV-28	___ FWV-28
Suction	___ FWV-14	___ FWV-15

7.14 ___ WHEN OTSG level in available OTSGs is > 12½ in, THEN **EXIT** this enclosure.

ENCLOSURE 7 EFWP MANAGEMENT (CONT'D)

ACTIONS	DETAILS

STATUS

Any of the following exist:

- **EDG A supplying power to the A ES 4160V Bus.**
- **EFP-1 not available.**

7.15 ___ Verify AFW is available.

- ___ Verify all of the following exist:
  - ___ Neither ES 4160V Bus aligned to Alternate AC Diesel
  - ___ FWP-7 available
  - ___ CDT-1 level > 9 ft

___ IF AFW is NOT available, THEN **GO TO** Step 7.24 in this enclosure.

Facility: **Crystal River #3** Scenario No.: 4 (NRC 2009) Op-Test No.: 1

Examiners: _____ Operators: _____

_____ _____

_____ _____

Initial Conditions: The plant is at 100% power.

Turnover: The following equipment is OOS: MUP-1A (12 hours). Severe thunderstorms are predicted for Citrus and Levy counties.

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	TS (SRO)	CFT boron concentration low. (Chemistry call) SRO TS determination. (TS 3.5.1)
2	1	C (BOP)	TBP-7A trip. TBP-7B fails to auto-start. (AI-500)
3	2	R (RO)	RHV-4 closes. (AP-510)
4	N/A	N (BOP)	Swap Unit buses to Startup transformer. (AP-510) (UAT minor alarm if buses not transferred during performance of AP-510) (OP-703)
5	3	I (RO) I (SRO)	Dropped rod with automatic runback continuing through setpoint. (AP-545, AP-504, AI-505) SRO TS determination. (TS 3.1.4)
6	4	C (RO) C (BOP)	Electrical generator high temperature. Manual turbine trip required. (AP-660, AP-510)
7	5	M (ALL)	"A" OTSG steam leak in the RB following the turbine trip. Manual MFLI required. (EOP-2, EOP-5) **[CT]**
8	6	C (RO or BOP)	EFV-58 fails as is, EFV-14 fuse blows. (EOP-13, Rule 3) **[CT]**
9	7	C (RO or BOP)	MUV-73 fails to open remotely. (EOP-13, Rule 2) **[CT]**

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

Narrative Summary **NRC 2009** **Scenario #4**

The plant is at 100% power. Severe thunderstorms are predicted for Citrus and Levy counties.

Soon after turnover is complete Chemistry will call the control room with CFT boron sample results that are below TS minimum required ppm. TS 3.5.1, CFT Operability, will be referred to and the SRO should determine that the affected CFT is inoperable.

The A EHC pump (TBP-7A) will trip and the B EHC pump (TBP-7B) will fail to auto-start. The BOP will manually start TBP-7B.

RHV-4 (IV-4) will fail closed. Per OP-204, Power Operations, unit load must be reduced to $\leq$ 73% power within 15 minutes. The SRO will enter AP-510, Rapid Power Reduction, and reduce reactor power.

If auxiliary loads were not transferred to the Startup Transformer during the power reduction a Unit Aux Transformer alarm will be actuated (low oil level) requiring the BOP to transfer loads to the Startup Transformer.

Following the power reduction control rod 2-4 will drop into the core. AP-545, Plant Runback, will be entered. The automatic runback will occur as designed but will not stop at setpoint (60% reactor power). The RO, at a minimum, must take the SG/Rx Master control station to manual. The RO will probably perform the Immediate Actions of AP-504, Integrated Control System Failure, and take multiple ICS stations to hand. When the plant is stabilized OP-504, Integrated Control System, will be used to return ICS stations to automatic. The SG/Rx Master control station must remain in manual. TS 3.1.4, Condition A, should be addressed.

After ICS stations are returned to automatic (may not be returned to automatic if malfunction cannot be diagnosed) a failure will occur on the main generator cooling water control valve (SCV-12) causing main generator temperatures to rise. Per OP-701 a turbine trip is required if main generator cold gas temperature exceeds 55 degrees F. The SRO may enter AP-510, Rapid Power Reduction, dependent on current power level, to reduce reactor power below the anticipatory reactor trip setpoint (41% power) and trip the main turbine. AP-660, Turbine Trip, should be concurrently performed. Alternatively the SRO may elect to trip the reactor at this point. This option is allowable and will not detract from the scenario.

The turbine trip will cause a steam leak on the "A" OTSG inside the reactor building. RB pressure will start rising and a manual reactor trip should be initiated (if not already actuated) prior to reaching 4 psig in the RB. EOP-2, Vital System Status Verification, will be entered and a symptom scan performed. EOP-5, Excessive Heat Transfer, should be entered. Once the steam leak is confirmed a MSLI and MFLI will be performed. The MFLI will not work automatically and the operator must manually perform the actions **(CT)**.

EFIC will actuate from the HPI signal. The operator will recognize excessive EFW flow to the "A" OTSG through EFV-58. Rule 3 will be in effect and the operator will attempt to isolate flow by taking EFIC to manual and closing EFV-14 (block valve). The block valve will stroke partially in the closed direction and then the motor power fuse will blow. The operator must secure EFP-3 **(CT)** to stop EFW flow to the OTSG.

When the ES actuation occurs MUV-73 will not open from the MCB and MUP-1C will not auto-start. The operator will manually start MUP-1C. In addition, the operator must monitor MUT level and either have MUV-73 manually opened in the field, MUV-62 powered up and opened from the control room or secure MUP-1B **(CT)** prior to the MUT going empty.

This scenario may be terminated any time after actions to minimize subcooling margin have been taken.

Procedures used: (ARs not listed)

OP-204	AP-510	EOP-2
OP-402	AP-545	EOP-5
OP-504	AP-660	EOP-13
	AP-504	EOP-14

Target Quantitative Attributes – Scenario 4 – NRC 2009	Actual Attributes
1. Total Malfunctions (5-8)	7
2. Malfunctions after EOP entry (1-2)	2
3. Abnormal Events (2-4)	3
4. Major Transients (1-2)	1
5. EOPs entered requiring substantive actions (1-2)	2
6. EOP contingencies requiring substantive actions (0-2)	1
7. Critical Task (2-3)	3

SHIFT TURNOVER

A. Initial Conditions:

1. Time in core life – 300 EFPD
2. Shift: [X] Day [ ] Night
3. Rx power and power history – 100% power for 42 days
4. Boron concentration – 995 PPMB
5. Xenon – Equilibrium
6. RCS Activity - See Status Board
7. EOOS Condition – Green
8. Protected Train - B

B. Tech. Spec. Action requirement(s) in effect:

- Fire Protection Plan, Table 6.9a, for MUP-1A

C. Clearances in effect:

- MUP-1A wet alignment. Expected return to service in 12 hours.

D. Significant problems/abnormalities:

- Severe thunderstorms are predicted for Citrus and Levy counties.

E. Evolutions/maintenance for the on-coming shift:

- Maintenance to continue work on MUP-1A.

F. CRS – Instruct the ROs to walk down the main control board.

G. Required Emergency Plan Implementation

[ ] Full Implementation, including all required notifications.
[ ] Initial/upgrade classifications - internal notifications.
[X] None

INITIAL CONDITIONS

A. *"Restore" the simulator to IC #_____31____ developed for this SES.*

B. "Unfreeze" the simulator and ensure the following configuration is setup:

N/A

C. "Freeze" the simulator and enter "Exam 4" lesson plan directory:

1. Start" Lesson Plan SES #4 NRC 2009

D. "Unfreeze" the simulator and "Trigger" Setup Step(s) which will:

See Simulator lesson plan

E. Tag out the following equipment:

1. Place CIT on MUP-1A C/S in Normal After Stop

F. Additional Modifications required to the IC.

1. Ensure SPDS selected to NORM/IMB and history traces cleared and history trace selected. Also ensure "A" and "B" SPDS are properly selected for RCS Loops and Primary instruments selected.

2. Ensure SPDS on CNO/SSO/STA computers displaying correct data for IC.

3. Ensure Group 59 indicative of current reactor power.

4. Acknowledge computer and annunciator alarms.

5. Ensure proper PICS groups displayed on overhead screens.

6. Ensure Ann. Log cleared and restarted.

START DATA RECORDER

A. EVENT #1
Role Play: When directed or soon after turnover is complete notify the control room that the results of a requested boron sample for A CFT is 2200 ppm. State that this value has already been verified and is accurate.

B. EVENT #2
When directed input the EHC TBP-7A failure.
[Trigger Step #1: TBP-7A trip, TBP-7B auto-start failure]

C. EVENT #3
When directed input the RHV-4 failure.
[Trigger Step #2: RHV-4 (IV-4) Fails Closed]

D. EVENT #4
If directed (loads not transferred to Startup Transformer during AP-510) then input Unit Aux Transformer Minor Alarm
[Trigger Step #3: Unit Aux Xfmr Minor Alarm]

E. EVENT #5
When directed input the dropped control rod and runback malfunction.
[Trigger Step #4: Dropped rod and runback fails to stop]

F. EVENT #6
When directed input the hydrogen leak malfunction.
[Trigger Step #5: SWV-12 failure with rising main generator cold gas temperature]

G. EVENTs #7, 8, & 9
The remaining events are conditional based on expected plant parameters and are included in the Setup Step.

F. INSTRUCTOR ACTION
When notified by RO/BOP to open MUV-73 manually wait 3 minutes then trigger Step #5.
[Trigger Step #6: Manually open MUV-73, ramped over 3 minutes]

G. INSTRUCTOR ACTION
If notified by RO/BOP to power up MUV-62 wait 3 minutes then trigger Step #6 and report back to control room.
[Trigger Step #7: Power up MUV-62]

Role Play: If contacted as the SPO to perform EOP-14 Enclosure 1 wait ~23 minutes and report completion.
[Open Lesson Plan: Misc\Enc_1.lsn, execute and trigger]

Role Play: If contacted as the PPO to perform EOP-14 Enclosure 2 wait ~15 minutes and report completion.
[Open Lesson Plan: Misc\Enc_2.lsn, execute and trigger]

Op-Test No.: 1 Scenario No.: 4 Event No.: 1 Rev.: 02

Event Description: (Examiner Cue) Soon after turnover is complete Chemistry will notify the control room that the A CFT boron sample results show 2200 ppm. TS 3.5.1, CFT Operability, will be referred to and the SRO will determine that the A CFT is inoperable.

Time	Position	Applicant's Actions or Behavior
	SRO	• Enters TS 3.5.1, Condition A o Determines A CFT boron is less than 2270 ppm required by TS and declares the A CFT inoperable. o Restore CFT to operable status within 72 hours • May review SRO checklist for unplanned equipment status change • May discuss action plan for returning the A CFT to operable status.

Op-Test No.: 1 Scenario No.: 4 Event No.: 2 Rev.: 02

Event Description: (Examiner Cue) After the CFT TS actions are addressed the A EHC pump (TBP-7A) will trip. **[MALF]** Per AR N-6-1 the B EHC pump (TBP-7B) will be manually started.

Time	Position	Applicant's Actions or Behavior
	BOP	• Announce/acknowledge alarm o (N-6-1) EH Fluid System Trouble o Event Point 1600 o Review AR-602 o Event Point 1600 • Informs CRS of alarms • Informs CRS that TBP-7A (EHC pump) has tripped. • Starts TBP-7B and verifies that the alarm clears.
	SRO	• Acknowledges receipt of alarms • Assists RO/BOP in diagnosing failure • Concurs with BOP to start TBP-7B (EHC pump)

Op-Test No.: 1 Scenario No.: 4 Event No.: 3 Rev.: 02

Event Description: (Examiner Cue) After the EHC pump failure RHV-4 (IV-4) will fail closed. **[MALF]** Per OP-204, Power Operations, unit load must be reduced to ≤ 73% power within 15 minutes. The SRO will enter AP-510, Rapid Power Reduction, and reduce reactor power.

Time	Position	Applicant's Actions or Behavior
	BOP	• Announce/acknowledge alarm o (K-2-2) ICS NNI Trouble o Event Point 1116 AULD Trouble o Review AR-503 o Event Point 0041 Reheat Steam Non-Return Valve Trip • Informs CRS of alarms • Informs CRS that Intercept Valve 4 is closed (computer alarm) • May report power above 2609 MWth • May review OP-204 Limits and Precautions • Notifies CRS that maximum power level is 73%
	SRO	• Acknowledges receipt of alarms • Assists RO/BOP in diagnosing failure • Enters AP-510, Rapid Power Reduction • Directs RO/BOP actions per AP-510 o Adjust Load Rate to desired setpoint o Set Unit Load Demand to "10" o Notify personnel of entry into AP-510 o Maintain PZR Level (Rule 7, attached) o Notify Chemistry of power change o Verify Imbalance within limits o When power is < 80% notify SPO to ensure MS is supplying AS o Maintain DFT level between 8 and 11 feet o May determine that transfer of loads to the Startup Transformer is not required based on plant remaining online. • If MBVs close, then ensure MBVs remain closed • Directs RO/BOP to stabilize plant parameters at approximately 73% power

Op-Test No.: 1 Scenario No.: 4 Event No.: 3 Rev.: 02

Event Description: (Examiner Cue) After the EHC pump failure RHV-4 (IV-4) will fail closed. **[MALF]** Per OP-204, Power Operations, unit load must be reduced to ≤ 73% power within 15 minutes. The SRO will enter AP-510, Rapid Power Reduction, and reduce reactor power.

Time	Position	Applicant's Actions or Behavior
	RO	• Perform actions as directed by the SRO per AP-510 o Adjust Load Rate to desired setpoint o Set Unit Load Demand to "10" o Verify Imbalance within limits o Maintain DFT level between 8 and 11 feet o If MBVs close, then ensure MBVs remain closed • Stops power reduction at about 73% power (SG/Rx Master to Hand and back to Auto) • Stabilizes plant parameters
	BOP	• Perform actions as directed by the SRO per AP-510 o Notify personnel of entry into AP-510 o Maintain PZR level (Rule 7, attached) o Notify Chemistry of power change o When power is < 80% notify SPO to ensure MS is supplying AS o Maintain DFT level between 8 and 11 feet o Transfer Unit loads to the Startup Transformer if directed by the SRO.
	SRO	• Goes to OP-204, Power Operations • Directs BOP actions per OP-204
	BOP	• Perform actions as directed by the SRO per OP-204

Op-Test No.: 1 Scenario No.: 4 Event No.: 4 Rev.: 02

Event Description: If loads were NOT transferred during performance of AP-510 a Minor Aux Xfmr Alarm due to liquid level low will be inserted to require swap of Unit buses to Startup Transformer.

Time	Position	Applicant's Actions or Behavior
	BOP	• Announce/acknowledge alarm o (R-4-3) Aux Xfmr Minor Alarm o Event Point 749 o Review AR-703 o Event Point 0749 LIQUID LEVEL LO • Informs CRS of alarms • Informs CRS that Aux XFMR has a low oil level alarm
	SRO	• Direct BOP to perform OP-703, Section 4.11 to transfer the electrical loads from the Aux transformer
	BOP	• Align A 6900V bus to the Startup transformer o Select Auto Transfer 3103 to Manual o Close breaker 3103 o Open breaker 3101 • Align A Unit 4160V bus to the Startup transformer o Select Auto Transfer 3203 to Manual o Close breaker 3203 o Open breaker 3201 • Align B 6900V bus to the Startup transformer o Select Auto Transfer 3104 to Manual o Close breaker 3104 o Open breaker 3102 • Align B Unit 4160V bus to the Startup transformer o Select Auto Transfer 3204 to Manual o Close breaker 3204 o Open breaker 3202

Op-Test No.: 1 Scenario No.: 4 Event No.: 5 Rev.: 02

Event Description: (Examiner Cue) Once the plant is stable control rod 2-4 drops into the core. (**MALF**) AP-545, Plant Runback, will be entered. The automatic runback will occur as designed but will not stop at setpoint (60% reactor power) (**MALF**). The RO, at a minimum, must take the SG/Rx Master control station to manual. The crew will probably enter AP-504. When the plant is stabilized OP-504, Integrated Control System, will be used to return stations to automatic. The SG/Rx Master control station must remain in manual. TS 3.1.4, 3.1.5 & 3.1.7 should be addressed.

Time	Position	Applicant's Actions or Behavior
	RO	• Announce/acknowledge alarms o (K-4-2) Asymmetric Rod Runback o (K-6-2) Unit Master in Track o (K-5-3) FW Limited by Reactor o (J-2-3) CRD Out Inhibit o (J-2-4) CRD Asymmetric Alarm • Observes the following: o Control rod 2-4 inserted into the core o Runback in progress • Notifies SRO of dropped control rod and runback occurring as expected
	SRO	• Acknowledges dropped rod and runback in progress • Enters AP-545, Plant Runback • Directs RO/BOP actions per AP-545 o Ensures plant runback is in progress o Directs notification of plant personnel o Ensures RCS pressure is stable o Ensures reactor power $\leq$ 60% power o Ensures vital plant parameters approaching stability o Notifies Reactor Engineer o Verifies quadrant power tilt is within limits o Notifies Chemistry of power change o Ensures rod index within insertion limits o Verifies adequate SDM exists o Verifies imbalance within limits

Op-Test No.: 1 Scenario No.: 4 Event No.: 5 Rev.: 02

Event Description: (Examiner Cue) Once the plant is stable control rod 2-4 drops into the core. (**MALF**) AP-545, Plant Runback, will be entered. The automatic runback will occur as designed but will not stop at setpoint (60% reactor power) (**MALF**). The RO, at a minimum, must take the SG/Rx Master control station to manual. The crew will probably enter AP-504. When the plant is stabilized OP-504, Integrated Control System, will be used to return stations to automatic. The SG/Rx Master control station must remain in manual. TS 3.1.4, 3.1.5 & 3.1.7 should be addressed.

Time	Position	Applicant's Actions or Behavior
	BOP	• Monitors plant parameters
	RO	• Monitors plant runback • Notifies SRO that Main Block Valves are closing (unexpected) • Once MBVs are closed may take the following ICS stations to hand per AP-504. o Both FW Loop Master Stations o Both FW pump Stations o Rx Diamond o Rx Demand Station o Condensate Master Station • SG/Rx Master to Hand is the only required station to stop the power reduction • Announces current reactor power • Stabilizes plant parameters
	BOP	• Controls RCS pressure o Spray o PZR heaters o Utilizes Rule 7, PZR Level Control (attached) • Assists RO with stabilizing plant parameters

Op-Test No.: 1 Scenario No.: 4 Event No.: 5 Rev.: 02

Event Description: (Examiner Cue) Once the plant is stable control rod 2-4 drops into the core. (**MALF**) AP-545, Plant Runback, will be entered. The automatic runback will occur as designed but will not stop at setpoint (60% reactor power) (**MALF**). The RO, at a minimum, must take the SG/Rx Master control station to manual. The crew will probably enter AP-504. When the plant is stabilized OP-504, Integrated Control System, will be used to return stations to automatic. The SG/Rx Master control station must remain in manual. TS 3.1.4, 3.1.5 & 3.1.7 should be addressed.

Time	Position	Applicant's Actions or Behavior
	SRO	• Ensures OAC and BOP actions are in progress • Monitors progress via SPDS • Maintains overview of plant conditions and directs plant trip if limits are closely approached. • Once the plant is stable, holds a mini brief to ensure all crew members understand plant status • Contacts Work Control to initiate repair efforts
	CREW	• Diagnose ICS failure • If unable to diagnose failure then ICS stations should remain in hand
	SRO	• Direct RO/BOP to return ICS stations to automatic IAW OP-504, Integrated Control System • Addresses TS 3.1.4, Condition A (1 hour to verify SDM) • Addresses TS 3.1.5, Condition A (1 hour to verify SDM) • Addresses TS 3.1.7, Condition A (8 hours to verify API operable)
	RO/BOP	• ICS stations are returned to "Auto" in accordance with OP-504 (BOP will normally assist by reading OP-504)

Op-Test No.: 1 Scenario No.: 4 Event No.: 6 Rev.: 02

Event Description: (Examiner Cue) After ICS stations are returned to automatic, if applicable, a failure on SCV-12 will cause main generator temperatures to rise. **(MALF)** The SRO will probably enter AP-510, Rapid Power Reduction, to reduce reactor power below the anticipatory reactor trip setpoint (41% power) and trip the main turbine. AP-660, Turbine Trip, should be concurrently performed. Dependent upon power level and status of ICS stations the SRO may elect to manually trip the reactor when it is determined that cooling water flow can not be restored. This action is allowable and will not detract from the scenario.

Time	Position	Applicant's Actions or Behavior
	RO/BOP	• Recognize generator main generator temperatures are rising. • Announce/acknowledge alarms o Event Point 1600 o (O-5-9) Hydrogen Panel Alarm • Direct SPO to investigate the rising main generator temperatures • Notify SRO of generator temperature rise
	SRO	• Acknowledges receipt of alarms • Assists RO/BOP in diagnosing failure • *Dependent upon the current power level additional power decrease to trip the turbine may not be needed (OP-701 P&L requires turbine trip if main generator cold gas temperature exceeds 55 degrees.* • Enters AP-510, Rapid Power Reduction • Direct RO/BOP actions per AP-510 o Adjust Load Rate to desired setpoint o Set Unit Load Demand to "10" o Notify personnel of entry into AP-510 o Maintain PZR Level (Rule 7, attached) o Notify Chemistry of power change o Verify Imbalance within limits o Maintain DFT level between 8 and 11 feet • Directs BOP to trip the turbine when reactor power is below the anticipatory reactor trip setpoint (41% power).

Op-Test No.: 1 Scenario No.: 4 Event No.: 6 Rev.: 02

Event Description: (Examiner Cue) After ICS stations are returned to automatic, if applicable, a failure on SCV-12 will cause main generator temperatures to rise. **(MALF)** The SRO will probably enter AP-510, Rapid Power Reduction, to reduce reactor power below the anticipatory reactor trip setpoint (41% power) and trip the main turbine. AP-660, Turbine Trip, should be concurrently performed. Dependent upon power level and status of ICS stations the SRO may elect to manually trip the reactor when it is determined that cooling water flow can not be restored. This action is allowable and will not detract from the scenario.

Time	Position	Applicant's Actions or Behavior
	RO	• Perform actions as directed by the SRO per AP-510 o Adjust Load Rate to desired setpoint o Set Unit Load Demand to "10" o Verify Imbalance within limits o Maintain DFT level between 8 and 11 feet • Continues power reduction until within the capability of the TBVs (≈ 20% reactor power) • Stabilizes plant parameters
	BOP	• Perform actions as directed by the SRO per AP-510 o Notify personnel of entry into AP-510 o Maintain PZR level (Rule 7, attached) o Notify Chemistry of power change o Maintain DFT level between 8 and 11 feet
	SRO	• Enters AP-660, Turbine Trip • Direct BOP actions per AP-660 o Depress Main Turbine trip push button o Ensures TVs and GVs are closed o Ensures RCS pressure is stable o Notify personnel of entry into AP-660 o Ensures MS header pressure between 870 and 900 psig o Ensures main generator output breakers are open o Shutdown main generator o Ensures plant conditions stabilize o Maintain PZR level (Rule 7, attached)

Op-Test No.: 1 Scenario No.: 4 Event No.: 6 Rev.: 02

Event Description: (Examiner Cue) After ICS stations are returned to automatic, if applicable, a failure on SCV-12 will cause main generator temperatures to rise. **(MALF)** The SRO will probably enter AP-510, Rapid Power Reduction, to reduce reactor power below the anticipatory reactor trip setpoint (41% power) and trip the main turbine. AP-660, Turbine Trip, should be concurrently performed. Dependent upon power level and status of ICS stations the SRO may elect to manually trip the reactor when it is determined that cooling water flow can not be restored. This action is allowable and will not detract from the scenario.

Time	Position	Applicant's Actions or Behavior
	BOP	• Perform actions as directed by the SRO per AP-660 o Depress Main Turbine trip push button o Ensure TVs and GVs are closed o Ensure RCS pressure is stable o Notify personnel of entry into AP-660 o Ensure MS header pressure between 870 and 900 psig o Ensure main generator output breakers are open ▪ Breakers 1661 & 1662 o Shutdown main generator ▪ Open field breaker ▪ Select voltage regulator to "OFF" o Ensure plant conditions stabilize o Maintain PZR level

Op-Test No.: 1 Scenario No.: 4 Event No.: 7 Rev.: 02

Event Description: (Automatic Parameter Cue) The turbine trip will cause a steam leak on the "A" OTSG (**MALF**) inside the reactor building. (**MT**) RB pressure will start rising and a manual reactor trip should be initiated prior to reaching 4 psig in the RB. EOP-2, Vital System Status Verification, will be entered and a symptom scan performed. EOP-5, Excessive Heat Transfer, should be entered. Once the steam leak is confirmed a MSLI and MFLI will be performed. The MFLI will not work automatically (**MALF**) and the operator must manually perform the actions **(CT)**.

Time	Position	Applicant's Actions or Behavior
	CREW	• Recognize indications of a steam leak in the RB o Alarms o RB pressure and temperature increase o No RM-A6 rise o No loss of RCS inventory
	BOP	• Announce/acknowledge alarms o (B-2-5) RB Fan A Condensate High o (E-2-5) RB Fan B Condensate High o (E-3-2) Reactor Bldg Temp High • Monitors RB pressure, temperature and sump level • Verifies no rise in RM-A6 (RB radiation monitor) • Verifies no loss of RCS inventory

Op-Test No.: 1 Scenario No.: 4 Event No.: 7 Rev.: 02

Event Description: (Automatic Parameter Cue) The turbine trip will cause a steam leak on the "A" OTSG (**MALF**) inside the reactor building. (**MT**) RB pressure will start rising and a manual reactor trip should be initiated prior to reaching 4 psig in the RB. EOP-2, Vital System Status Verification, will be entered and a symptom scan performed. EOP-5, Excessive Heat Transfer, should be entered. Once the steam leak is confirmed a MSLI and MFLI will be performed. The MFLI will not work automatically (**MALF**) and the operator must manually perform the actions **(CT)**.

Time	Position	Applicant's Actions or Behavior
	SRO	• Acknowledges receipt of alarms • Assists the RO/BOP in diagnosing the failure • Directs the RO to trip the reactor prior to 4 psig RB pressure • Enters EOP-2, Vital System Status Verification • Direct RO actions per EOP-2 o Depress the Rx trip pushbutton o Verify CRD groups 1 through 7 are fully inserted o Verify NIs indicate Rx is shutdown o Depress Main Turbine trip pushbutton o Verify TVs and GVs are closed • Direct formal Symptom Scan with RO and BOP o Check for Station Black Out o Check for Adequate Sub Cooling Margin o Check for Inadequate Heat Transfer o Check for Excessive Heat Transfer o Check for OTSG Tube Rupture • Directs BOP to determine faulted OTSG and isolate
	RO	• When the Rx is tripped, performs EOP-2, Immediate Actions, from memory o Depresses Rx Trip pushbutton o Verifies Groups 1 thru 7 rod inserted o Verifies NIs indicate Rx is shutdown o Depress Turbine Trip pushbutton o Verifies all TVs and GVs are closed • Re-performs EOP-2, Immediate Actions, as directed by SRO

Op-Test No.: 1 Scenario No.: 4 Event No.: 7 Rev.: 02

Event Description: (Automatic Parameter Cue) The turbine trip will cause a steam leak on the "A" OTSG (**MALF**) inside the reactor building. (**MT**) RB pressure will start rising and a manual reactor trip should be initiated prior to reaching 4 psig in the RB. EOP-2, Vital System Status Verification, will be entered and a symptom scan performed. EOP-5, Excessive Heat Transfer, should be entered. Once the steam leak is confirmed a MSLI and MFLI will be performed. The MFLI will not work automatically (**MALF**) and the operator must manually perform the actions **(CT)**.

Time	Position	Applicant's Actions or Behavior
	CREW	• Perform symptom scan o Station Blackout o Inadequate SCM o Inadequate Heat Transfer o Excessive Heat Transfer o SG Tube Rupture • Determine that Excessive Heat Transfer symptom exists and enters EOP-5, Excessive Heat Transfer • Recognize that Rule 2, HPI Control and Rule 3, EFW Control are in effect (attached)
	BOP	• Depresses Global Silence pushbutton • **Isolates the "A" OTSG (CT)** • Recognizes that MFLI did not occur and performs the following: o Selects close FWV-31 (block valve) o Selects close FWV-30 (block valve) o Selects close FWV-36 (block valve) o Selects close FWV-28 (cross-tie valve) o Selects close FWV-14 (MFWP suction valve) o Trips FWP-2A (MFWP) • Notifies SRO of MFLI automatic isolation failure

Op-Test No.: 1 Scenario No.: 4 Event No.: 8 Rev.: 02

Event Description: (Automatic Parameter Cue) EFIC will actuate from the HPI signal. The operator will recognize excessive EFW flow to the "A" OTSG through EFV-58. Rule 3 will be in effect and the operator will attempt to isolate flow by taking EFIC to manual and closing EFV-14 (block valve). The block valve will stroke partially in the closed direction and then the motor power fuse will blow. **[MALF]** The operator must secure EFP-3 **(CT)** to stop EFW flow to the OTSG.

Time	Position	Applicant's Actions or Behavior
	SRO	• Enters EOP-5, Excessive Heat Transfer • Direct RO/BOP actions per EOP-5 o Isolate affected OTSGs ▪ Depress MSLI and MFLI push buttons ▪ Ensure FW sources and leak paths are closed ▪ If any affected EFIC control valve fails to close then select Manual Permissive and close the associated block valve. • EFV-58 (A train, A OTSG control valve) • EFV-14 (A train, A OTSG block valve) o Ensure ES equipment is properly aligned ▪ If RBIC has actuated and adequate SCM exists, then stop all RCPs o Maintain PZR level (Rule 7, attached) o Notify personnel of entry into EOP-5 o If RCS temp remains < 532° F then start RCS boration o Ensure proper MSLI and MFLI o Notify Chemistry to sample for tube leakage o Verify proper CC cooling o Ensure level in available OTSG trending to correct level o Minimize RCS temperature changes o Minimize RCS pressure changes o Verify OTSG tube leakage ≤ 1 gpm o Ensure MSR HP bundle isolation valves are closed o Bypass ES if permit exists o Maintain minimum adequate SCM

Op-Test No.: 1 Scenario No.: 4 Event No.: 8 Rev.: 02

Event Description: (Automatic Parameter Cue) EFIC will actuate from the HPI signal. The operator will recognize excessive EFW flow to the "A" OTSG through EFV-58. Rule 3 will be in effect and the operator will attempt to isolate flow by taking EFIC to manual and closing EFV-14 (block valve). The block valve will stroke partially in the closed direction and then the motor power fuse will blow. **[MALF]** The operator must secure EFP-3 **(CT)** to stop EFW flow to the OTSG.

Time	Position	Applicant's Actions or Behavior
	RO/BOP	• Performs Rule 3, EFW/AFW Control o Attempts to close EFV-58 (A train, A OTSG control valve) • Determines that EFW flow is not controlled and depresses "Manual Permissive" on both channels o Selects close EFV-14 (A train, A OTSG block valve) • Recognizes that EFV-14 did not fully close o Amber light only o Flow indication on EF-25-FI1 • Requests permission from SRO to secure EFP-3 • **Secures EFP-3 (CT)** • Ensure ES equipment is properly aligned o If RBIC has actuated and adequate SCM exists, then stop all RCPs • Maintain PZR level (Rule 7, attached) • Notifies personnel of entry into EOP-5 • If RCS temp remains < 532° F then start RCS boration • Ensures proper MSLI and MFLI • Notify Chemistry to sample for tube leakage • Verify proper CC cooling • Minimizes RCS temperature changes • Minimizes RCS pressure changes • Verifies OTSG tube leakage ≤ 1 gpm • Ensures MSR HP bundle isolation valves are closed • Maintains minimum adequate SCM o PZR Spray o PORV

Op-Test No.: 1 Scenario No.: 4 Event No.: 9 Rev.: 02

Event Description: (Automatic Parameter Cue) When the ES actuation occurs MUV-73 will not open from the MCB. (**MALF**) The operator must monitor MUT level and either have MUV-73 manually opened in the field or secure MUP-1B **(CT)** prior to the MUT going empty.

Time	Position	Applicant's Actions or Behavior
	SRO	• Directs the RO/BOP to ensure all ES equipment is properly aligned
	RO/BOP	• Performs Rule 2, HPI Control (attached) • Verifies all ES components are operating via the actuation light indications (green) for ES actuated equipment. o Recognizes MUV-73 still closed (BWST suction valve for MUP-1B) o Attempts to open MUV-73 manually o Recognizes MUP-1C is not running o Starts MUP-1C o Notifies SRO of malfunction with MUV-73 and MUP-1C o Directs PPO to manually open MUV-73 o Monitors MUT level • **Secures MUP-1B, opens MUV-73 (or opens MUV-62) prior to loss of suction (CT)**

Scenario may be terminated any time after actions to minimize subcooling margin have been taken.

RULE 1, LOSS OF SCM

- ___ IF < 1 min has elapsed since losing adequate SCM, THEN immediately stop all RCPs.

- ___ IF RCPs were NOT stopped within 1 min, THEN ensure all operating RCPs remain running until any of the following exist:

  ___ SCM is restored

  ___ LPI flow > 1400 gpm in each injection line.

- ___ Progress toward a maximum plant cooldown to achieve CFT and LPI flow as soon as possible.

- ___ Manually actuate ES.

- ___ Depress "HPI MAN ACT" push buttons on Trains A and B.

- ___ Depress "RB ISO MAN ACTUATION" push buttons on Trains A and B.

- ___ IF LPI has NOT actuated, AND RCS PRESS ≤ 300 psig, THEN depress "LPI MAN ACT" push buttons on Trains A and B.

- ___ Depress "ISCM" push buttons for EFIC channels A and B.

- ___ Ensure Tincore is selected on SPDS.

RULE 2, HPI CONTROL

- ___ IF HPI has actuated, THEN bypass or reset ES actuation.

1 ___ Obtain SRO concurrence to bypass or reset ES.

2 Bypass or reset ES actuation:

___ Auto

___ Manual

- ___ Open MUP recirc prior to throttling HPI flow < 200 gpm/pump.

- ___ IF recirc to MUT is desired, THEN open MUP recirc to MUT valves:

___ MUV-53	___ MUV-257

- ___ IF recirc to RB sump is desired, THEN open HPI recirc to sump valves:

___ MUV-543	___MUV-544
___ MUV-545	___ MUV-546

- ___ IF adequate SCM exists based, on Tincore, THEN throttle HPI to maintain required conditions.

- ___ Prevent exceeding NDT limit
- ___ IF OTSG isolated for TRACC, THEN maintain RCS PRESS <1000 psig.
- ___ IF PTS, SGTR, or dry OTSG exists, THEN maintain minimum adequate SCM.

- ___ IF adequate SCM can be maintained with 1 HPI pump, AND stopping second HPI pump is desired, THEN stop 1 HPI pump.

- ___ Ensure running HPI pump is aligned to MUT.

RULE 3, EFW/AFW CONTROL

- ___ Ensure available OTSGs are at or trending toward required level.

"LLL"	> 20 in
"NAT CIRC"	> 70%
"ISCM"	> 90%

- ___ IF manual control of EFW flow is desired,
  THEN establish manual EFIC control.

1 ___ Obtain SRO concurrence to place EFIC in manual.

2 ___ Control EFW to maintain required EFW flow and OTSG level.

3 ___ IF EFW flow is NOT controlled,
THEN depress EFIC channels A and B "MANUAL PERMISSIVE" push buttons and close affected EFW block valve.

- ___ IF adequate SCM does NOT exist,
  AND level in available OTSGs is NOT at or trending toward "ISCM" level,
  THEN establish manual required flow.

EFW	2 OTSGs	> 280 gpm in 1 line to each OTSG
	1 OTSG	> 470 gpm in 1 line to 1 OTSG
AFW	2 OTSGs	> 250 gpm to < 300 gpm/OTSG
	1 OTSG	> 450 gpm to < 600 gpm

- ___ IF adequate SCM exists,
  THEN throttle flow to prevent OTSG PRESS from lowering > 100 psig below desired PRESS.

- Do not allow OTSG level to lower.

RULE 4, PTS

- ___ IF any of the following exist:

  ___ Tincore < 400°F,
  AND cooldown rate
  exceeds ITS limit

  ___ RCPs off,
  AND HPI flow exists

  THEN perform required PTS actions.

- ___ Throttle HPI flow to minimize adequate SCM.
- ___ Throttle LPI flow to minimize adequate SCM.
- ___ PTS is applicable until an Engineering evaluation has been completed.

RULE 7, PZR LEVEL CONTROL

1 ___ IF PZR level is < PZR level band,
THEN restore PZR level.

PZR Level Band	
Rx at power > 20%	200 in to 240 in
Rx at power ≤ 20%	120 in to 200 in
Rx tripped	50 in to 120 in

- Cycle appropriate BWST to MUP valve to maintain MUT level ≥ 55 in:

___ MUV-73	___ MUV-58

- ___ Close MUV-49

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2 ___ IF PZR level does NOT recover,
THEN establish manual HPI flow.

1 ___ Open MUV-24

2 ___ Notify SSO to evaluate Emergency Plan entry.

3 ___ IF PZR level does NOT recover,
THEN start second MUP and required cooling pumps.

[Rule 5, Diesel Load Control]

4 ___ IF PZR level does NOT recover,
THEN open additional HPI valves.

5 ___ IF PZR level does NOT recover,
THEN close MUP to MUT recircs:

___ MUV-53	___ MUV-257

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3 ___ IF PZR level recovers,
THEN restore normal PZR conditions.

[Rule 2, HPI Control]

- ___ IF letdown is desired,
THEN **CONCURRENTLY PERFORM** EOP-14, Enclosure 4, Letdown Recovery (if accessible).

Facility: **Crystal River #3** Scenario No.: Spare (NRC 2009) Op-Test No.: 1

Examiners: _____ Operators: _____

_____ _____

_____ _____

Initial Conditions: The plant is at 100% power.

Turnover: The following equipment is OOS: DHP-1A (12 hours); MUP-1A (12 hours) and RWP-1 (24 hours). Severe thunderstorms are predicted for Citrus and Levy counties.

Event No.	Malf. No.	Event Type*	Event Description
1	1	C (BOP) C (SRO)	MUP-1B sheared shaft. (OP-402) SRO TS determination. (TS 3.5.2)
2	NA	N (BOP)	Restore Seal Injection, Letdown and PZR level. (OP-402)
3	2	C (BOP) C (SRO)	AHF-1A high vibration, then trip. (OP-417) SRO TS determination. (TS 3.6.6)
4	3	R (RO)	40 gpm "A" OTSG tube leak. Rapid power reduction. (EOP-6)
5	4	I (RO)	*ULD* station fails "as is" during power decrease. (OP-504)
6	N/A	N (BOP)	Transfer buses to Startup Transformer. (EOP-14)
7	5	M (RO)	Two MSIVs close at 70% power / manual reactor trip (AI-505, EOP-2) **[CT]**
8	6	C (RO)	One TV and one GV fail to close when Rx tripped requiring closure of remaining two MSIVs. (EOP-2) **[CT]**
9	7	M (ALL)	Tube leak increases to 330 gpm when the Rx is tripped. (EOP-6)
10	8	C (RO or BOP)	RCV-14, PZR spray valve, failed closed requiring use of PORV to reduce SCM. (EOP-6)

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

Plant is initialized at 100% power. Severe thunderstorms are predicted for Citrus and Levy counties.

Soon after turnover is complete MUP-1B will experience a sheared shaft. OP-402, Makeup and Purification System, will be used to start MUP-1C. Section 4.6, System Restoration after MU Pump Trip, is a much easier section to use for this failure, however use of Section 4.5, MU Pump Transfer, is allowable. The crew should start MUP-1C and restore PZR level, Seal Injection and Letdown. ITS 3.5.2, Condition A, should be addressed.

After the plant has been stabilized AHF-1A will experience high vibration due to a failing bearing. The fan will trip after one minute if not already secured. TS 3.6.6, Condition C, will be entered. OP-417, Containment Operating Procedure, will be used to select AHF-1C for ES start.

After AHF-1C is selected for ES start and TS actions are addressed a 36 gpm SGTR develops on the "A" OTSG. Crew diagnoses the tube leak using MS line monitor increase, RM-A12 indication and RCS leak rate determination. EOP-6 will be entered and a power reduction commenced.

At approximately 95% power ULD station output will fail "as is". The RO will diagnose the problem and receive permission from the SRO to lower power in manual using the SG/RX master station.

At approximately 70% power two MSIVs close (opposite OTSGs). A manual reactor trip is required per AI-505 **(CT)**. Immediate actions of EOP-2 are performed. During the Immediate Actions, one TV and one GV will be found open. The RO will have to close the remaining two MSIVs **(CT).** The Immediate Actions will then be verified and a symptom scan performed. Due to the trip the SGTR increases to ≈ 330 gpm. After the symptom scan is performed the SRO should return to the beginning of EOP-6 and start a plant cooldown and depressurization.

Since all MSIVs are closed TBVs are lost requiring steaming to atmosphere. Emergency Plan upgrade should be recognized but classification is not required.

When RCS depressurization is attempted RCV-14 (spray valve) fails to open. Crew should use the PORV to decrease subcooling margin.

The scenario may be terminated when SCM is minimized and a plant cooldown has commenced.

Procedures used: (ARs not listed)

OP-402	AP-510	EOP-2
OP-417		EOP-6
OP-504	AI-505	EOP-13
		EOP-14

Target Quantitative Attributes – Spare Scenario – NRC 2009	Actual Attributes
1. Total Malfunctions (5-8)	8
2. Malfunctions after EOP entry (1-2)	2
3. Abnormal Events (2-4)	2
4. Major Transients (1-2)	1
5. EOPs entered requiring substantive actions (1-2)	1
6. EOP contingencies requiring substantive actions (0-2)	1
7. Critical Task (2-3)	2

SHIFT TURNOVER

A. Initial Conditions:

1. Time in core life – 300 EFPD
2. Shift: [X] Day [ ] Night
3. Rx power and power history – 100% for 40 days
4. Boron concentration – 992 ppmb
5. Xenon – Equilibrium @ -2.4% ΔK/K
6. RCS Activity - See Status Board
7. EOOS condition: Yellow
8. Protected Train - B

B. Tech. Spec. Action requirement(s) in effect:

- TS 3.5.2, Condition A, for DHP-1A. Condition entered 12 hours ago.
- TS 3.3.17, Condition A, Function 23, for LPI Pump Run Status lights. Condition entered 12 hours ago.
- Fire Protection Plan, Table 6.9A, for MUP-1A

C. Clearances in effect:

- DHP-1A for breaker fuse block replacement. Expected return to service in 4 hours.
- MUP-1A shaft replacement due to high vibration. Expected return to service in 24 hours.
- RWP-1 for impellor replacement. Expected return to service in 4 hours.

D. Significant problems/abnormalities:

- Severe thunderstorms are predicted for Citrus and Levy counties.

E. Evolutions/maintenance for the on-coming shift:

- Continue power operations.
- Maintenance to continue work on DHP-1A, MUP-1A and RWP-1.

F. CRS – Instruct the ROs to walk down the main control board.

G. Required Emergency Plan Implementation

[ ] Full Implementation, including all required notifications.
[ ] Initial/upgrade classifications - internal notifications.
[X] None

Examination Setup/Execution
Spare Scenario

INITIAL CONDITIONS

A. *"Restore" the simulator to IC#___31____ developed for this SES.*

B. "Unfreeze" the simulator and perform the following:

1. Start RWP-2A running
2. Stop RWP-1

C. "Freeze" the simulator and enter Exam 4 lesson plan directory.

1. "Start" Lesson Plan SES Spare NRC-2009

D. "Unfreeze" the simulator and "Trigger" Setup Step(s) which will:

See Simulator lesson plan

E. Tag out the following equipment:

1. Place CIT on DHP-1A C/S in Normal After Stop
2. Place CIT on MUP-1A C/S in Normal After Stop
3. Place CITs on MUP-2A & 3A C/S in Normal After Stop
3. Place CITs on MUP-4A & 5A C/S in Stop
4. Place CIT on RWP-1 C/S in Normal After Stop

F. Additional Modifications required to the IC.

1. Ensure SPDS selected to NORM/IMB and history traces cleared and history trace selected. Also ensure "A" and "B" SPDS are properly selected for RCS Loops and Primary instruments selected.

2. Ensure SPDS on CNO/SSO/STA computers displaying correct data for IC.

3. Ensure Group 59 indicative of current reactor power.

4. Acknowledge computer and annunciator alarms.

5. Ensure proper PICS groups displayed on overhead screens.

G. Freeze the simulator and notify the lead examiner.

RESTORE AHF-1C "COOLING WATER ISOLATED" AND "ES SELECTED" TAGS

START DATA RECORDER

A. EVENT #1
When directed input the MUP-1B failure.
[Trigger Step #1: MUP-1B sheared shaft]

Role Play: When directed as PPO to energize MUV-62 and MUV-69 wait two minutes, then trigger Step 2 and report back to control room that the breakers are closed.
[Trigger Step #2: Instructor Action – Energize MUV-62 and MUV-69]

B. EVENT #2 – Normal Evolution

C. EVENT #3
When directed input the AHF-1A failure.
[Trigger Step #3: AHF-1A high vibration – trips in one minute if not secured]

Role Play: When directed as PPO manipulate SW valves and report back to control room.

D. EVENT #4
When directed initiate the ~40 gpm "A" SGTR.
[Trigger Step #4: "A" OTSG Tube Leak, 40 gpm]

E. EVENT #5
When directed or at 95% power ULD demand fails "as is".
[Trigger Step #5: ULD demand fails "as is"]
NOTE: ULD demand failure is set for 95% power. If failure is input more than 2% from expected (95% power) then failure value must be adjusted to new power level prior to input.

F. EVENT #6 – Normal evolution
Transfer buses to SUT. No booth actions.

G. EVENTS #7, #8 & #9
When directed or at 70% power two MSIVs close requiring a manual reactor trip. One TV and one GV will not close following the turbine trip. Tube leak increases to ~330 gpm.
[Trigger Step #6: Two MSIVs close, tube leak increases to 330 gpm, one TV and one GV fail to close]

H. EVENT #10

When crew attempts to open RCV-14 to minimize SCM RCV-14 will not open. Crew will have to use the PORV to control SCM.

Note: RCV-14 failure is conditional based on Rx power and was triggered during the setup step.

Role Play: If contacted as the SPO to perform EOP-14 Enclosure 1 wait ~23 minutes and report completion.
[Open Lesson Plan: Misc\Enc_1.lsn, execute and trigger]

Role Play: If contacted as the PPO to perform EOP-14 Enclosure 2 wait ~15 minutes and report completion.
[Open Lesson Plan: Misc\Enc_2.lsn, execute and trigger]

Op-Test No.: 1 Scenario No.: Spare Event No.: 1/2 Rev.: 0

Event Description: (Examiner Cue) Soon after turnover is complete MUP-1B will experience a sheared shaft. (**MALF**) OP-402, Makeup and Purification System, will be used to start MUP-1C. Section 4.6, System Restoration after MU Pump Trip, is a much easier section to use for this failure, however use of Section 4.5, MU Pump Transfer, is allowable. The crew should start MUP-1C and restore PZR level, Seal Injection and Letdown. ITS 3.5.2, Condition B, should be addressed.

Time	Position	Applicant's Actions or Behavior
	BOP	• Announce/acknowledge alarms o (B-6-2) Makeup PP B Gear Oil Press Low o (H-5-7) RC Pump Seal Flows High/Low • Informs SRO of the following: o Auto-start of MUP-5B o Low current indication on MUP-1B (≈ 30%) o Seal injection flow indication at 0 gpm o Makeup flow indication at 0 gpm
	SRO	• Acknowledges receipt of alarms • Directs BOP to secure MUP-1B • May direct BOP to isolate letdown • May direct BOP to have DC knife switch for MUP-1B opened • Directs BOP to start MUP-1C IAW OP-402, Makeup and Purification System • Addresses TS 3.5.2, Condition B, and declares MUP-1B inoperable (72 hours to repair)

Op-Test No.: 1 Scenario No.: Spare Event No.: 1/2 Rev.: 0

Event Description: (Examiner Cue) Soon after turnover is complete MUP-1B will experience a sheared shaft. (**MALF**) OP-402, Makeup and Purification System, will be used to start MUP-1C. Section 4.6, System Restoration after MU Pump Trip, is a much easier section to use for this failure, however use of Section 4.5, MU Pump Transfer, is allowable. The crew should start MUP-1C and restore PZR level, Seal Injection and Letdown. ITS 3.5.2, Condition B, should be addressed.

Time	Position	Applicant's Actions or Behavior
	BOP	• Performs OP-402, Section 4.6 o Closes MUV-16 (Seal Injection control valve) o Closes MUV-31 (PZR level control valve) o Closes MUV-50 (letdown control valve) o Closes MUV-51 (letdown control valve) o Observes RCP parameters o Directs the PPO to energize MUV-62 and MUV-69 o Closes MUV-58 (BWST to MUP-1C iso valve) o Closes MUV-69 (MUP cross-tie valve) o Opens MUV-62 (MUP cross-tie valve) o Opens MUV-73 (BWST to MUP-1B iso valve) o Starts MUP-4C (MUP-1C gear oil pump) o Starts DCP-1B (cooling water pump) o Starts RWP-3B (cooling water pump) o Starts MUP-1C o Places MUP-4C to auto o Restores makeup and letdown flow ▪ Places MUV-31 in auto ▪ Performs section 4.15 (attached) o Slowly re-establishes Seal Injection flow ▪ Throttle MUV-16 to obtain 12 gpm over 2 minutes ▪ Ensure CBO valves open (MUV-253, 258, 259, 260 & 261) ▪ Throttle MUV-16 to obtain 24 gpm ▪ Throttle MUV-16 to obtain 36 gpm ▪ Place MUV-16 in auto o Directs the PPO to de-energize MUV-62 and MUV-69 o Notifies SRO to review Tech Specs

Op-Test No.: 1 Scenario No.: Spare Event No.: 1/2 Rev.: 0

Event Description: (Examiner Cue) Soon after turnover is complete MUP-1B will experience a sheared shaft. (**MALF**) OP-402, Makeup and Purification System, will be used to start MUP-1C. Section 4.6, System Restoration after MU Pump Trip, is a much easier section to use for this failure, however use of Section 4.5, MU Pump Transfer, is allowable. The crew should start MUP-1C and restore PZR level, Seal Injection and Letdown. ITS 3.5.2, Condition B, should be addressed.

Time	Position	Applicant's Actions or Behavior
	SRO	• Once the plant is stable, holds a mini brief to ensure all crew members understand plant status • Contacts Work Control to initiate repair efforts • May review the SRO checklist for unplanned equipment status changes

Op-Test No.: 1 Scenario No.: Spare Event No.: 3 Rev.: 0

Event Description: (Examiner Cue) After the plant has been stabilized AHF-1A will experience high vibration due to a failing bearing **[MALF]**. The fan will trip after one minute if not already secured. TS 3.6.6, Condition C, will be entered. OP-417, Containment Operating Procedure, will be used to select AHF-1C for ES start.

Time	Position	Applicant's Actions or Behavior
	BOP	• Announce/acknowledge alarms o (B-2-4) "RB Fan A Vibration High" o Reviews AR-302 • Notifies SRO of malfunction • May attempt to reset alarm • May recommend securing fan
	SRO	• May direct BOP to secure AHF-1A • Directs BOP to start AHF-1C using OP-417 • Enters TS 3.6.6, Condition C, for one required containment cooling train inoperable (7 days to restore) • Contacts Work Control to initiate repair efforts • May review SRO checklist for unplanned equipment status change
	BOP	• Uses OP-417, Section 4.7, to perform the following: o Notifies PPO to seal closed SWV-36 (field action) o Selects AHF-1C using the "RB Fan ES A Select" switch in ES Act Relay Cabinet 4D o Notifies SRO to review TS 3.6.6 o Notifies PPO to seal open SWV-105 (field action) o Ensures open SWV-39 and SWV-45 (cooling water inlet and outlet valves) o Starts AHF-1C

Op-Test No.: 1 Scenario No.: Spare Event No.: 4 Rev.: 0

Event Description: (Examiner Cue) After AHF-1C is selected for ES start and TS actions are addressed a 36 gpm SGTR develops on the "A" OTSG **[MALF]**. Crew diagnoses the tube leak using MS line monitor increase, RM-A12 indication and RCS leak rate determination. EOP-6 will be entered and a power reduction commenced.

Time	Position	Applicant's Actions or Behavior
	BOP	• Announce/acknowledge alarms o (H-1-5) "MN Stm Line A/B High Rad Monitor Fail" • Diagnoses OTSG tube leak o RM-G27 in Hi/Hi alarm o Mismatch between makeup and letdown o SPDS shows RM-G27 at 100 GPD o Monitors RM-A12 • Perform leak rate calculation
	RO	• Assists BOP with diagnosing tube leak • Monitors SPDS • Verifies PZR level is being maintained • Performs backup leak calculation
	SRO	• Assist RO/BOP in diagnosing the tube leak. • Enters EOP-06 if leakage is reported > 1GPM and directs RO/BOP actions o Maintains PZR level, Rule 7 (attached) o Directs adjustment of ICS load rate o Directs adjustment of Unit Load Master to 10 o Directs RO to trip Rx if PZR level goes < 100" o Direct BOP to make a PA announcement, inform SPO/PPO of EOP-06 entry o Verifies affected OTSG o Directs closure of MSV-55 (A OTSG steam to EFP-2) • Recognize E-plan entry conditions are met (not required to classify at this time)

Op-Test No.: 1 Scenario No.: Spare Event No.: 4 Rev.: 0

Event Description: (Examiner Cue) After AHF-1C is selected for ES start and TS actions are addressed a 36 gpm SGTR develops on the "A" OTSG **[MALF]**. Crew diagnoses the tube leak using MS line monitor increase, RM-A12 indication and RCS leak rate determination. EOP-6 will be entered and a power reduction commenced.

Time	Position	Applicant's Actions or Behavior
	BOP	• Perform actions as directed by the SRO per EOP-6 o Make PA announcement, inform SPO/PPO of EOP-06 entry o Verifies affected OTSG ▪ Closes MSV-55 (A OTSG steam to EFP-2)
	RO	• Perform actions as directed by the SRO per EOP-6 o Maintains PZR level, Rule 7 (attached) o Adjusts of ICS load rate o Adjusts Unit Load Master to 10

Op-Test No.: 1 Scenario No.: Spare Event No.: 5/6 Rev.: 0

Event Description: (Examiner Cue) Power reduction is started per EOP-6. Initially the ULD station will be used for the power reduction. The ULD station output will fail "as is" at approximately 95% power **[MALF].** The RO will diagnose the problem and receive permission from the SRO to decrease power in manual using the SG/RX master station. BOP will transfer Unit buses to the Startup Transformer.

Time	Position	Applicant's Actions or Behavior
	SRO	• Directs RO/BOP actions IAW EOP-6 • Assists RO in diagnosing ULD failure • Directs RO to continue the power reduction with the SG/RX Master in Hand o When power is < 80% notify SPO to ensure MS is supplying AS o Maintain DFT level between 8 and 11 feet o Verify Aux Transformer is not supplying any bus ▪ Directs BOP to perform EOP-14, Enclosure 23 o Concurrently performs EOP-14, Enclosure 17
	RO	• Perform actions as directed by the SRO per EOP-6 • At approximately 95% power recognizes power reduction is not in progress when plant quits responding • Informs the SRO of failure • Takes SG/RX master to hand and continue power reduction • Monitors o RCS Tave o "A" and "B" FW flows o Turbine Setter/Reference • Maintains DFT level between 8 and 11 feet
	BOP	• Performs EOP-14, Enclosure 23 o Selects AUTO Transfer switches for breakers 3103, 3203, 3104 and 3204 to Manual o Closes breaker 3103/opens breaker 3101 o Closes breaker 3203/opens breaker 3201 o Closes breaker 3104/opens breaker 3102 o Closes breaker 3204/opens breaker 3202

Op-Test No.: 1 Scenario No.: Spare Event No.: 7/8/9 Rev.: 0

Event Description: (Examiner Cue) At approximately 70% power 2 MSIVs close **[MT]** which requires a manual reactor trip **(CT).** The SGTR increases to approximately 330 gpm (triggered by the reactor trip). When the Rx is tripped, one TV and one GV do not close, **[MALF]** requiring the closure of the remaining two MSIVs. **(CT)** Plant cooldown commences per EOP-6. TBVs are unavailable due to MSIV closure.

Time	Position	Applicant's Actions or Behavior
	RO	• Announces and responds to alarms o (H-5-3) "Main Steam Iso Vlv Air Failure" o SV1/SV2 lights flashing intermittently • Announce MSIV closures as they occur • **Manually trips the reactor due to the closure of 2 MSIVs (CT)** • Performs Immediate Actions of EOP-2 from memory o Depress Rx Trip pushbutton o Verify Groups 1-7 fully inserted o Verifies NIs indicate the Rx is shutdown o Depresses Turbine Trip pushbutton o Verifies all TVs and GVs Closed ▪ Notes 1 TV and 1 GV NOT closed ▪ **Closes the remaining two MSIVs (CT)** ▪ Report failure of 1 TV and 1 GV to close ▪ Report completion of EOP-02 Immediate Actions • Perform EOP-02 Immediate Action verification with SRO

Op-Test No.: 1 Scenario No.: Spare Event No.: 7/8/9 Rev.: 0

Event Description: (Examiner Cue) At approximately 70% power 2 MSIVs close **[MT]** which requires a manual reactor trip **(CT).** The SGTR increases to approximately 330 gpm (triggered by the reactor trip). When the Rx is tripped, one TV and one GV do not close, **[MALF]** requiring the closure of the remaining two MSIVs. **(CT)** Plant cooldown commences per EOP-6. TBVs are unavailable due to MSIV closure.

Time	Position	Applicant's Actions or Behavior
	RO/BOP	• Performs Symptom Scan o Verifies No Station Blackout o Verifies No Inadequate Subcooling Margin o Verifies No Inadequate Heat Transfer o Verifies No Excessive Heat Transfer o Verifies Increased OTSG Tube Leakage • Diagnoses rise in OTSG tube leakage • Informs SRO of increased leakage • Performs follow-up actions of EOP-6 o Maintains PZR level per Rule 7 (attached) ▪ Open MUV-58 (BWST to MUP-1C) ▪ Close MUV-49 (letdown isolation) ▪ Open MUV-24 (HPI nozzle) ▪ Open MUV-23, 25, and 26 if necessary (HPI nozzles) ▪ Close MUV-53 and 257 if necessary (MUP recircs) o Verifies MSSVs are closed ▪ Controls OTSG pressure using ADVs o Check closed MSV-55 o Verifies proper CC cooling ▪ Places CC ventilation in emergency recirc ▪ Verifies CC chiller running ▪ EOP-14, Enclosure 17 attached o Sets MUV-31 to 100 inches o Selects all PZR heaters to "Off" o Bypasses ES if a permit exists

Op-Test No.: 1 Scenario No.: Spare Event No.: 7/8/9 Rev.: 0

Event Description: (Examiner Cue) At approximately 70% power 2 MSIVs close **[MT]** which requires a manual reactor trip **(CT).** The SGTR increases to approximately 330 gpm (triggered by the reactor trip). When the Rx is tripped, one TV and one GV do not close, **[MALF]** requiring the closure of the remaining two MSIVs. **(CT)** Plant cooldown commences per EOP-6. TBVs are unavailable due to MSIV closure.

Time	Position	Applicant's Actions or Behavior
	SRO	• Enters EOP-2 and verifies Immediate Actions are complete o Rx Trip pushbutton depressed o Group 1-7 rods inserted o NIs indicate Rx sutdown o Turbine Trip pushbutton depressed o All TVs and GV closed (One TV and one GV not closed) ▪ Verifies all MSIVs are closed • Directs Symptom scan o Verifies No Station Blackout o Verifies No Inadequate Subcooling Margin o Verifies No Inadequate Heat Transfer o Verifies No Excessive Heat Transfer o Verifies Increased OTSG tube leakage and transitions to EOP-06 • Assist ROs in diagnosing rise in OTSG tube leakage • Transitions to beginning of EOP-6 and directs ROs actions o Maintains PZR level per Rule 7 (attached) ▪ Open MUV-58 (BWST to MUP-1C) ▪ Close MUV-49 (letdown isolation) ▪ Open MUV-24 (HPI nozzle) ▪ Open MUV-23, 25, and 26 if necessary (HPI nozzles) ▪ Close MUV-53 and 257 if necessary (MUP recircs) o Verifies MSSVs are closed ▪ Controls OTSG pressure using ADVs o Directs closure of MSV-55 o Verifies MSSVs are closed o Verifies proper CC cooling o Select all PZR heaters to "Off" o Bypass ES if a bypass permit exists • Recognizes E-plan actions need to be taken (HPI valve open, steaming to atmosphere with a tube leak)

Op-Test No.: 1 Scenario No.: Spare Event No.: 10 Rev.: 0

Event Description: When RCS pressure reduction is required per EOP-06, RCV-14 (spray valve) fails to open **[MALF]**. Procedural guidance is provided to use the PORV to minimize SCM.

Time	Position	Applicant's Actions or Behavior
	RO/BOP	• Attempts to open RCV-14 to minimize SCM as directed o Diagnoses failure of RCV-14 to open (PZR Spray valve) • Cycles the PORV to minimize SCM as directed • Controls SCM within band • Controls HPI flow, Rule 2 (attached) • Starts of RCS boration o Ensures post-filter(s) in service o Opens CAV-60 (boration valve) o Starts CAP-1A or 1B • Starts RCS cooldown within normal limits on both OTSGs using ADVs
	SRO	• Directs ROs to maintain minimum subcooling margin with a target value of 15 degrees (will probably give a band to maintain of 10 to 20 degrees) o Directs RO to open RCV-14 per EOP-6 ▪ Assists in diagnosing RCV-14 failure o Directs RO to minimize SCM by opening the PORV o Directs RO to control HPI flow • Directs start of RCS boration • Directs start of RCS cooldown with both OTSGs

Scenario may be terminated when SCM is minimized and a plant cooldown has commenced.

RULE 1, LOSS OF SCM

- ___ IF < 1 min has elapsed since losing adequate SCM, THEN immediately stop all RCPs.

- ___ IF RCPs were NOT stopped within 1 min, THEN ensure all operating RCPs remain running until any of the following exist:

  ___ SCM is restored

  ___ LPI flow > 1400 gpm in each injection line.

- ___ Progress toward a maximum allowable plant cooldown to achieve CFT and LPI flow as soon as possible.

- ___ Manually actuate ES.

- ___ Depress "HPI MAN ACT" push buttons on Trains A and B.

- ___ Depress "RB ISO MAN ACTUATION" push buttons on Trains A and B.

- ___ IF LPI has NOT actuated, AND RCS PRESS ≤ 300 psig, THEN depress "LPI MAN ACT" push buttons on Trains A and B.

- ___ Depress "ISCM" push buttons for EFIC channels A and B.

- ___ Ensure Tincore is selected on SPDS.

RULE 2, HPI CONTROL

- ___ IF HPI has actuated, THEN bypass or reset ES actuation.

1 ___ Obtain SRO concurrence to bypass or reset ES.

2 Bypass or reset ES actuation:

___ Auto

___ Manual

- ___ Open MUP recirc prior to throttling HPI flow < 200 gpm/pump.

- ___ IF recirc to MUT is desired, THEN open MUP recirc to MUT valves:

___ MUV-53	___ MUV-257

- ___ IF recirc to RB sump is desired, THEN open HPI recirc to sump valves:

___ MUV-543	___MUV-544
___ MUV-545	___ MUV-546

- ___ IF adequate SCM exists based, on Tincore, THEN throttle HPI to maintain required conditions.

- ___ Prevent exceeding NDT limit
- ___ IF OTSG isolated for TRACC, THEN maintain RCS PRESS <1000 psig.
- ___ IF PTS, SGTR, or dry OTSG exists, THEN maintain minimum adequate SCM.

- ___ IF adequate SCM can be maintained with 1 HPI pump, AND stopping second HPI pump is desired, THEN stop 1 HPI pump.

- ___ Ensure running HPI pump is aligned to MUT.

RULE 3, EFW/AFW CONTROL

- ___ Ensure available OTSGs are at or trending toward required level.

"LLL"	> 20 in
"NAT CIRC"	> 70%
"ISCM"	> 90%

- ___ IF manual control of EFW flow is desired,
  THEN establish manual EFIC control.

1 ___ Obtain SRO concurrence to place EFIC in manual.

2 ___ Control EFW to maintain required EFW flow and OTSG level.

3 ___ IF EFW flow is NOT controlled,
THEN depress EFIC channels A and B "MANUAL PERMISSIVE" push buttons and close affected EFW block valve.

- ___ IF adequate SCM does NOT exist,
  AND level in available OTSGs is NOT at or trending toward "ISCM" level,
  THEN establish manual required flow.

EFW	2 OTSGs	> 280 gpm in 1 line to each OTSG
	1 OTSG	> 470 gpm in 1 line to 1 OTSG
AFW	2 OTSGs	> 250 gpm to < 300 gpm/OTSG
	1 OTSG	> 450 gpm to < 600 gpm

- ___ IF adequate SCM exists,
  THEN throttle flow to prevent OTSG PRESS from lowering > 100 psig below desired PRESS.

- Do not allow OTSG level to lower.

RULE 4, PTS

- ___ IF any of the following exist:

  ___ Tincore < 400°F,
  AND cooldown rate
  exceeds ITS limit

  ___ RCPs off,
  AND HPI flow exists

  THEN perform required PTS actions.

- ___ Throttle HPI flow to minimize adequate SCM.
- ___ Throttle LPI flow to minimize adequate SCM.
- ___ PTS is applicable until an Engineering evaluation has been completed.

RULE 7, PZR LEVEL CONTROL

1 ___ IF PZR level is < PZR level band,
THEN restore PZR level.

PZR Level Band	
Rx at power > 20%	200 in to 240 in
Rx at power ≤ 20%	120 in to 200 in
Rx tripped	50 in to 120 in

- Cycle appropriate BWST to MUP valve to maintain MUT level ≥ 55 in:

___ MUV-73	___ MUV-58

- ___ Close MUV-49

---

2 ___ IF PZR level does NOT recover,
THEN establish manual HPI flow.

1 ___ Open MUV-24

2 ___ Notify SSO to evaluate Emergency Plan entry.

3 ___ IF PZR level does NOT recover,
THEN start second MUP and required cooling pumps.

[Rule 5, Diesel Load Control]

4 ___ IF PZR level does NOT recover,
THEN open additional HPI valves.

5 ___ IF PZR level does NOT recover,
THEN close MUP to MUT recircs:

___ MUV-53	___ MUV-257

---

3 ___ IF PZR level recovers,
THEN restore normal PZR conditions.

[Rule 2, HPI Control]

- ___ IF adequate SCM exists,
AND letdown is desired,
THEN **CONCURRENTLY PERFORM** EOP-14, Enclosure 4,
Letdown Recovery (if accessible).

Section 4.15 Recovery From Letdown Isolation (Reference) **[NOCS 000209]**

IF recovery is due to high temperature
THEN PROCEED to next step, ☐

IF NOT
THEN GO TO Step 0 ☐

IF MUDM-1A is in service,
THEN PERFORM the following:

ENSURE CLOSED the following:

- MUV-133 MUDM-1B Inlet ☐
- MUV-201 1A to 1B Series ☐
- MUV-116 MUDM-1A Outlet ☐

ENSURE OPEN the following:

- MUV-124 MUDM-1A Inlet ☐
- MUV-200 1B to 1A Series ☐
- MUV-117 MUDM-1B Outlet ☐

IF MUDM-1B is in service,
THEN PERFORM the following:

ENSURE CLOSED the following:

- MUV-124 MUDM-1A Inlet ☐
- MUV-200 1B to 1A Series ☐
- MUV-117 MUDM-1B Outlet ☐

ENSURE OPEN the following:

- MUV-133 MUDM-1B Inlet ☐
- MUV-201 1A to 1B Series ☐
- MUV-116 MUDM-1A Outlet ☐

ENSURE Block Orifice Isolation and Orifice Bypass are CLOSED:

ENSURE CLOSED the following:

- MUV-50 Block Orifice Isolation ☐
- MUV-51 Block Orifice Bypass ☐

ENSURE two Letdown Coolers are being supplied by SW,
AND Valve Alignment is arranged to cool letdown:

- MUHE-1A or MUHE-1C:
  - ENSURE OPEN SWV-47 ☐
  - ENSURE OPEN SWV-50 ☐
- MUHE-1B:
  - ENSURE OPEN SWV-48 ☐
  - ENSURE OPEN SWV-49 ☐

ENSURE a letdown flow path exists:

ENSURE at least 1 prefilter in service ☐
OR
MUV-194 is OPEN ☐

ENSURE at least 1 MU demin in service ☐
OR
MUV-126 is OPEN ☐
OR
Bypassed per Step 0 ☐
OR
Bypassed per Step 0 ☐

ENSURE at least 1 Post-Filter in service ☐
OR
MUV-100 is OPEN ☐

ENSURE letdown isolation valves are OPEN:

IF recovering from high temp,
THEN SELECT "MUV-49 HIGH TEMP BYPASS" switch to "BYPASS" ☐

OPEN MUV-49 ☐

ENSURE OPEN MUV-567 ☐

NOTE

Letdown (LD) Cooler 1C is NOT normally aligned for service whenever Coolers 1A and 1B are both available. Normally LD Cooler "1C" will have its SW outlet closed (SWV-691, RB entry required for opening) and its primary inlet (MUV-498) closed with electrical power removed.

IF it is desired to place "A" Letdown Cooler (MUHE-1A) in service,
THEN PERFORM the following:

ENSURE OPEN the following:

- SWV-47, SW Inlet ☐
- SWV-50, SW Outlet ☐

OPEN MUV-38, Cooler Inlet ☐

OPEN MUV-40, Cooler Outlet ☐

IF it is desired to place "B" Letdown Cooler (MUHE-1B) in service,
THEN PERFORM the following:

ENSURE OPEN the following:

- SWV-48, SW Inlet ☐
- SWV-49, SW Outlet ☐

OPEN MUV-39, Cooler Inlet ☐

OPEN MUV-41, Cooler Outlet ☐

NOTE

SW flow to Letdown (LD) Cooler 1C is set lower than LD Coolers 1A and 1B, therefore, letdown flow adjustments may be necessary to prevent high SW outlet temperatures.

IF either Letdown Cooler "A" or "B" can NOT be aligned for service,
OR it is required to remove Letdown Cooler "A" or "B" from service,
THEN PLACE Letdown Cooler "C" (MUHE-1C) in service as required:

THROTTLE OPEN SWV-691 1/2 turn ☐

ENSURE OPEN the following:

- SWV-47, SW Inlet ☐
- SWV-50, SW Outlet ☐

CLOSE breaker for MUV-498, Reactor MCC 3A1, Bkr. 1D ☐

OPEN MUV-498, Cooler Inlet ☐

ENSURE OPEN MUV-505, Cooler Outlet ☐

ESTABLISH desired letdown flow:

THROTTLE OPEN MUV-51 to 25 gpm and RAISE letdown flow 15 to 20 gpm each minute until desired flow is reached ☐

OPEN MUV-50, Block Orifice Isolation ☐

ADJUST MUV-51 for desired Letdown flow ☐

WHEN letdown temperature is < 130°F,
THEN SELECT "MUV-49 HIGH TEMP BYPASS" to "NORMAL ☐

IF MUDM-1A is to be returned to service,
THEN PERFORM the following:

ENSURE OPEN the following:

- MUV-124 MUDM-1A Inlet ..... ☐
- MUV-116 MUDM-1A Outlet ..... ☐

ENSURE CLOSED the following:

- MUV-133 MUDM-1B Inlet ..... ☐
- MUV-117 MUDM-1B Outlet ..... ☐
- MUV-200 1B to 1A Series ..... ☐
- MUV-201 1A to 1B Series ..... ☐
- MUV-126 MU Demin Bypass Valve ..... ☐

IF MUDM-1B is to be returned to service,
THEN PERFORM the following:

ENSURE OPEN the following:

- MUV-133 MUDM-1B Inlet ..... ☐
- MUV-117 MUDM-1B Outlet ..... ☐

ENSURE CLOSED the following:

- MUV-124 MUDM-1A Inlet ..... ☐
- MUV-116 MUDM-1A Outlet ..... ☐
- MUV-200 1B to 1A Series ..... ☐
- MUV-201 1A to 1B Series ..... ☐
- MUV-126 MU Demin Bypass Valve ..... ☐

END OF SECTION

ENCLOSURE 1 CONTROL COMPLEX EMERGENCY VENTILATION AND COOLING

ACTIONS	DETAILS
1.1 ___ Verify ES MCC 3AB is energized.	
___ IF ES MCC 3AB is NOT energized, THEN energize ES MCC 3AB.	1 ___ IF energized ES 480V Bus is powered from Diesel, THEN ensure Diesel load is ≤ 2975 KW. 2 ___ Depress transfer push button for ES MCC 3AB to energized bus.

NOTE

A Train is preferred if ES has actuated with B ES 4160V Bus powered by B ES Diesel.

1.2 ___ IF CC ventilation will be powered by a Diesel, THEN verify Diesel load is < Max Allowable Load.

ES Diesel Max Allowable Load (BSP running)	3280 KW
ES Diesel Max Allowable Load (BSP shutdown)	2960 KW
Alternate AC Diesel Max Allowable Load	3280 KW
A ES Diesel Load	_____ KW
B ES Diesel Load	_____ KW
Alternate AC Diesel Load	_____ KW

ACTIONS		DETAILS
1.3	___ Align CC ventilation in recirc.	• Select "CONTROL COMPLEX HVAC ISOLATE/RESET" switches to "ISO": ___ A Train ___ B Train

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1.4	___ Verify CC isolation dampers are closed.	___ AHD-12 ___ AHD-12D ___ AHD-2C ___ AHD-2E ___ AHD-1C ___ AHD-1E

ACTIONS

DETAILS

1.5 ___ Ensure CC ventilation fans are shut down.

1 Stop Control Complex Return Fans:

A Train	B Train
___ AHF-19A	___ AHF-19B

2 Stop Control Complex Normal Duty Supply Fans:

A Train	B Train
___ AHF-17A	___ AHF-17B

NOTE

A Train is preferred if ES has actuated with B ES 4160V Bus powered by B ES Diesel.

1.6 ___ Start 1 train of CC ventilation in emergency recirc.

1 Start Control Complex Emergency Duty Supply Fans:

A Train	B Train
___ AHF-18A	___ AHF-18B

2 Start Control Complex Return Fans:

A Train	B Train
___ AHF-19A	___ AHF-19B

ACTIONS	DETAILS
1.7 ___ Ensure 1 EFIC fan is running.	• ___ IF starting AHF-54A, THEN perform the following: ___ Select "TEMP CONT. VV, CHV-113" switch to "MOD" position. ___ Start AHF-54A • ___ IF starting AHF-54B, THEN perform the following: ___ Select "TEMP CONT. VV, CHV-100" switch to "MOD" position. ___ Start AHF-54B
1.8 ___ Establish ventilation for chemistry sampling.	• Start 1 train of ventilation:

A Train	B Train
___ AHF-20A in "SLOW"	___ AHF-20B in "SLOW"
___ AHF-44A	___ AHF-44B
___ AHF-30 (if available)	

ACTIONS	DETAILS

1.9 ___ IF all the following exist:

___ CC chiller running

___ Ventilation trains have NOT been shifted

THEN **EXIT** this enclosure.